

**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, 2021

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: 001-35527

Emmaus Life Sciences, Inc.

(Exact name of Registrant as specified in its charter)

Delaware
(State or Other Jurisdiction of
Incorporation or Organization)

2834
(Primary Standard Industrial
Classification Code Number)

87-0419387
(I.R.S. Employer
Identification No.)

21250 Hawthorne Boulevard, Suite 800, Torrance, California 90503
(Address of principal executive offices, including zip code)

(310) 214-0065
(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
None		

Securities Registered Pursuant to Section 12(g) of the Act:

Title of class
Common stock, par value \$0.001 per share
Warrants to purchase common stock

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

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

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

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

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

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input checked="" type="checkbox"/>
Emerging growth company	<input type="checkbox"/>		

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

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 shares of common stock held by non-affiliates of the registrant as of June 30, 2021, the last business day of the registrant's most recently completed second fiscal quarter, was \$49,132,089 based upon the closing price of the common stock as reported on the OTC Pink.

There were 49,311,864 shares of common stock outstanding as of March 15, 2022.

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CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report contains some statements that are not purely historical and that are considered “forward-looking statements” within the meaning of Section 27A of the Securities Act of 1933, as amended, which we refer to as the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, which we refer to as the Exchange Act. Such forward-looking statements express our management’s expectations, beliefs, and intentions regarding the future. The words “anticipates,” “believes,” “continue,” “could,” “estimates,” “expects,” “intends,” “may,” “might,” “plans,” “possible,” “potential,” “predicts,” “projects,” “seeks,” “should,” “will,” “would” and similar expressions and variations, or comparable terminology, or the negatives of any of the foregoing, may identify forward-looking statements, but the absence of these words does not mean that a statement is not forward-looking.

The forward-looking statements contained in this Annual Report are based on current expectations and beliefs concerning future developments that are difficult to predict. We cannot guarantee future performance, or that future developments affecting our company will be those currently anticipated. These forward-looking statements involve risks, uncertainties (some of which are beyond our control) or assumptions that may cause actual results or performance to be materially different from those expressed or implied by these forward-looking statements, including the factors referenced in this Annual Report under the sections entitled “Business,” “Risk Factors” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

All forward-looking statements attributable to us are expressly qualified in their entirety by these risks and uncertainties, and you should not place undue reliance on any forward-looking statement. We undertake no obligation to update or revise any forward-looking statement, except as may be required under applicable securities laws.

RISK FACTOR SUMMARY

Following is a summary of certain material risks and uncertainties facing our business. This summary is not a complete discussion of the risk and uncertainties affecting us. A more complete discussion of these and other risks and uncertainties is set forth under “Risk Factors” in Part I, Item 1A of this Annual Report. Additional risks not presently known to us or that we presently deem immaterial may also affect us. If any of these risks occur, our business, financial condition or results of operations could be materially and adversely affected.

Risks Related to Our Business

We have operated at a loss and may continue to operate at a loss for the foreseeable future.

We are dependent on financing to sustain our operations, and there is substantial doubt regarding our ability to continue as a going concern

We are dependent on the commercial success of our only approved product, Endari®.

We face intense competition from companies with greater resources than us, and if our competitors are successful in marketing or developing alternative treatments, our commercial opportunities may be reduced or eliminated.

The majority of Endari® sales are to a few customers and loss of a customer could adversely affect our results of operations.

The market exclusivity for Endari® for sickle cell disease (“SCD”) in the U.S. is limited and Endari® will have no market exclusivity in the United Arab Emirates, where it was recently approved for marketing, or other countries in the Middle East North Africa (MENA) region where applications for marketing approval are pending, which lack of exclusivity could adversely affect the commercial success of Endari®.

A variety of risks associated with marketing Endari® internationally could hurt our business.

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

The use of any of our product candidates in clinical trials and in the market may expose us to liability claims.

We will need to increase the size and complexity of our organization in the future, and we may experience difficulties in hiring qualified personnel and executing our growth strategy.

Historical material weaknesses in our internal controls over financial reporting have not been fully remediated.

Our business may be adversely impacted by the consequences of Russia's invasion of Ukraine.

Risks Related to Our Intellectual Property

We may not be able to obtain and enforce intellectual property rights that cover our commercial activities or are sufficient to prevent third parties from competing against us.

Risks Related to Regulatory Oversight of Our Business and Compliance with Law

Endari® is subject to ongoing and continued regulatory review, compliance with which may result in significant expense and limit our ability to commercialize Endari®.

We may not be able to receive regulatory approvals for our prescription grade L-glutamine treatment for diverticulosis or other indications, which would adversely affect our prospects.

The development process to obtain regulatory approval for new drug therapies is very costly and time consuming and if we cannot complete our clinical trials in a cost-effective manner, our operations may be adversely affected.

If we fail to comply with federal and state healthcare laws, including fraud and abuse and health information privacy and security laws, we could face substantial penalties and our business, results of operations, financial condition and prospects could be adversely affected.

Even though we have obtained Orphan Drug designation for Endari®, we may not be able to maintain Orphan Drug marketing exclusivity for Endari® or any of our product candidates.

Risks Related to Our Investment in EJ Holdings, Inc.

EJ Holdings has no revenues and is dependent on us to fund its business and operations, and there is no assurance that we can continue to provide needed funding or that EJ Holdings will be able to continue its activities.

If EJ Holdings fails to reactivate its plant and obtain customers, it may not be able to sell its plant and property if necessary and we may lose our investment.

EJ Holdings is subject to risks inherent in a new business and may not be successful.

Risks Related to Our Securities

Trading on the OTC Markets is volatile and sporadic, which could depress the market price of our common stock and make it difficult for our stockholders to resell their common stock.

Stockholders may experience future dilution from future equity offerings.

Our common stock is not traded on a national securities exchange, which may adversely affect our ability to raise needed financing.

We may effect a reverse stock split of our common stock, but it may not result in the intended benefits.

PART I

ITEM 1. BUSINESS

In this Annual Report, the terms, “we,” “us,” “our” or the “Company” refer to Emmaus Life Sciences, Inc., and its subsidiaries.

Overview

Endari®

We are a commercial-stage biopharmaceutical company engaged in the discovery, development, marketing and sale of innovative treatments and therapies, primarily for rare and orphan diseases. Our lead product, Endari® (prescription grade L-glutamine oral powder) is approved by the U.S. Food and Drug Administration, or FDA, to reduce the acute complications of sickle cell disease (“SCD”) in adult and pediatric patients five years of age and older. Endari® has received Orphan Drug designation from the FDA and Orphan Medicinal designation from the European Commission, which designations afford marketing exclusivity for Endari® for a seven-year period in the U.S. and ten-year period in the European Union, respectively, following marketing approval.

Endari® is marketed and sold in the U.S. by our internal commercial sales team. Endari® is reimbursable by the Centers for Medicare and Medicaid Services, and every state provides coverage for Endari® for outpatient prescriptions to all eligible Medicaid enrollees within their state Medicaid programs. Endari® is also reimbursable by many commercial payors. We have agreements in place with the nation’s leading distributors, as well as physician group purchasing organizations and pharmacy benefits managers, making Endari® available at selected retail and specialty pharmacies nationwide.

SCD is a rare, debilitating and lifelong hereditary blood disorder that affects approximately 100,000 patients in the U.S. and up to 25 million patients worldwide, the majority of which are of African descent. Approximately one in every 365 African-American children are born with SCD. The FDA’s approval of Endari® was based upon the results of a 48-week randomized, double-blind, placebo-controlled, multi-center Phase 3 clinical trial evaluating the effects of Endari®, as compared to placebo in 230 adults and children with SCD. The results demonstrated that Endari® reduced the frequency of sickle cell crises by 25% and hospitalizations by 33%. Additional findings included a 41% decrease in cumulative hospital days and greater than 60% fewer incidents of acute chest syndrome in patients treated with Endari®. The FDA has acknowledged that the clinical benefit of Endari® was observed irrespective of hydroxyurea use, which supports the use of Endari® as a monotherapy or in combination with hydroxyurea as safe and effective treatment options for patients with SCD.

The safety of Endari® was based upon data from 298 patients, 187 treated with Endari® and 111 patients treated with placebo in Phase 2 and Phase 3 studies. Endari®’s safety profile was similar to the placebo and Endari® was well-tolerated in pediatric and adult patients alike. The most common adverse reactions, occurring in more than 10% of patients treated with Endari®, were constipation, nausea, headache, abdominal pain, cough, pain in extremity, back pain, and chest pain (non-cardiac).

The following table summarizes our product pipeline:

Emmaus ID	Preclinical	Phase 1	Phase 2	Phase 3	Commercial	Description
ELS001/ELS007	[Green bar spanning Preclinical, Phase 1, Phase 2, Phase 3, and Commercial]					Pharmaceutical grade L-glutamine to treat SCD (Endari)
ELS004	[Green bar spanning Preclinical, Phase 1, and Phase 2]					Pharmaceutical grade L-glutamine to treat diverticulosis
ELS005	[Green bar in Preclinical]					Use of KM10544 and combination of to treat blood cancers
ELS003	[Green bar in Preclinical]					Lab device/research tool to measure transmittance of cell sheet
ELS002	[Green bar in Preclinical]					Chondrocyte cell sheet technology to replace knee cartilage replacement or to treat osteoarthritis

Diverticulosis

On July 4, 2018, the FDA acknowledged receipt of our investigational new drug application, or IND, for the treatment of diverticulosis using the same prescription grade L-glutamine oral powder (“PGLG”) used in Endari®. We subsequently received a “Study May Proceed” letter from the FDA. In April 2019, we commenced a Pilot/Phase 1 study of the safety and efficacy of PGLG oral powder in diverticulosis. The study will evaluate the change in the number and size of colonic diverticula and assess safety in a total of up to 10 to 15 patients at multiple study sites. The COVID-19 pandemic interrupted the progress of clinical trials in the pharmaceutical industry, in general, and our Pilot/Phase 1 study was temporarily interrupted. On August 5, 2020, we announced preliminary top-line data for two patients who had most recently completed the first six months of the scheduled twelve months of treatment in the pilot study of diverticulosis. In each of these patients, the investigator noted the appearance of healthier mucosa with pinkish coloration compared to the baseline. Subsequently, we have collected data on 2 more patients who completed the first 6 months of treatment. There were 100% and 50% disappearance of diverticula in their sigmoid colon in each of these subjects respectively. Unlike earlier patients, these patients were monitored with video capture support, instead of still photo monitoring. There were no safety concerns reported by the patients.

Based upon the data from the initial study, in July 2021 a sub-study was initiated by an amendment to the original IND protocol. The purpose of the sub-study rationale is to standardize data collection and recording using video capture to support the accurate assessment of any changes in the sigmoid colon, the most frequent site for diverticulosis, as well as diverticulitis, a more severe manifestation of diverticulosis. The sub-study objective is to provide additional safety and efficacy data to support further clinical development. The sub-study colonoscopy procedures will be assessed by a central medical monitor in addition to the treating investigator. For the sub-study, at least five patients will be administered oral L-glutamine 15g BID over six months. Patient enrollment was completed in December 2021.

Oncology Project

On October 7, 2021, we entered into a License Agreement with Kainos Medicine, Inc., a South Korean corporation (“Kainos”), under which Kainos has granted us an exclusive license in the territory encompassing the U.S., the U.K. and the EU to patent rights, know-how and other intellectual property relating to Kainos’s novel IRAK4 inhibitor, referred to as KM10544, for the treatment of cancers, including leukemia, lymphoma, and solid tumor cancers. Based upon the positive pre-clinical results, we intend to conduct further testing *in vivo* to evaluate KM10544’s toxicity and efficacy against targeted cancers, including acute myeloid leukemia and Waldenstrom Macroglobulinemia.

Chondrocyte Cell Sheet Technology

We have developed chondrocyte and osteoblast “cell sheets” using human mesenchymal stem cells and are conducting pre-clinical studies to assess the potential of the cell sheets to articular cartilage injury, osteoarthritis and other cartilage-related conditions and bone diseases such as osteoarthritis, nonunion and Paget’s disease. A cell sheet is a composite of cells grown and harvested in an intact sheet, rather than as individual cells, and can be used for tissue transplantation or to engineer complex multilayer cell sheets composed of different types of cells. Cell sheets offer several potential advantages over existing treatment options, including reduced chemical toxins needed during cell sheet generation, easier and more convenient cell coverage of the injured tissue, and allogeneic (*i.e.*, use of stem cells from one individual in another individual) transplantation.

Cultured Autologous Oral Mucosal Epithelial Cell Sheets (CAOMECS)

An Emmaus-led team at The Lundquist Institute, or TLI, an independent non-profit biomedical research organization academically affiliated with the David Geffen School of Medicine at University of California, at Los Angeles that works in partnership with Harbor-UCLA Medical Center, is conducting pre-clinical studies of Cultured Autologous Oral Mucosal Epithelial Cell Sheet, or CAOMECS technology. Our lead CAOMECS program is for the treatment of corneal diseases.

Device Measuring Cell Sheets Transparency

We also have developed a device for measuring the thickness and maturity of biological cell cultures for harvesting of cell sheets, as well as the number and transparency of cells present in one or more cell sheets of the biological cell cultures. This device is a potentially essential tool for quality control in the growing field of cell sheet translational medicine. The potential application of this device includes assessment of the transparency of donor’s cornea before transplantation. Currently, there is no objective method to assess the donor’s cornea transparency to understand compatibility with a healthy cornea one. We have filed a patent application in the U.S. for this technology and are in the process of improving the device. We may seek a potential partner to develop or commercialize the device.

Summary of Pipelines Products

The development of our potential anti-cancer treatments, cell sheet technologies including chondrocyte cell sheets for treating bone related conditions and CAOMECS for treating corneal and other diseases are in the early stages.

Recent Highlights

In March 2022, we received approval for marketing of Endari to treat SCD from the United Arab Emirates (U.A.E.) Ministry of Health.

In December 2021, we announced that data on Endari had been accepted for a poster presentation at the 63rd American Society of Hematology Annual Meeting and Exhibition.

In November 2021, we entered into an agreement with Asembia to provide expanded patient support services and announced a partnership with UpScript IP Holdings, LLC to provide telehealth solutions to SCD patients.

In October 2021, we entered into an exclusive license agreement with Kainos under which we acquired patent rights and other intellectual property to Kainos’ novel IRAK4 inhibitor in the U.S., the U.K. and the EU and announced the submission of an Application for Marketing Authorization for Endari in the United Arab Emirates.

In August 2021, we announced that Texas added Endari to its latest preferred drug list and that the National Health Regulatory Authority of the Kingdom of Bahrain approved a Temporary License for Importation of Pharmaceutical Product for Endari®.

In July 2021, we submitted an Endari Marketing Authorization Application in Kuwait

In May 2021, we submitted a Marketing Authorization Application for *Endari*® to the Saudi Food & Drug Authority.

In March 2021, we entered into an agreement with Kainos Medicine, Inc. (“Kainos”) to lead the preclinical development of Kainos’ patented IRAK4 inhibitor (KM10544) as an anti-cancer drug and further advance the research and development activity underway at Kainos.

Sickle Cell Disease—Market Overview

Sickle cell disease (“SCD”) is a genetic blood disorder that affects 20 million - 25 million people worldwide and occurs with increasing frequency among those whose ancestors are from regions including sub-Saharan Africa, South America, the Caribbean, Central America, the Middle East, India and Mediterranean regions such as Turkey, Greece and Italy. The U.S. Centers for Disease Control and Prevention estimates that there are as many as 100,000 people with SCD in the United States, and we estimate there are approximately 80,000 SCD sufferers in the EU. We estimate that there are over 100,000 SCD patients that could potentially be treated in the Persian Gulf States, as well as patients in other countries that comprise the Middle East and North Africa (“MENA”) region.

SCD is characterized by the production of an altered form of hemoglobin which polymerizes and becomes fibrous, causing the red blood cells of patients with SCD to become sickle-shaped, inflexible and adhesive rather than round, smooth and flexible. These changes also lead to increased oxidant stress and much damage to the membrane of red blood cells. It also causes increased adhesiveness of red blood cells. The complications associated with SCD occur when these inflexible and sticky cells block, or occlude, small blood vessels, which can then cause severe and chronic pain throughout the body due to insufficient oxygen being delivered to tissue, or ischemia, and inflammation. According to an article in *Annals of Internal Medicine*, “*In the Clinic: Sickle Cell Disease*” by M.H. Steinberg (September 2011), which we refer to as the Steinberg Article, this leads to long-term organ damage, diminished exercise tolerance, increased risk of stroke and infection and decreased lifespan.

Sickle cell crisis, a broad term covering a range of disorders, is one of the most devastating complications of SCD. Types of sickle cell crisis include:

- *Vaso-occlusive crisis*, characterized by obstructed blood flow to organs such as the bones, liver, kidneys, eyes or central nervous system;
- *Aplastic crisis*, characterized by acute anemia typically due to viral infection;
- *Hemolytic crisis*, characterized by accelerated red blood cell death and reduced hemoglobin;
- *Splenic sequestration crisis*, characterized by painful enlargement of the spleen due to trapped red blood cells; and
- *Acute chest syndrome*, a potentially life-threatening obstruction of blood supply to the lungs characterized by fever, chest pain, cough, and lung infiltrates.

According to the Steinberg Article referred to above, acute chest syndrome affects more than half of all patients with SCD and is a common reason for hospitalization. Other symptoms and complications of SCD include swelling of the hands and feet, infections, pneumonia, vision loss, leg ulcers, gall stones and stroke.

A crisis is characterized by excruciating musculoskeletal pain, visceral pain and pain in other locations. These crises occur periodically throughout the life of a person with SCD. In adults, the acute pain typically persists for five or ten days or longer, followed by a dull, aching pain generally ending only after several weeks and sometimes persisting between crises. According to the Steinberg Article, the frequency of sickle cell crises varies within patients with SCD from rare occurrences to occurrences several times a month. The frequency of crises tends to increase late in the second decade of life and to decrease after the fourth decade.

Treatment of sickle cell crises is burdensome and expensive for patients and payors, as it encompasses costs for hospitalization, urgent care and emergency room visits and prescription pain medication. Endari® enhances nicotinamide adenine dinucleotide (“NAD”) synthesis to reduce excessive oxidative stress in sickle red blood cells, which is the cause of much of the damage leading to characteristic symptoms of SCD. We believe that Endari®, when taken daily, will decrease the incidence of sickle cell crisis by restoring the flexibility, fluidity and function of red blood cells in patients with SCD. We believe that regular use of Endari® also will reduce the number of costly hospitalizations of patients with SCD, as well as unexpected urgent care and emergency room visits.

Limitations of the Current Standard of Care

Prior to the approval of Endari®, the only other FDA approved pharmaceutical targeting sickle cell crisis was hydroxyurea, which is available in both generic and branded formulations. Hydroxyurea, a drug originally developed as an anticancer chemotherapeutic agent, has been approved as a once-daily oral treatment for reducing the frequency of sickle cell

crisis and the need for blood transfusions in adult patients with recurrent moderate to severe sickle cell crisis. In December 2017, the FDA granted Addmedica a regular approval for hydroxyurea (Siklos) to reduce the frequency of painful crises and the need for blood transfusions in pediatric patients two years of age and older with sickle cell anemia with recurrent moderate to severe painful crises. While hydroxyurea has been shown to reduce the frequency of sickle cell crisis in some patient groups, it is not suitable for many patients due to significant toxicities and side effects. In particular, hydroxyurea can cause a severe decrease in the number of blood cells in a patient's bone marrow, which may increase the risk that the patient will develop a serious infection or bleeding, or that the patient will develop certain cancers. Another potential treatment option for SCD, bone marrow transplant, is limited in its use due to the lack of availability of matched donors and the risk of serious complications, including graft versus host disease, infection and potentially death, as well as by its high cost.

Two new treatments for sickle cell disease were approved by the FDA at the end of 2019. Crizanlizumab, marketed under the brand name of Adakveo® by Novartis AG, is a humanized monoclonal antibody that binds to P-selectin. It is approved by the FDA to reduce the frequency of vaso-occlusive crises in adults and pediatric patients aged 16 years and older with SCD. It is administered intravenously in two loading doses two weeks apart and every four weeks thereafter. Voxelotor, marketed under the brand name of Oxbryta™ by Global Blood Therapeutics, Inc., is an HbS polymerization inhibitor that reversibly binds to hemoglobin to stabilize the oxygenated hemoglobin state, thus shifting the oxyhemoglobin dissociation curve. Voxelotor is approved by the FDA for the treatment of SCD in adults and pediatric patients 12 years of age and older. In December 2021, the FDA granted accelerated approval for Oxbryta to treat SCD in pediatric patients aged 4 to less than 12 years.

Upon onset of sickle cell crisis, the current standard of care is focused on pain management, often with prescription narcotics or non-prescription oral medications taken at home. If the pain is not relieved, or if it progresses, patients may seek medical attention in a clinic or emergency department. Pain that is not controlled in these settings may require hospitalization for more potent pain medications, typically opioids administered intravenously. The patient must stay in the hospital to receive these intravenous pain medications until the sickle cell crisis resolves and the pain subsides. Other supportive measures during hospitalization may include hydration, supplemental oxygen and treatment of any concurrent infections or other conditions.

According to *Hematology in Clinical Practice*, by Robert S. Hillman et. al. (5th ed. 2011), sickle cell crisis, once it has started, almost always results in tissue damage at the affected site in the body, increasing the importance of preventative measures. While pain medications can be effective in managing pain during sickle cell crisis, they do not affect or resolve the underlying vascular occlusion, tissue ischemia or potential tissue damage. Additionally, opioid narcotics that are generally prescribed to treat pain can also lead to tissue or organ damage and resulting complications and morbidities, prolonged hospital stays and associated continuation of pain and suffering. Given the duration and frequency of sickle cell crises, addiction to these opioid narcotics is also a significant concern.

Endari®, Our Solution for SCD

We believe Endari® may provide a safe and effective means for reducing the frequency of sickle cell crises in patients with SCD and the need for costly hospital stays or treatment with highly addictive pain medications such as opioid narcotics. Published academic research has identified L-glutamine as a precursor to NAD, one of the major molecules that regulate and prevent oxidative damage in red blood cells. Several published studies have demonstrated that sickle red blood cells have a significantly increased rate of transport of L-glutamine, which appears to be driven by the cells' synthesis of NAD to protect against oxidative damage and thereby leading to further improvement in their regulation of oxidative stress. In turn this makes sickle red blood cells less adhesive to cells of the interior wall of blood vessels, which suggests that there is decreased chance of blockage of blood vessels, especially small ones. In summary, improved regulation of oxidative stress appears to lead to less obstruction or blockage of small blood vessels, thereby alleviating a major cause of the pain and other problems associated with SCD.

In December 2013, we completed a Phase 3 prospective, randomized, double blind, placebo controlled, parallel group multicenter clinical trial to measure, over a 48-week time frame, as its primary outcome, the reduction in the number of occurrences of sickle cell crises experienced by patients in the trial. All participants other than those who received placebo, including children, received up to 30 grams of Endari® daily, dissolved in liquid, split between morning and evening; the same dosage as our Phase 2 clinical trial completed in 2009. Patients were randomized to the study treatment using a 2:1 ratio of Endari® to placebo. The randomization was stratified by investigational site and hydroxyurea usage.

The clinical trial evaluated the efficacy and safety of Endari® in 230 patients (5 to 58 years of age) with sickle cell anemia or sickle β^0 -thalassemia who had 2 or more painful crises within 12 months prior to enrollment. Eligible patients stabilized on hydroxyurea for at least 3 months continued their therapy throughout the study. The trial excluded patients who

had received blood products within 3 weeks, had renal insufficiency or uncontrolled liver disease, or were pregnant (or planning pregnancy) or lactating. Study patients received Endari® or placebo for a treatment duration of 48 weeks followed by 3 weeks of tapering.

Efficacy was demonstrated by a reduction in the number of sickle cell crises through Week 48 and prior to the start of tapering among patients that received Endari® compared to patients who received placebo. A sickle cell crisis was defined as a visit to an emergency room/medical facility for sickle cell disease-related pain which was treated with a parenterally administered narcotic or parenterally administered ketorolac. In addition, the occurrence of acute chest syndrome, priapism, and splenic sequestration were considered sickle cell crises. Treatment with Endari® also resulted in fewer hospitalizations due to sickle cell pain at Week 48, fewer cumulative days in hospital, longer time until first sickle cell crisis and a lower incidence of acute chest syndrome.

Table 1. Results from the Endari® Clinical Trial in Sickle Cell Disease

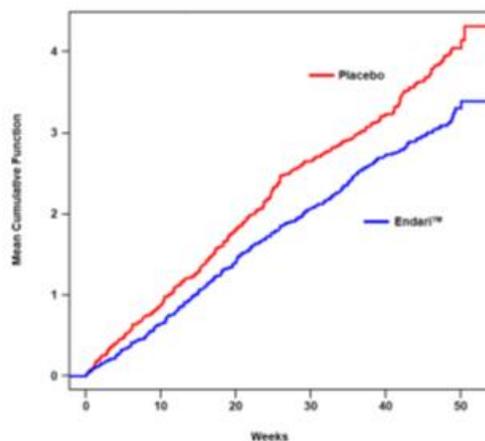
Event	Endari (n = 152)	Placebo (n = 78)
Median number of sickle cell crises (min, max) ¹	3 (0, 15)	4 (0, 15)
Median number of hospitalizations for sickle cell pain (min, max) ¹	2 (0, 14)	3 (0, 13)
Median cumulative days hospitalized (min, max) ¹ ,	6.5 (0, 94)	11 (0, 187)
Median time (days) to first sickle cell crisis (95% CI) ^{1,2}	84 (62, 109)	54 (31, 73)
Patients with occurrences of acute chest syndrome (%) ¹	13 (8.6%)	18 (23.1%)

1. Measured through 48 weeks of treatment.

2. Hazard Ratio=0.69 (95% CI=0.52, 0.93), estimated based on unstratified Cox's proportional model. Median time and 95% CI were estimated based on the Kaplan Meier method.

The recurrent crisis event time analysis (Figure 1) yielded an intensity rate ratio (IRR) value of 0.75 with 95% CI= (0.62, 0.90) and (0.55, 1.01) based on unstratified models using the Andersen-Gill and Lin, Wei, Yang and Ying methods, respectively in favor of Endari®, suggesting that over the entire 48- week period, the average cumulative crisis count was reduced by 25% from the Endari® group over the placebo group.

Figure 1. Recurrent Event Time for Sickle Cell Crises by Treatment Group



Endari® was studied in 2 placebo-controlled clinical trials (a phase 3 study, n=230 and a phase 2 study, n=70). In these trials, patients with sickle cell anemia or sickle β0-thalassemia were randomized to receive Endari® (n=187) or placebo (n=111) orally twice daily for 48 weeks followed by 3 weeks of tapering. Both studies included pediatric and adult patients (5-58 years of age) and 54% were female.

Treatment discontinuation due to adverse reactions was reported in 2.7% (n=5) of patients receiving Endari®. These adverse reactions included one case each of hypersplenism, abdominal pain, dyspepsia, burning sensation, and hot flash.

Commercialization and Distribution

United States

Our in-house commercial team encompasses marketing, market access, patient support, and distribution support personnel. The sales team consists of sales representatives, sales management, and a National Sales Director. In February 2019 we established a Commercial Patient Assistance Program (C- PAP) to provide financial assistance to eligible patients who are unable to afford their monthly co-payments for Endari®. On December 8, 2020, we announced the launch of the Endari® Patient Support Program to provide eligible patients access to Endari® where appropriate.

Our sales and marketing efforts focus on the following groups: pediatric and adult hematologists who treat SCD patients with sickle cell disease, Community Based Organizations, or CBOs, government payors, insurance companies, and pharmacy benefit managers. SCD patients are primarily treated at specialized clinics located in children's hospitals, university hospitals and community-based out-patient locations. The current focus of our sales team is as follows:

- educating prescribers and CBOs on the approved use and benefits of Endari®; and
- establishing collaborative relationships with CBOs and patient support groups that focus on SCD education and patient advocacy in their respective communities.

We have contracted with AmerisourceBergen Specialty Group (ASD Healthcare LLC and US Bioservices Corporation), AmerisourceBergen Corporation companies, McKesson Plasma and Biologics LLC, a McKesson Corporation company, and Cardinal Health 108, LLC, a Cardinal Health Inc. company, to distribute Endari® to selected pharmacies and hospitals. AmerisourceBergen Corporation, McKesson Corporation and Cardinal Health, Inc. are the three largest specialty distributors of prescription drugs in the U.S.

Our two largest distributors, ASD Healthcare LLC and McKesson Plasma and Biologics LLC, each account for more than 20% of units sold for the year ended December 31, 2021. On a combined basis, these distributors accounted for approximately 79% of our units sold in 2021.

Outside the United States

In July 2012, the European Commission, or EC, granted Orphan Drug Designation status in the European Union, or EU, for our prescription grade L-glutamine oral powder, to be known as Xyndari™ in the EU, for the treatment of SCD. In January 2018, the European Medicines Agency, or EMA, provided their agreement on the pediatric investigation plan, or PIP, for Xyndari™ and we filed with the EMA an application for marketing authorization, or MAA, in the EU. In May 2019, we announced that the EMA's Committee for Medicinal Products for Human Use, or CHMP, adopted a negative opinion regarding our MAA based upon the CHMP's position that our main clinical study did not conclusively support the efficacy of the treatment in SCD patients, although no safety concerns were raised. In light of the CHMP's opinion, we withdrew our MAA in September 2019 to consider pursuing alternative decentralized and centralized regulatory pathways for obtaining marketing authorization in an effort to ensure access to Xyndari™ for patients afflicted by SCD.

We tentatively plan to convert and update our MAA or our FDA New Drug Application, or NDA, for both the UK national submission and for either a centralized procedure in the EU or separate national submissions in the EU. With Brexit in place, we will assess our overall data package and determine strategies for engagement with the U.K.'s Medicines and Healthcare Products Regulatory Agency, or MHRA, to determine the need for a pre-submission meeting for Xyndari™ in the U.K. We expect to provide an update in the second half of 2022 on our plans in this regard.

On November 10, 2020, we announced the submission of a temporary license application for Endari® to the National Health Regulatory Authority in the Kingdom of Bahrain as a prerequisite for marketing authorization there. The temporary license was approved on August 12, 2021, which allows Endari® to be prescribed in the Kingdom pending marketing authorization. During 2021, we submitted marketing authorization applications in the Kingdom of Saudi Arabia, Kuwait, and the United Arab Emirates. In August 2021, the National Health Regulatory Authority of the Kingdom of Bahrain approved a Temporary License for Importation of Pharmaceutical Product for Endari®.

We have entered into exclusive distribution agreements with strategic partners to register, commercialize and distribute Endari® in the Gulf Cooperation Council countries and other countries throughout the MENA region in collaboration with our branch office in Dubai.

We also are party to an exclusive early access agreement with a strategic partner in the EU pursuant to which our partner distributes Endari® on an early access basis only in France and certain other EU member states. We also are in talks with potential strategic partners in other countries to establish similar early access programs while we consider seeking marketing authorization in one of more of such countries.

We also may seek future collaborations with other pharmaceutical or biotechnology companies and identify potential licensees and other international opportunities to commercialize Endari®, if approved by foreign regulatory authorities.

Diverticulosis

Diverticulosis, or the presence of colonic diverticula (*i.e.*, pouches in the colon wall), is very common in industrialized nations, with its prevalence increasing with age. An estimated 40% of 60 year-olds and 70% of 80 year-olds have diverticulosis. Of these individuals, 10% to 25% are expected to develop diverticulitis, or the advancement of peridiverticular inflammation and infection, resulting in abdominal pain, nausea, vomiting, constipation, diarrhea, fever, and leukocytosis.

The pathogenesis of diverticulosis is believed to result from structural abnormalities of the colonic wall, disordered motility and low fiber diets. The relationships between glutamine and intestinal physiology have been extensively studied in ulcerative colitis and Crohn's disease, short bowel syndrome and as a nutritional therapy for critical illnesses. Overall, glutamine elicits the following mechanisms of action within intestinal cells: promotion of enterocyte proliferation, regulation of tight junction proteins; suppression of pro-inflammatory signaling pathways; suppression of intestinal cell apoptosis and cellular stress; and microbiome regulation. Glutamine also helps to maintain intestinal tissue integrity through various signaling pathways.

See the discussion above of our Pilot/Phase 1 study of the safety and efficacy of prescription grade L-glutamine oral powder in diverticulosis.

We are party to a distributor agreement with Telcon RF Pharmaceutical, Inc., or Telcon pursuant to which we granted Telcon exclusive rights to our PGLG oral powder for the treatment of diverticulosis in South Korea, Japan and China. The agreement contemplates that Telcon will be responsible at its expense for obtaining marketing authorization assuming FDA approval is obtained and for all other commercial activities in the territories. In exchange for the exclusive rights, Telcon paid us a \$10 million upfront fee, which is refundable in the event of termination of the distributor agreement for failure to obtain FDA approval. See the "Raw Materials and Manufacturing," below, for more information on our arrangements with Telcon.

Oncology Project

On October 7th, 2021, we licensed a small molecule (KM10544) targeting IRAK4 signaling pathway to treat leukemia and lymphomas. Leukemia is a cancer of blood-forming tissue causing high variation of its manifestation and therefore requiring many different treatment options. While there has been increase in survival rate by seven years from treatment of younger patient population (*i.e.*, less than 60 years) since 1970, the survival rate has increased only one year for patients older than 60 years. Waldenstrom macroglobulinemia (WM) is a rare blood cancer that accounts for 1% to 2% of all hematological malignancies. In the U.S., around 1000 to 5000 new cases are detected each year. Many of the WM patients are asymptomatic making it difficult to detect and treat WM in its early stages.

We are conducting pre-clinical studies to assess KM10544's efficacy in two cancer cell lines, acute myeloid leukemia and Waldenstrom macroglobulinemia. In *in vitro* studies, KM10544 suppressed the proliferation and also induced apoptosis (cell death) in both cancer cell lines. Further, *in vitro* studies indicated that KM-10544 had minimal toxic effects on healthy human cell lines, including human dermal fibroblasts and human adipose stromal cells. We plan to undertake further *in vivo* testing to evaluate its toxicity and efficacy against acute myeloid leukemia and WM.

Cultured Autologous Oral Mucosal Epithelial Cell Sheets (CAOMECS)

An Emmaus-led team at The Lundquist Institute (Torrance, CA, USA), or TLI, and non-profit biomedical research organization academically affiliated with the David Geffen School of Medicine at University of California, at Los Angeles that

works in partnership with Harbor-UCLA Medical Center, is conducting a pre-clinical study of Cultured Autologous Oral Mucosal Epithelial Cell Sheet, or CAOMECS, technology. A cell sheet is a composite of cells grown and harvested in an intact sheet, rather than as individual cells. These cell sheets can be used for tissue transplantation or to engineer complex multilayer cell sheets composed of different types of cells. These cell sheets are engineered using specialized media not containing any animal products. Using a patient's own oral mucosal epithelial cells, we are working toward being able to grow and harvest a cell sheet for directly transplanting onto the cornea of the patient's affected eye to repair the damaged cornea. The development of CAOMECS for treating corneal and other diseases, including limbal stem cell deficiency, has been successful in animal studies. (Please see Fawzia for publication reference)

Chondrocyte Cell Sheet Technology

We have developed human cartilage and bone multilayer cell sheets using human adult mesenchymal stem cells and are conducting preclinical studies to assess the restorative properties of these cell sheets. Cartilage cell sheets have the potential to treat diseases such as articular cartilage injury and osteoarthritis. Bone cell sheets are potentially useful in treating diseases such as osteoarthritis, nonunion and Paget's disease. This cell sheet technology offers several potential advantages over the existing treatment options. The harvesting does not require any special treatment, such as the use of enzymes which could be harmful to the treated cells and patients. Current treatment options involve the injection of individual cells to the damaged area, which requires identification of precise injection location and multiple injections due to rapid cell death. In contrast, cell sheet technology allows wider coverage of needed cells to the damaged cartilage and higher cell survival due to the cell sheet structure.

Unlike existing cell therapies, our cell sheets can be produced from stem cells from one patient for use on other patients, referred to as allogeneic transplantation, thereby decreasing the risk of immune rejection. We believe these advantages may also lead to lower-cost and more efficient production.

This technology is supported by the US patent application No.: 63/360,710, filed on October 21, 2021, entitled "Engineering of Different Stratified Cell Sheets Using Human Adipose Stromal Cells," filed on October 21, 2021.

Device Measuring Cell Sheets Transparency

We have developed a device for quality control in the cell-sheet manufacturing process. This device measures the thickness of the biological cell culture, maturity of the biological cell culture for harvesting the biological cell culture purposes, number of cells present in one or more cell sheets of the biological cell culture, and transparency of biological cell culture. The application of this device extends to ophthalmology to assess the transparency of donor's cornea before transplantation. Currently there is no objective method to assess the donor's cornea to understand readiness or compatibility.

This technology is supported by the PCT patent application No. PCT/US2022/011267, entitled "System and Method of Evaluating Cell Culture," filed on January 5, 2022.

Research and Development

We incurred \$4.1 million and \$2.4 million of research and development expenses in 2021 and 2020, respectively. The increase primarily related to the acquisition of KM10544 from Kainos, our Pilot/Phase 1 diverticulosis study, and preclinical stage activities involving our chondrocyte cell sheet technology, CAOMECS, and device technology to support cell-sheet research.

Raw Materials and Manufacturing

Our Endari® SCD treatment uses prescription grade L-glutamine ("PGLG"), which differs from non-prescription grade L-glutamine widely available as a nutritional supplement. PGLG is differentiated from ordinary L-glutamine by several factors, including the presence of a Drug Master File, oversight of purity and manufacturing at FDA inspected facilities, and stringent stability tested packaging. There are limited suppliers of PGLG, and we currently obtain substantially all our PGLG, directly or indirectly, from Ajinomoto Health and Nutrition North America, Inc. ("Ajinomoto"), a subsidiary of Ajinomoto North American Holdings, Inc.

Ajinomoto provided PGLG to us free of charge for our clinical trials of Endari®, including our Phase 3 trial. In return, we agreed to purchase from Ajinomoto substantially all our commercial needs for PGLG, subject to certain exceptions; however, we have no written long-term supply agreement with Ajinomoto.

On June 16, 2017, we entered into an API supply agreement with Telcon (formerly, Telcon, Inc.), a South Korea-based company, pursuant to which Telcon paid us approximately ₩36.0 billion KRW (approximately \$31.8 million) in consideration of the right to supply 25% of our requirements for bulk containers of PGLG for a 15-year term. The amount was recorded as a deferred trade discount. The API supply agreement provides for target annual revenue of more than \$5,000,000 and annual “profit” (*i.e.*, sales margin) to Telcon of at least \$2,500,000 commencing in 2018. On July 12, 2017, we entered into a raw material supply agreement with Telcon which revised certain terms of the API supply agreement, which we refer to as the “revised API agreement.” The revised API agreement is effective for a term of five years and will renew automatically for 10 successive one-year renewal periods, except as either party may determine. In the revised API agreement, we have agreed to purchase a cumulative total of \$47.0 million of PGLG over the term of the agreement. In September 2018, we entered into an agreement with Ajinomoto and Telcon to facilitate Telcon’s purchase of PGLG from Ajinomoto for resale to us under the revised API agreement. The PGLG raw material purchased from Telcon is recorded in inventory at net realizable value and the excess purchase price is recorded against deferred trade discount.

Our obligations under the agreements with Telcon are secured by a pledge of a convertible bond of Telcon purchased by us under a Convertible Bond Purchase Agreement dated September 28, 2020. See Note 11 and Note 14 of the Notes to Consolidated Financial Statements in this Annual Report for more information regarding our obligations under the various agreements with Telcon.

In December 2019, EJ Holdings, Inc., or EJ Holdings a Japanese corporation which is 40% owned by us, purchased from Kyowa Hakko Bio Co. Ltd., or Kyowa, a subsidiary of Kyowa Hakko Kirin Co., Ltd., Kyowa’s phased-out facility in Ube, Japan, for the manufacture of L-glutamine and other amino acids. EJ Holdings is engaged in phasing in the plant, including obtaining FDA and other regulatory approvals for the manufacture of PGLG in accordance with current Good Manufacturing Practices (“cGMP”). Once the plant is active, we expect to enter into a long-term agreement with EJ Holdings for the supply of PGLG. We currently anticipate that test production will commence later in 2022 with regulatory approval expected in 2023. EJ Holdings has had no revenues since its inception, has depended on loans from us to acquire the Ube plant and fund its operations and will continue to be dependent on loans from us or other financing unless and until its plant is activated and it can secure customers, including us, for its products. As of December 31, 2021, we had loaned EJ Holdings a total of \$22.6 million. In addition to loans from us, EJ Holdings may require substantial financing in order bring the Ube plant online. EJ Holdings has no commitments or understandings regarding any additional financing. Under the asset purchase agreement pursuant to which EJ Holdings purchased the Ube plant, Kyowa has the right to repurchase the plant at the purchase price of \$10.4 million plus certain taxes paid by EJ Holdings if the plant does not become operational within a reasonable period (not to exceed five years).

In May 2020 we entered into a memorandum of understanding and agreement, or MOU, with Japan Industrial Partners, Inc., or JIP, which owns 60% of the capital stock of EJ Holdings, to memorialize the parties’ intentions with respect to the business and operations of the Ube plant and ownership of EJ Holdings. The MOU contemplates, among other things, that we will continue to be the principal source of funding for EJ Holdings’ ownership and operation of the plant and that, subject to certain conditions, to the extent we provide additional funding our ownership interest in EJ Holdings is expected to increase accordingly and that the composition of EJ Holdings’ board of directors and control of EJ Holdings would be modified consistent with the parties’ relative ownership interests. The MOU also contemplates that the Ube plant will eventually supply us with the plant’s output of amino acids and that the operation of the plant will be principally for our benefit and, accordingly, that major decisions affecting EJ Holdings and the Ube plant will be made by EJ Holdings’ board of directors in consultation with us. At present, JIP owns 60% of EJ Holdings and is entitled to designate a majority of EJ Holdings’ board of directors, its Chief Executive Officer, and outside auditors, and as such, controls the management, business and operations of EJ Holdings.

Endari® and any other commercial products we develop must be manufactured and packaged by facilities that meet FDA requirements for cGMP. We believe that Ajinomoto and Packaging Coordinators, Inc., or PCI, of Rockville, Illinois, which packages Endari®, meet FDA cGMP for manufacture and packaging of Endari®. Previous compliance with cGMP; however, does not guarantee future compliance. We have no long-term agreement with Ajinomoto or PCI. We may seek to enter into long-term supply agreements in the future and to establish one or more arrangements with alternative suppliers, including EJ Holdings.

Competition

The biopharmaceutical industry is highly competitive and subject to rapid and significant technological change. We face potential competition from both large and small pharmaceutical and biotechnology companies, academic institutions, governmental agencies (such as the National Institutes of Health) and public and private research institutions. Many of our competitors and potential competitors have far greater financial resources and expertise in research and development,

manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

Any product candidates that we successfully develop and commercialize will compete with existing therapies and new therapies that may become available in the future. The key competitive factors affecting the success of each of our product candidates, if approved, are likely to be their safety, efficacy, convenience, price, the level of proprietary and generic competition, and the availability of coverage and reimbursement from government and other third-party payors. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer or more effective, have fewer or less severe side effects, or are more convenient or less expensive than any products that we may develop. Our competitors may also obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in their establishing a strong market position before we are able to enter the market.

Sickle Cell Disease

Endari® is approved as a therapy to reduce the acute complications of SCD in adult and pediatric patients 5 years of age and older. The other drugs which are indicated to treat sickle cell disease are hydroxyurea (marketed as DROXIA or Hydrea by Bristol-Myers Squibb Company and available in generic form), which is approved to reduce the frequency of painful crises and need for blood transfusions in patients with sickle cell anemia for the treatment of adults with SCD; Voxelotor (marketed as Oxbryta™ by Global Blood Therapeutics, Inc.) tablets for the treatment of SCD in adults and children 4 years of age and older; and crizanlizumab (marketed as Adakveo® by Novartis International AG) intravenous infusion approved to reduce the frequency of VOCs in adult and pediatric patients ages 16 years and older with SCD. Several companies are also developing product candidates for chronic treatment in SCD. GBT and several other companies are in clinical trials to investigate new treatments for SCD.

Endari® also faces potential competition from one-time therapies for treating patients with severe SCD, including LentiGlobin BB305, which is being developed by bluebird bio, Inc. to treat SCD by inserting a functional human beta-globin gene into a patient's hematopoietic stem cells, or HSCs, *ex vivo* and then transplanting the modified HSCs into the patient's bloodstream. Bluebird has indicated its plans to pursue an accelerated development and approval pathway for its gene therapy product in SCD. Others are seeking to develop one-time therapies such as hematopoietic stem cell transplantation, gene therapy and gene editing, including gene editing using CRISPR. Attempts to develop a cure for SCD through gene therapy are in the early stages, but if these attempts were to succeed and receive regulatory approval, it could adversely affect the market for Endari®.

We are also aware of efforts to develop cures for SCD through approaches such as bone marrow treatments. Although bone marrow transplant is currently available for SCD patients, its use is limited by the lack of availability of matched donors and by the risk of serious complications, including graft versus host disease and infection.

Endari® also competes with non-prescription grade L-glutamine, which is widely available as a dietary supplement at substantially lower prices than Endari®. Dietary supplements may be marketed without FDA approval, are generally not reimbursed by payors and are not subject to the rigorous quality control standards required by regulatory authorities for prescription drug products. Also, unlike prescription drugs, manufacturers of dietary supplements may not make claims that the supplements will cure, mitigate, treat or prevent disease, and we are not aware of any reports in peer-reviewed literature regarding the effectiveness of non-prescription grade L-glutamine supplements in treating SCD in controlled clinical trials.

Diverticulosis

There is no currently FDA-approved treatment for diverticulosis.

Oncology Treatment

IRAK4 is a popular targeted pathway of inflammatory diseases, including cancers. In our pre-clinical studies, Kainos's novel IRAK 4 inhibitor, referred to as KM10544, has shown promising signs of efficacy against FLT-3 positive leukemia cell lines and other hematological malignancy cell lines.

Chondrocyte Cell Sheet Technology

Currently, no cell therapy to treat damaged cartilage or bone has been approved by the FDA, and according to available data from clinicaltrials.gov, there is only one clinical trial of the efficacy of cartilage cell sheets, engineered with

autologous peripheral blood mesenchymal stem cell, to treat Degree IV Local Cartilage Injury of Knee Joint (Peking University Third Hospital, China).

The development of cell sheets using mesenchymal stem cells (*e.g.* adipose stromal cells), may lead to new treatments of patients. In addition, the cell sheets were engineered using animal-free culture media and have the potential for allogeneic transplantation. Our cell sheet therapy also makes possible to layer different types of cell sheets by harvesting the cell sheet without the use of harmful enzymes (trypsin or dispase) that may damage the cell-based therapy and potentially to construct *in vitro* stratified tissue equivalents by alternately layering different types of harvested cell sheets to provide regenerated tissue architectures, resembling human tissues. For example, cartilage cell sheets can be layered on the top of a bone cell sheet before transplantation. This technique holds promise for the study of cell-cell communications and angiogenesis in reconstructed, three-dimensional environments, as well as for tissues engineering with complex, multicellular architectures and drug-screening.

Cultured Autologous Oral Mucosal Epithelial Cell Sheets (CAOMECS)

Currently, the treatment of limbal stem cell deficiency (“LSCD”) patients varies based on the severity of the LSCD. Treatment may include the use of non-invasive procedures such as autologous serum drops, therapeutic scleral lens and corneal scraping to more invasive surgical procedures such as limbal stem cells or oral mucosal stem cells graft. The source of the transplanted tissue can be from cells from the patient’s healthy eye, matched living donors or cadavers. Transplantation with cells other than from the patient’s own tissue can cause serious complications, including rejection of transplanted tissue. Using oral mucosal epithelial cells (“OMEC”) of the LSCD patients lessens these risks. Specifically, the use of OMEC eliminates the risk of graft rejection, permits treatment of bilateral LSCD patients and allows engineered corneal epithelial cell sheets to be transplanted on LSCD patients’ corneas.

The development of OMEC technology to treat LSCD is in the early stages. We are not aware of any FDA approved treatments using OMEC for LSCD.

Research institutions outside the United States (*e.g.*, The Centre Hospitalier National d’Ophtalmologie des Quinze Vingts lin Paris, France; Royan Institute Teheran in the Islamic Republic of Iran and Hospital San Raffaele in Milan, Italy) are researching the transplantation of corneal cells from patients’ healthy eyes to reverse LSCD. However, results from these clinical trials were not published yet. This approach only allows unilateral LSCD patients to be treated and risks damage to the patients’ one healthy corneas.

The use of OMEC is a promising alternative for treat LSCD. For example, the Chang Gung Memorial Hospital South Korea and CliPS Co., Ltd (South Korea) are conducting a phase 1, the He Eye Hospital China, The Hospices Civils de Lyon (France), and the Adisak Wongkajornsilp, Siriraj Hospital in Thailand are conducting phase 2 clinical trials using the OMEC. While many research institutions as are conducting such trials, we are not aware of published results of these studies.

Our OMEC-based regenerative medicine technology eliminates risks associated with donor-dependent transplantation as it is an autologous technology developed by using the patient own cells. OMEC-based regenerative medicine technology has shown promising results in pilot studies (animal serum dependent) done by other groups in Japan and Europe. Our innovative technology utilizes cell sheet therapy was developed in xeno-free cell culture conditions that allow harvesting cell sheets that retain intact basal membranes and extracellular matrix (fibronectin, laminin, collagen type IV), reducing the inherent risks of suturing during transplantation.

Government Regulation

The FDA has granted Endari Orphan Drug designation and the EC has granted our PGLG Orphan Medicinal designation for the treatment of SCD.

Orphan Drug Designation. The FDA has authority under the U.S. Orphan Drug Act to grant Orphan Drug designation to a drug or biological product intended to treat a rare disease or condition. This law defines a rare disease or condition generally as one that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of the development and distribution of the orphan product in the United States will be recovered from sales of the product. Being granted Orphan Drug designation provides tax benefits to mitigate expenses of developing the orphan product. More importantly, Orphan Drug designation provides seven years of market exclusivity if the product receives the first FDA approval for the disease or condition for which it was granted such designation and the indication for which approval is granted matches the indication for which Orphan Drug designation was granted. During the seven-year exclusivity period, Orphan Drug exclusivity precludes FDA approval of a marketing application for the same active ingredient for the same indication. Orphan Drug exclusivity is limited and will not preclude the FDA from

approving the same active ingredient for the same indication if the same product is shown to be clinically superior to the product previously granted exclusivity. In addition, a product that is the same as the orphan product may receive approval for a different indication (whether orphan or not) during the exclusivity period of the orphan product. Also, Orphan Drug market exclusivity will not bar a different product such as Global Blood Therapeutics, Inc.'s Oxbryta to treat the same orphan disease or condition from obtaining its own Orphan Drug designation and Orphan Drug exclusivity.

The Orphan Drug designation for Endari will expire July 7, 2024, after which date Endari may face competition from generic PGLC products. In the meantime, we may pursue improvements and reformulations of Endari to seek preserve our intellectual property rights in Endari following the expiration of its Orphan Drug designation.

Orphan Medicinal status in the EU has similar benefits, including a ten-year marketing exclusivity period following marketing authorization in the EU.

There is no designation available in the U.A.E. or other countries in the MENA region similar to Orphan Drug or Orphan Medicinal designations, so we will not be entitled to marketing exclusivity in the region for Endari® in the U.A.E. or other countries in the region where we may obtain marketing authorization.

505(b)(2) Applications. Under Section 505(b)(2) of the Federal Food, Drug, and Cosmetic Act ("FD&C Act"), a person may submit an NDA for which one or more of the clinical studies relied upon by the applicant for approval were not conducted by or for the applicant and for which the applicant does not have a right of reference or use from the person by or for whom the clinical studies were conducted. Instead, a 505(b)(2) applicant may rely on published literature containing the specific information (*e.g.*, clinical trials, animal studies) necessary to obtain approval of the application. The applicant may also rely on the FDA's finding of safety and/or effectiveness of a drug previously approved by the FDA when the applicant does not own or otherwise have the right to access the data in that previously approved application. The 505(b)(2) pathway to marketing authorization thus allows an applicant to submit a NDA without having to conduct its own studies to obtain data that are already documented in published reports or previously submitted NDAs. In addition to relying on safety data from the Phase 2 and 3 studies of Endari®, we intend to take advantage of the 505(b)(2) pathway to the extent published literature will further support any NDA for PGLG.

Regulation by United States and foreign governmental authorities is a significant factor in the development, manufacture and expected marketing of our product candidates and in our ongoing research and development activities. The nature and extent to which such regulation will apply to us will vary depending on the nature of the product candidates we seek to develop.

Human therapeutic products, such as drugs, biologics and cell-based therapies, are subject to rigorous preclinical and clinical testing and other preapproval requirements of the FDA and similar regulatory authorities in other countries. Various federal and state statutes and regulations govern and influence pre- and post-approval requirements related to research, testing, manufacturing, labeling, packaging, storage, distribution and record keeping of such products to ensure the safety and effectiveness for their intended uses. The process of obtaining marketing approval and ensuring post approval compliance with the FD&C Act for drugs and biologics (and applicable provisions of the Public Health Service Act for biologics), and the regulations promulgated thereunder, and other applicable federal and state statutes and regulations, requires substantial time and financial resources. Any failure by us or our collaborators to obtain, or any delay in obtaining, marketing approval could adversely affect the marketing of any of our product candidates, our ability to receive product revenues, and our liquidity and capital resources.

The manufacture of these products is subject to cGMP regulations. The FDA inspects manufacturing facilities for compliance with cGMP regulations before deciding whether to approve a product candidate for marketing.

The steps required by the FDA before a new product, such as a drug, biologic or cell-based therapy, may be marketed in the United States include:

- completion of preclinical studies (during this stage, the treatment is called a development candidate);
- the submission to the FDA of a proposal for the design of a clinical trial program for studying in humans the safety and effectiveness of the product candidate. This submission is referred to as an IND. The FDA reviews the IND to ensure it adequately protects the safety and rights of trial participants and that the design of the studies is adequate to permit an evaluation of the product candidate's safety and effectiveness. The IND becomes effective within thirty days after the FDA receives the IND, unless the FDA notifies the sponsor that the investigations described in the IND are deficient and cannot begin;

- the conduct of adequate and well controlled clinical trials, usually completed in three phases, to demonstrate the safety and effectiveness of the product candidate for its intended use;
- the submission to the FDA of a marketing application, a NDA, if the product candidate is a drug, that provides data and other information to demonstrate the product is safe and effective for its intended use (“BLA”), if the product candidate is a biologic that provides data and other information to demonstrate that the product candidate is safe, pure, and potent; and
- the review and approval of the NDA by the FDA before the product candidate may be distributed commercially as a product.

In addition to obtaining FDA approval for each product candidate before we can market it as a product, the manufacturing establishment from which we obtain it must be registered and is subject to periodic FDA post approval inspections to ensure continued compliance with cGMP requirements. If, as a result of these inspections, the FDA determines that any equipment, facilities, laboratories, procedures or processes do not comply with applicable FDA regulations and the conditions of the product approval, the FDA may seek civil, criminal, or administrative sanctions and/or remedies against us, including the suspension of the manufacturing operations, recalls, the withdrawal of approval and debarment. Manufacturers must expend substantial time, money and effort in the area of production, quality assurance and quality control to ensure compliance with these standards.

Preclinical testing includes laboratory evaluation of the safety of a product candidate and characterization of its formulation. Preclinical testing is subject to Good Laboratory Practice (“GLP”) regulations. Preclinical testing results are submitted to the FDA as a part of an IND which must become effective prior to commencement of clinical trials. Clinical trials are typically conducted in three sequential phases following submission of an IND. In Phase 1, the product candidate under investigation (and therefore often called an investigational product) is initially administered to a small group of humans, either patients or healthy volunteers, primarily to test for safety (*e.g.*, to identify any adverse effects), dosage tolerance, absorption, distribution, metabolism, excretion and clinical pharmacology, and, if possible, to gain early evidence of effectiveness. In Phase 2, a slightly larger sample of patients who have the condition or disease for which the investigational product is being studied receive the investigational product to assess the effectiveness of the investigational product, to determine dose tolerance and the optimal dose range, and to gather additional information relating to safety and potential adverse effects. If the data show the investigational product may be effective and has an acceptable safety profile in the targeted patient population, Phase 3 studies, also referred to as pivotal studies or enabling studies, are initiated to further establish clinical safety and provide substantial evidence of the effectiveness of the investigational product in a broader sample of the general patient population, to determine the overall risk benefit ratio of the investigational product, and provide an adequate basis for physician and patient labeling. During all clinical studies, Good Clinical Practice (“GCP”) standards and applicable human subject protection requirements must be followed. The results of the research and product development, manufacturing, preclinical studies, clinical studies, and related information are submitted in a NDA to the FDA.

The process of completing clinical testing and obtaining FDA approval for a new therapeutic product, such as a drug, biologic or cell-based product, is likely to take years and require the expenditure of substantial resources. If a NDA is submitted, there can be no assurance that the FDA will file, review, and approve it. Even after initial FDA approval has been obtained, post market studies could be required to provide additional data on safety or effectiveness. Additional pivotal studies would be required to support adding other indications to the labeling. Also, the FDA will require post market reporting and could require specific surveillance or risk mitigation programs to monitor for known and unknown side effects of the product. Results of post marketing programs could limit or expand the continued marketing of the product. Further, if there are any modifications to the product, including changes in indication, manufacturing process, labeling, or the location of the manufacturing facility, a NDA supplement would generally be required to be submitted to the FDA prior to or corresponding with that change, or for minor changes in the periodic safety update report that must be submitted annually to the FDA.

The rate of completion of any clinical trial depends upon, among other factors, sufficient patient enrollment and retention. Patient enrollment is a function of many factors, including the size of the patient population, the nature of the trial, the number of clinical sites, the availability of alternative therapies, the proximity of patients to clinical sites, and the eligibility and exclusion criteria for the trial. Delays in planned patient enrollment might result in increased costs and delays. Patient retention could be affected by patient noncompliance, adverse events, or any change in circumstances making the patient no longer eligible to remain in the trial.

Failure to adhere to regulatory requirements for the protection of human subjects, to ensure the integrity of data, other IND requirements, and GCP standards in conducting clinical trials could cause the FDA to place a “clinical hold” on one or more studies of a product candidate, which would stop the studies and delay or preclude further data collection necessary for

product approval. Noncompliance with GCP standards would also have a negative impact on the FDA's evaluation of a NDA. If at any time the FDA finds that a serious question regarding data integrity has been raised due to the appearance of a wrongful act, such as fraud, bribery or gross negligence, the FDA may invoke its Application Integrity Policy ("AIP") under which it could immediately suspend review of any pending NDA or refuse to accept the submission of a NDA as filed, require the sponsor to validate data, require additional clinical studies, disapprove a pending NDA or withdraw approval of marketed products, as well as require corrective and preventive action to ensure data integrity in future submissions. Significant noncompliance with IND regulations could result in the FDA not only refusing to accept a NDA as filed but could also result in enforcement actions, including civil and administrative actions, civil money penalties, criminal prosecution, criminal fines and debarment. Whether or not FDA approval has been obtained, approval of a product by regulatory authorities in foreign countries must be obtained prior to the commencement of marketing the product in those countries.

The requirements governing the conduct of clinical trials and product approvals vary widely from country to country, and the time required for approval might be longer or shorter than that required for FDA approval. Although there are some procedures for unified filings for some European countries, in general, each country at this time has its own procedures and requirements.

In most cases, if the FDA has not approved a product candidate for sale in the United States, the unapproved product may be exported to any country in the world for clinical trial or sale if it meets U.S. export requirements and has marketing authorization in any listed country without submitting an export request to the FDA or receiving FDA approval to export the product, as long as the product meets the regulatory requirements of the country to which the product is being exported. Listed countries include each member nation in the European Union or the European Economic Area, Canada, Australia, New Zealand, Japan, Israel, Switzerland and South Africa. If an unapproved product is not approved in one of the listed countries, the unapproved product may be exported directly to an unlisted country if the product meets the requirements of the regulatory authority of that country, and the FDA determines that the foreign country has statutory or regulatory requirements similar or equivalent to the United States.

In addition to the regulatory framework for product approvals, we and our collaborative partners must comply with federal, state and local laws and regulations regarding occupational safety, laboratory practices, the use, handling and disposition of radioactive materials, environmental protection and hazardous substance control, and other local, state, federal and foreign regulation. All facilities and manufacturing processes used by third parties to produce our product candidates for clinical use in the United States and our products for commercialization must be in compliance with cGMP requirements and are subject to periodic regulatory inspections. The failure of third-party manufacturers to comply with applicable regulations could extend, delay or cause the termination of clinical trials conducted for our product candidates or the withdrawal of our products from the market. The impact of government regulation upon us cannot be predicted and could be material and adverse. We cannot accurately predict the extent of government regulation that might result from future legislation or administrative action.

Patents, Proprietary Rights and Know-How

Our success will depend in part on our ability to obtain patents and otherwise preserve the intellectual property rights relating to the design, operation, sale and distribution of our products. We intend to seek patents on our products when we deem it commercially appropriate. The process of seeking patent protection can be lengthy and expensive, and there can be no assurance that patents will be issued for currently pending or future applications or that our existing patents or any new patents issued will be of sufficient scope or strength or provide meaningful protection or any commercial advantage to us. We may be subject to, or may initiate, litigation or patent office interference proceedings, which may require significant financial and management resources. The failure to obtain necessary licenses or other rights or the advent of litigation arising out of any such intellectual property claims could have a material adverse effect on our operations.

We have relied to date on a combination of patent licenses, trademark rights, trade secret protection, distribution agreements, manufacturing agreements, manufacturing capability and other unpatented proprietary information to protect our intellectual property rights. While we do not currently own any issued patents directed to the treatment of sickle cell anemia, we do own patent applications in that area, as well as issued patents and patent applications directed to the treatment of diverticulosis, diabetes and hypertriglyceridemia. We have Orphan Drug market exclusivity for the treatment of sickle cell anemia with Endari® in the United States through July 7, 2024 and, if approved in the EU, for ten years from the approval date. We may seek to pursue improvements and reformulations of Endari® to preserve our intellectual property rights in Endari following the expiration of its Orphan Drug designation.

We also rely on employee agreements to protect the proprietary nature of our products. We require that our officers and key employees enter into confidentiality agreements that require these officers and employees to assign to us the rights to

any inventions developed by them during their employment with us. All the confidentiality agreements include non-solicitation provisions that remain effective during the course of employment and for periods following termination of employment.

Patents

We have issued patents related to compositions including PGLG and methods involving administration of PGLG for the treatment of diverticulosis in the United States, Europe, Japan, Australia, India, Mexico, China, Indonesia, Korea and Russia. Associated patent applications are currently pending in the United States, the EU, Brazil, Korea and Russia.

Patents directed to compositions for decreasing HbA1C levels in individuals who are shown to have average blood sugar levels in the diabetic range have issued in Japan, Indonesia and the Philippines. Associated applications are currently pending in the United States, Europe, Brazil, India, China, the Philippines, and Japan.

The company has issued patents directed to the treatment of hypertriglyceridemia in Japan and the Philippines. A corresponding European patent application has been granted and is currently the subject of an Opposition proceeding. Associated applications are pending in the United States, Brazil, India, China, and the Philippines.

A patent application directed to the treatment of sickle cell using a multi-component composition is pending in the United States and Europe. An international application directed to the same invention has been filed under the Patent Cooperation Treaty.

License Agreements

On October 7, 2021, we entered into a License Agreement with Kainos, under which Kainos granted us an exclusive license in the territory encompassing the U.S., the U.K. and the EU to patent rights, know-how and other intellectual property relating to Kainos's IRAK4 inhibitor, referred to as KM10544, for the treatment of cancers, including leukemia, lymphoma and solid tumor cancers. In consideration of the license, we paid Kainos a six-figure upfront fee in cash and agreed to make future cash payments upon the achievement of specified milestones totaling in the mid-eight figures, a single-digit percentage royalty based on net sales of the licensed products and a similar percentage of any sublicensing consideration. The License Agreement will continue on a licensed product-by-licensed product and country-by-country basis until the last to expire valid claim of any licensed patent in such country.

Trademarks

We hold U.S. trademark registrations for "Emmaus Medical" and "Endari" and a trademark registration for "Xyndari™" (as Endari® will be marketed if approved) in the EU. This Annual Report also contains trademarks, service marks, trade names and copyrights of other companies, which are the property of their respective owners. Solely for convenience, these trademarks, service marks, trade names and copyrights may appear without the® or TM symbols, but such references are not intended to indicate that we or the other owners do not assert, to the fullest extent under applicable law, our rights, or the rights of any licensor to the same.

Employees

As of December 31, 2021, we had 62 employees, 58 of whom were full time. We have not experienced any work stoppages and we consider our relations with our employees to be good.

Corporate Information

We were incorporated in Delaware on March 20, 1987 under the name Age Research, Inc. Prior to January 16, 2007, our company (then called Strativation, Inc.) existed as a "shell company" with nominal assets and whose sole business was to identify, evaluate and investigate various companies to acquire or with which to merge. On January 16, 2007, we entered into an Agreement and Plan of Merger with CNS Response, Inc., and CNS Merger Corporation, our wholly owned subsidiary, pursuant to which CNS Merger Corporation merged with and into CNS Response, Inc., which survived the merger. On March 7, 2007, we changed our corporate name to CNS Response, Inc. On November 2, 2015, we changed our corporate name to MYnd Analytics, Inc. On July 17, 2019, we completed our merger transaction with EMI Holding, Inc., formerly known as Emmaus Life Sciences, Inc. ("EMI"), with EMI surviving as our wholly owned subsidiary. On July 17, 2019, immediately following the merger, we changed our name to "Emmaus Life Sciences, Inc."

Our principal executive offices and corporate offices are located at 21250 Hawthorne Boulevard, Suite 800, Torrance, California, and our telephone number at that address is (310) 214-0065. We maintain an Internet website at the following address: www.emmausmedical.com. The information on our website is not incorporated by reference in this Annual Report or in any other filings we make with the Securities and Exchange Commission (“SEC”).

ITEM 1A. RISK FACTORS

Risks Related to Our Business

We have operated at a loss and may continue to operate at a loss for the foreseeable future.

We realized comprehensive loss of \$17.3 million for the year ended December 31, 2021, compared to comprehensive income of \$2.6 million for the year ended December 31, 2020, and have historically operated at a loss due to substantial expenditures related to commercialization of Endari®, pursuit of marketing authorization of Endari® outside the U.S., research and development of our other product candidates, interest on our outstanding indebtedness and general and administrative expenses. While we anticipate increased net revenues as we expand our commercialization of Endari® in the U.S. through telehealth and other initiatives, as well as in the MENA region, there is no assurance that we will be able to increase our Endari® sales or attain sustainable profitability or that we will have sufficient capital resources to fund our operations until we are able to generate sufficient cash flow from operations.

We are dependent on financing to sustain our operations, and there is substantial doubt regarding our ability to continue as a going concern.

Unless and until we become profitable, we will continue to depend upon proceeds from related-party loans, sales of our debt or equity securities (including the exercise of options and warrants) or other financing arrangements, and to a lesser extent, upon payments from potential strategic partners and licensees, to generate funds needed to finance our business and operations. As of December 31, 2021, we had cash and cash equivalents of \$2.3 million and a working capital deficit of \$28 million. Depending upon our future results of operations and other factors, we will need additional financing to fund our business and operations, including our commitment to provide funding to EJ Holdings, Inc. described below under “Risks Related to Our Investment in EJ Holdings, Inc.,” and will continue to be dependent on future financing until such time, if ever, as we can generate sufficient revenues to become profitable. We have no current understanding or arrangement to obtain any additional financing. Accordingly, we may not be able to obtain future financing on favorable terms, or at all. If we are unable to obtain needed future financing, we may have to curtail some of our business activities or modify our business plans and may be unable to repay our outstanding indebtedness or continue providing funding to EJ Holdings, Inc. Because we did not timely file our Annual Report on Form 10-K for the year ended December 31, 2020 and Quarterly Reports for 2021 under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), we are ineligible to utilize the short-form Registration Statement on Form S-3 for the public offer and sale of securities until we have timely filed all required reports under the Exchange Act for the 12 months prior to filing a Registration Statement on Form S-3. The inability to utilize Form S-3 may adversely impact our ability to raise capital in a timely manner and increase transaction costs.

In light of the foregoing, there is substantial doubt regarding our ability to continue as a going concern and the report of our independent public accounting firm on our financial statements as of and for the year ended December 31, 2021 contains a going concern qualification.

We are dependent on the commercial success of our only approved product, Endari®.

Our ability to become profitable will depend upon the commercial success of Endari®. In addition to the risks discussed elsewhere in this section, our ability to generate future revenues from Endari® sales will depend on a number of factors, including, but not limited to:

- the efficacy and safety of Endari®;
- the achievement of broad market acceptance and coverage by third-party payors for Endari®;
- the effectiveness of our in-house commercialization team and distribution partners and other efforts in successfully marketing and selling Endari®;
- our ability to effectively work with physicians to ensure that their patients have access to Endari® and fill and refill prescriptions to adhere to their twice daily regimen;
- our ability to compete effectively against competing products, including hydroxyurea, Oxbryta™ (voxelotor) and Adakveo® (crizanlizumab) and potential generic products;

- our contract manufacturers' ability to successfully manufacture commercial quantities of Endari® at acceptable cost levels and in compliance with regulatory requirements;
- our ability to maintain a cost-efficient commercial organization and, to the extent we seek to do so, successfully partner with third parties; and
- our ability to comply with ongoing regulatory requirements.

Because of the numerous risks and uncertainties associated with our commercialization efforts, we are unable to predict the extent of revenues we will generate from Endari® sales or the timing for when or the extent to which we will become and continue to be profitable, if ever. Even if we do achieve increased net revenues from Endari® sales and become profitable, we may not be able to sustain our revenues or maintain or increase our profitability on an ongoing basis.

The COVID-19 pandemic may adversely affect our revenues, results of operations and financial condition and the market price of our common stock.

Although we believe the COVID-19 pandemic and ongoing epidemic and governmental responses have not had a material adverse effect on our Endari® sales to date, COVID-19 or future official responses may deter or prevent sickle cell disease, or SCD, patients from traveling to see their doctors or filling or refilling their prescriptions for Endari®, our one approved product, which could cause a temporary or prolonged decline in our revenues and have a material adverse effect on our results of operations and financial condition. COVID-19 or the governmental response may adversely affect the timing and conduct of clinical studies or the ability of regulatory bodies to consider or grant approvals with respect to Endari® or our prescription grade L-glutamine drug candidates or oversee the development of our drug candidates, may further divert the attention and efforts of the medical community to coping with COVID-19 and disrupt the marketplace in which we operate. For example, we experienced a temporary disruption in 2020 in patient enrollment in our Pilot/Phase I study of our prescription grade L-glutamine oral powder in diverticulosis, but patient enrollment has now been completed. Any outbreak of COVID-19 among our executives or key employees or their families and loved ones could disrupt our management and operations and adversely affect our Endari® sales, results of operations and financial condition. The foregoing factors could also have an adverse effect on the market price of our common stock.

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

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

We face intense competition from companies with greater resources than us, and if our competitors are successful in marketing or develop alternative treatments our commercial opportunities may be reduced or eliminated.

The pharmaceutical industry is characterized by rapidly advancing technologies, intense competition and a strong emphasis on developing proprietary therapeutics. We face competition from a number of sources, some of which may target the same indication as Endari®, such as pharmaceutical companies, including generic drug companies, biotechnology companies, drug delivery companies and academic and research institutions, many of which have greater financial resources, marketing capabilities, including well-established sales forces, manufacturing capabilities, research and development capabilities, experience in obtaining regulatory approvals for product candidates than do we. For example, in late 2019 the FDA approved a new drug application, or NDA, submitted by Novartis, permitting the marketing of ADAKVEO® (crizanlizumab-tmca) to reduce the frequency of vaso-occlusive crises in adults and pediatric patients aged 16 years and older with SCD. ADAKVEO®, which is administered by intravenous infusion every four weeks, is a selectin blocker humanized IgG2 kappa monoclonal antibody that binds to P-selectin. Also, in late 2019, Global Blood Therapeutics, Inc. (“GBT”) announced that the FDA approved its NDA for Oxbryta™ (voxelotor) tablets for the treatment of SCD in adults and children 12 years of age and older. Oxbryta™ is an oral, once-a-day therapy intended to treat SCD by targeting hemoglobin polymerization. Both Novartis and GBT have far greater financial, sales and marketing resources than our company and there is no assurance that we will be able to compete effectively with ADAKVEO® or Oxbryta™ as a stand-alone therapy or that Endari® will gain widespread use as an adjunct to the use of ADAKVEO® or Oxbryta™. If we are unable to compete effectively or successfully position Endari® as a complementary therapy, our Endari® sales and results of operation may suffer, which could have a material, adverse effect

on our financial condition. We also face competition from hydroxyurea and non-prescription grade L-glutamine supplements. Non-prescription grade L-glutamine is manufactured in large quantities, primarily by a few large chemical companies, and processed and sold as a nutritional supplement. The sale of non-prescription grade L-glutamine nutritional supplements at prices lower than the price that we charge for Endari® could have a material adverse effect on our sales of Endari® and results of operations.

If we are unable to achieve and maintain adequate levels of coverage and reimbursement for Endari®, on reasonable pricing terms, its commercial success may be severely hindered.

Successful sales of Endari® depend on the availability of adequate coverage and reimbursement from third-party payors and governmental healthcare programs, such as Medicare and Medicaid. Patients who are prescribed medicine for the treatment of their conditions generally rely on third-party payors to reimburse all or a significant portion of the costs associated with their prescription drugs. Coverage determination depends on financial, clinical and economic outcomes that often disfavors new drug products when more established or lower cost therapeutic alternatives are already available or subsequently become available. Although Endari® is reimbursable by the Centers for Medicare and Medicaid Services, and every state provides coverage for Endari® for outpatient prescriptions to all eligible Medicaid enrollees within their state Medicaid programs, the reimbursement amounts are subject to change and may not be adequate and may require higher co-payments that patients find unacceptable. Patients are unlikely to use Endari® unless reimbursement is adequate to cover a significant portion of the cost of Endari®. Future coverage and reimbursement will likely be subject to increased pressure in the U.S. Third-party coverage and reimbursement for Endari® may cease to be available or adequate in the U.S., which could have a material adverse effect on our business, results of operations, financial condition and prospects.

In addition, the market for Endari® will depend significantly on access to third-party payors' drug formularies, which are lists of medications for which third-party payors provide coverage and reimbursement. The competition in the industry to be included in such formularies may lead to downward pricing pressures on us. Also, third-party payors may refuse to include Endari® in their formularies or otherwise restrict patient access to Endari® if a less costly generic equivalent or other alternative treatment is available.

The majority of Endari® sales are to a few customers and loss of a customer could adversely affect our results of operations.

We sell Endari® to specialty distributors and specialty pharmacies who, in turn, resell Endari® to pharmacies, hospitals and other customers. Three of our distributors account for approximately 80% of Endari sales in the year ended December 31, 2021, and the loss of any of these distributors or a material reduction in their Endari® purchases could have a material adverse effect on our business, results of operations, financial condition and prospects.

In addition, the distribution network for pharmaceutical products in the U.S. has undergone, and may continue to undergo, significant consolidation marked by mergers and acquisitions. As a result, a smaller number of large distributors control a significant share of the market, which has increased, and may continue to increase, competitive and pricing pressures on pharmaceutical products. There is no assurance that we can manage these pricing pressures or that specialty distributor and specialty pharmacy purchases will not fluctuate unexpectedly from period to period.

The market exclusivity for SCD in the U.S. is limited and Endari® will have no market exclusivity in the United Arab Emirates, where it was recently approved for marketing, or other countries in the Middle East North Africa (MENA) region where applications for marketing approval are pending, which lack of exclusivity could adversely affect the commercial success of Endari®.

The exclusivity protections that protect Endari® for use for SCD are limited in ways that may affect our ability to effectively exclude third parties from competing against us. In particular:

- Orphan Drug market exclusivity protection for Endari® for SCD will expire in the U.S. July 7, 2024;
- Orphan Drug designation does not preclude the FDA from granting Orphan Drug designation to another sponsor developing the same drug for the same indication, granting Orphan Drug designation and approving such other drug after we receive approval if such drug is considered clinically superior to our product, approving a product that is the same as our product for a different indication, or approving a different product intended to treat SCD; in this regard, Global Blood Therapeutics, Inc.'s Oxbritya for treating SCD also has been granted Orphan Drug status in the U.S. and in the EU;
- Orphan Medicinal status in the EU is subject to exclusions similar to those in the U.S.; and

- there are many countries, including some key markets for Endari® in the MENA region, in which we do not have intellectual property protection and where neither orphan drug designation nor data exclusivity is available.

These limitations and any reductions in our expected protection, including other products that could be approved by FDA under the Orphan Drug Act, may subject Endari® to greater competition than we expect and could adversely affect our ability to generate revenue from Endari®, perhaps materially. These circumstances may also impair our ability to obtain license partners or other international commercialization opportunities on terms acceptable to us, if at all.

Many of our potential customers are in markets with underdeveloped health care systems.

Our only approved product, Endari®, is a prescription-grade L-glutamine oral powder treatment for sickle cell anemia and sickle B0-thalassemia, two of the most common forms of SCD. SCD is a genetic blood disorder that affects 20 million to 25 million people worldwide and occurs primarily among those whose ancestors are from regions including sub-Saharan Africa, South America, the Caribbean, Central America, the Middle East, India and Mediterranean regions such as Turkey, Greece and Italy. Thus, while SCD affects people throughout the world, the prevalence of SCD is higher in certain geographies, such as central and sub-Saharan Africa and the Caribbean, that currently have underdeveloped health care systems or significantly lower rates of health insurance coverage and incidence of these conditions in the United States is relatively low. Furthermore, many potential patients in many of these geographies are low-income and may be unable to afford Endari®. These factors may ultimately limit our addressable market. Our ability to achieve and sustain profitability may be adversely impacted if we are unable to access markets with greater prevalence of SCD or reach enough SCD patients in geographies with more well-developed health care systems.

A variety of risks associated with marketing Endari® internationally could hurt our business.

We recently received marketing authorization for Endari in the United Arab Emirates and are seeking regulatory approval for Endari® for SCD in other countries in the MENA region, but may not be successful. For example, in January 2018, the European Medicines Agency, or EMA, provided their agreement on the pediatric investigation plan, or PIP, for our prescription grade L-glutamine oral powder in SCD and we filed with the EMA an application for marketing authorization, or MAA, in the EU. In May 2019, we announced that the EMA's Committee for Medicinal Products for Human Use, or CHMP, had adopted a negative opinion regarding our MAA based upon the CHMP's position that our main clinical study did not conclusively support the efficacy of the treatment in SCD patients. In light of the CHMP's opinion, we withdrew our MAA in September 2019 to consider pursuing alternative decentralized and centralized regulatory pathways for obtaining marketing authorization in the EU or one or more EU countries. There is no assurance that we will be successful in obtaining marketing authorization in the EU or other jurisdictions outside the U.S. If we obtain marketing authorization, we expect that we will be subject to additional risks related to operating in foreign countries including:

- business interruptions resulting from geopolitical actions, including war such as the recent Russian invasion of Ukraine or terrorism or actual or potential public health emergencies, including the COVID-19 epidemic;
- differing regulatory requirements in foreign countries such as lack of orphan designation or other market exclusivity;
- the potential for parallel importing (*i.e.*, when a local seller, faced with high or higher local prices, opts to import goods from a foreign market with low or lower prices rather than buying them locally);
- unexpected changes in tariffs, trade barriers, price and exchange controls and other regulatory requirements;
- economic weakness, including inflation or political instability in particular foreign markets;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- foreign taxes, including withholding of payroll taxes;
- foreign currency fluctuations, which could result in increased operating expenses and reduced revenues, and other obligations related to doing business in another country;
- difficulties staffing and managing foreign operations;
- workforce uncertainty in countries where labor unrest is more common than in the U.S.;
- potential liability under the U.S. Foreign Corrupt Practices Act or comparable foreign regulations;
- challenges enforcing our contractual and intellectual property rights, especially in foreign countries that do not respect and protect intellectual property rights to the same extent as the U.S.; and

- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad.

These and other risks associated with international operations may compromise our ability to achieve or maintain profitability.

We may not be able to anticipate the demand for and appropriate supply of Endari®.

We monitor our distributors' inventories of Endari® using a combination of methods. However, our estimates of distributor inventories may differ significantly from actual inventory levels. Significant differences between actual and our estimated inventory levels may result in excessive production (requiring us to hold substantial quantities of unsold inventory which may result in the establishment of inventory reserves or actual write offs of expired inventory), inadequate supplies of products in distribution channels, insufficient product available at the retail level, and unexpected increases or decreases in orders from our specialty distributors. For example, as of December 31, 2021, we established a \$2.9 million reserve against possible future inventory write offs. These changes may cause our revenues to fluctuate significantly from quarter to quarter, and in some cases may cause our operating results for a quarter to be below our expectations or the expectations of securities analysts or investors. In addition, we sometimes offer price discounts to our customers in advance of Endari® price increases, including a price increase implemented as of March 1, 2021, or as an incentive for bulk orders of Endari®. Such discounts may result in specialty distributor purchases in excess of customer demand, resulting in reduced specialty distributor purchases in later periods and substantial fluctuations in our results of operations from period to period. Sales attributable to one-time discounts offered by us increased in 2021 as compared to 2020 may adversely affect sales in subsequent periods. If our financial results are below analysts' or investors' expectations, the market price of our common stock may be adversely affected.

If the L-glutamine manufacturer upon which we rely fails to produce in the volumes and quality that we require on a timely basis or fails to comply with stringent regulations applicable to pharmaceutical manufacturers, we may face interruptions in the commercialization of, or be unable to meet demand for, our L- glutamine based products, and may lose any marketing exclusivity and potential revenues.

We do not currently have our own manufacturing capabilities and depend upon a single Japanese supplier, Ajinomoto Aminoscience, LLC, or Ajinomoto for commercial supplies of Endari® and clinical supplies of PGLG used in our product candidates under development. We intend to continue to rely on Ajinomoto to produce our pharmaceutical grade L-glutamine, but we have not entered into, and may not be able to establish, long-term supply agreements with this key supplier on acceptable terms. Furthermore, pursuant to a letter of intent with Ajinomoto, we have agreed to purchase from Ajinomoto substantially all of the L-glutamine that we will need for our commercial products. If Ajinomoto were to experience any manufacturing or production difficulties producing prescription grade L-glutamine, or we were unable to purchase sufficient quantities of PGLG on acceptable terms, it could interrupt sales of Endari® and have a material, adverse effect on our financial condition and results of operations.

In addition, all manufacturers, packers, distributors and suppliers of pharmaceutical products must comply with applicable cGMP regulations for the manufacture of pharmaceutical products, which are enforced by the FDA through its facilities inspection program. If our manufacturers and key suppliers are not in compliance with cGMP requirements, it may result in a delay of approval for products undergoing regulatory review or the inability to meet market demands for any approved products, particularly if these sites are supplying single source ingredients required for the manufacture of any potential product. Furthermore, each manufacturing facility used to manufacture drug or biological products is subject to FDA inspection and must meet cGMP requirements. As a result, if one of the manufacturers that we rely on shifts production from one facility to another, the new facility must undergo a preapproval inspection and, for biological products, must be licensed by regulatory authorities prior to being used for commercial supply. A failure to comply with any applicable manufacturing requirements, including cGMP requirements, could delay or prevent the promotion, marketing or sale of our products. If the FDA or any other applicable regulatory authorities do not approve the facilities for the manufacture of Endari® or if they withdraw any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to commercially supply Endari®.

If the safety of any quantities supplied is compromised due to a third-party manufacturer's failure to comply with or adhere to applicable laws or for other reasons, we may be liable for injuries suffered by patients who have taken such products and we may not be able to obtain regulatory approval for or successfully commercialize our products.

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

We engaged a third-party contract research organization (“CRO”) to conduct our clinical trials for Endari® and expect to engage a CRO to conduct any further required clinical trials of Endari® and any clinical trials with respect to any of our product candidates that may progress to clinical development. We expect to continue to rely on third parties, such as CROs, clinical data management organizations, medical institutions and clinical investigators, to conduct those clinical trials. Agreements with such third parties might terminate for a variety of reasons, including a failure to perform by the third parties. If we need to enter into alternative arrangements, it could delay our product development activities.

Our reliance on these third parties for research and development activities reduces our control over these activities but does not relieve us of our responsibilities. For example, we will remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols for the trial. Moreover, the FDA requires us to comply with standards, commonly referred to as GCPs for conducting, recording and reporting the results of clinical trials to ensure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of trial participants are protected. We also are required to register ongoing clinical trials and post the results of completed clinical trials on a government-sponsored database, www.ClinicalTrials.gov, within specified timeframes. Failure to do so can result in the FDA refusing to accept a NDA for the product candidate under study, fines, adverse publicity and civil and criminal sanctions.

Furthermore, these third parties may also have relationships with other entities, some of which may be our competitors. If these third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our clinical trials in accordance with regulatory requirements and our stated protocols, we will not be able to obtain, or may be delayed in obtaining, marketing approvals for our product candidates and will not be able to, or may be delayed in our efforts to, successfully commercialize them as products. We also expect to rely on other third parties to store and distribute supplies of our product candidates for clinical trials of them. Any performance failure on the part of our distributors could delay clinical development or marketing approval of our product candidates or commercialization of them as products, producing additional losses and depriving us of potential revenue.

Delays in the commencement, enrollment and completion of clinical trials could result in increased costs to us and delay in our ability to develop and obtain regulatory approval for product candidates. The commencement, enrollment and completion of clinical trials can be delayed for a variety of reasons, including delays or difficulties in enrolling patients due to unforeseen natural disasters, public health crises, political crises and other catastrophic events or other events outside of our control, such as the recent emergence and spread of COVID-19, which may cause participants to not want to participate in these trials or otherwise have any unnecessary contact with the medical community.

Endari® may cause undesirable side effects or have other unexpected properties that could result in post-approval regulatory action.

The most common side effects seen with Endari® included constipation, nausea, headache, pain in the stomach area, cough, pain in the hands or feet, back pain, and chest pain. If we or others identify previously unknown undesirable side effects, or other previously unknown problems, caused by Endari® or other products with the same or related active ingredients, a number of potentially significant negative consequences could result, including:

- regulatory authorities may withdraw their approval of Endari®;
- we may need to recall Endari®;
- we may need to add warnings or narrow the indication in the product label or to create a Medication Guide outlining the risks of such side effects for distribution to patients;
- we may be required to change the way Endari® is administered or modify Endari® in some other way;
- the FDA may require us to conduct additional clinical trials or costly post-marketing testing and surveillance to monitor the safety or efficacy of the product;
- we could be sued and held liable for harm caused to patients; and
- our reputation may suffer.

Any of the above events resulting from undesirable side effects or other previously unknown problems could prevent us from achieving or maintaining market acceptance of Endari® and could substantially increase the costs of commercializing Endari®.

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

The commercial use of Endari® will expose us to the risk of product liability claims despite the fact it is approved for commercial sale by the FDA and manufactured in facilities licensed and regulated by the FDA. Any side effects, manufacturing defects, misuse or abuse associated with Endari® could result in injury to a patient or even death and product liability claims against us. In addition, a liability claim may be brought against us even if Endari® merely appears to have caused an injury. Product liability claims may be brought against us by consumers, health care providers, pharmaceutical companies or others selling or otherwise coming into contact with Endari® and we could incur substantial liabilities.

In addition, regardless of merit or eventual outcome, product liability claims may result in:

- decreased demand for Endari®;
- impairment of our business reputation;
- recall or withdrawal of Endari® from the market;
- costs related to litigation;
- distraction of management's attention from our business;
- substantial monetary awards to patients or other claimants; or
- loss of revenues.

We maintain product liability insurance coverage and carry commercial excess and umbrella coverage, but our insurance coverage may not be sufficient to cover product liability related expenses or losses and may not cover us for any consequential expenses or losses we may suffer. We may not be able to continue to maintain insurance coverage at a reasonable cost, in sufficient amounts or upon adequate terms to protect us against losses due to product liability. Large judgments have been awarded in class action or individual lawsuits based on drugs that had unanticipated side effects, including side effects that are less severe than those of Endari®. Successful product liability claims against us could cause the value of our common stock to decline and, if judgments exceed our insurance coverage, reduce our cash and have a material adverse effect on our business, results of operations, financial condition and prospects.

The use of any of our product candidates in clinical trials and in the market may expose us to liability claims.

We are exposed to potential liability risks inherent in the testing and manufacturing of our product candidates and marketing of any products. While in clinical stage testing, our product candidates could potentially harm people or allegedly harm people and we may be subject to costly and damaging product liability claims. Informed consent and contractual limitations on payments for subject injury or waivers we obtain may not be enforceable and may not protect us from liability or the costs of product liability litigation. Although we carry clinical product liability insurance, it may not be sufficient to cover future claims.

In addition, in some cases the contractors on which we rely for manufacturing our product candidates may indemnify us for third-party claims brought against us arising from matters for which these contractors are responsible. We could be materially and adversely affected if we were required to pay damages or incur defense costs in connection with a claim outside the scope of indemnity or insurance coverage, if the indemnity is not performed or enforced in accordance with its terms, or if our liability exceeds the amount of applicable insurance or indemnity. In addition, there can be no assurance that insurance will continue to be available in amounts and on terms acceptable to us, if at all, to cover any potential claims or liabilities.

We will need to increase the size and complexity of our organization in the future, and we may experience difficulties in managing our growth and executing our growth strategy.

We will need to expand our scientific, sales and marketing, managerial, operational, financial and other resources to support our planned commercialization activities. Continued operations and growth require that we manage our commercialization activities for Endari® and product development efforts successfully and in a cost-effective manner. We will also need to continue to improve our operational, financial, management and regulatory compliance controls and reporting systems and procedures.

We will need to attract and retain sufficient talented employees and scientific collaborators.

Historically we have utilized, and continue to utilize, part-time outside consultants to perform certain tasks, including tasks related to accounting and finance, compliance programs, clinical trial management, regulatory affairs, formulation development and other drug development functions. Our growth strategy related to Endari® may entail expanding our use of consultants to implement these and other tasks going forward. There can be no assurance that we will be able to manage our existing consultants or engage other competent consultants, as needed, on economically reasonable terms.

In addition, we have scientific and clinical advisors who assist us in our commercialization strategies for Endari® and our other product development efforts, including development of new medical indications for L-glutamine-based products. Although we have established research collaborations, we cannot assure you that our relationships with our research collaborators and scientific and clinical advisors will continue or that we will be able to attract additional research partners and advisors. Without such scientific relationships to assist in our research and development, we may not be able to successfully develop our product candidates or expand our product offerings.

We rely heavily on Yutaka Niihara, M.D., M.P.H., our Chairman and Chief Executive Officer, and the loss of his services would have a material adverse effect upon our business and prospects.

Our success depends to a significant extent upon the continued services of Yutaka Niihara, M.D., M.P.H., our founder and Chairman and Chief Executive Officer. The loss of Dr. Niihara's services could materially and adversely affect our business and prospects. We do not maintain key man life insurance on Dr. Niihara or any of our other executive officers.

Our business and operations may be adversely affected by information technology ("IT") system failures or cybersecurity or data breaches.

We rely on IT networks and systems, including those of third-party service providers, to collect, process, store and transmit confidential information including, but not limited to, personal information and intellectual property for a variety of functions including, but not limited to, conducting clinical trials, financial reporting, data and inventory management. We also outsource certain services, including recruiting services, call center services, contract sales organization services and other ancillary services relating to the commercial marketing and sale of Endari® in the U.S., as well as significant elements of our IT security systems, as a result, our service providers have access to our confidential information.

Despite the implementation of security measures and recovery plans, our network and information systems and those of third-party service providers may be vulnerable to damage from computer viruses, cyberattacks, physical or electronic break-ins, service disruptions, and security breaches from inadvertent or intentional actions by our employees or vendors, or from attacks by malicious third parties. While we have not experienced any such system failure or security breach to date, if such an event were to occur, our operations may be disrupted, and we may suffer from economic loss, reputational harm, regulatory actions or other legal proceedings. Further, such breaches and other inappropriate access can be difficult to detect, and any delay in identifying them may lead to increased risks of the actions described above. We expect that risks and exposures related to cybersecurity breaches will remain high for the foreseeable future due to the rapidly evolving nature and sophistication of these threats.

Historical material weaknesses in our internal controls over financial reporting have not been fully remediated.

In connection with the preparation and filing of this Annual Report, our management concluded that historical material weaknesses in our internal controls over financial reporting had not been fully remediated and our disclosure controls and procedures were not effective as described in more detail in Part II – Item 9A “Controls and Procedures” in this Annual Report. We cannot guarantee when our disclosure controls and procedures will be fully effective or that we will not identify other material weaknesses in the future. Any material weaknesses in our internal control over financial reporting could result in errors in our consolidated financial statements, which could erode market confidence in our company, adversely affect the market price of our common stock and, in egregious circumstances, result in possible claims based upon such financial information.

Our business may be adversely impacted by the consequences of Russia's invasion of Ukraine.

The United States, United Kingdom and European Union governments, among others, have instituted various sanctions and export-control measures in response to the invasion, including comprehensive financial sanctions, targeted at Russia or designated individuals and entities with business interests or government connections to Russia or those involved in Russian military activities. Governments have also enhanced export controls and trade sanctions targeting Russia's imports of

goods. The duration and intensity of this conflict and its potential impact on our business or operations is uncertain at this time, but it is possible that our business and operations could be adversely affected.

Risks Related to Our Intellectual Property

We may not be able to obtain and enforce intellectual property rights that cover our commercial activities or are sufficient to prevent third parties from competing against us.

Our success with respect to Endari® will depend, in part, on our ability to preserve our trade secrets and to prevent third parties from infringing upon our proprietary rights because we do not have (and will do not expect to be able to obtain) composition of matter patents or methods of use patents that cover Endari®. In particular, the patent for the use of L-glutamine to treat SCD expired in May 2016 and our license to the patent terminated. This means that our competitors are free to utilize processes, technologies and methods that were previously protected by the SCD patent to potentially develop competing products. While we have an Orphan Drug designation for the use of L-glutamine for the treatment of SCD in the U.S., our Orphan Drug exclusivity will expire in July 2024 and may be lost sooner if another L-glutamine product for the same indication demonstrates clinical superiority. If our competitors develop alternative L-glutamine products, it may have a material, adverse effect on our business and results of operations.

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

Although we expect all our employees to assign their inventions to us, and all our employees, consultants, advisors and any third parties who have access to our proprietary know-how, information or technology to enter into confidential information and invention agreements, we cannot provide any assurances that all such agreements have been duly executed or will be enforceable.

We depend on licenses of certain patents for the development of some of our product candidates. If any of these licenses terminate, or if any of the licensed patents is successfully challenged, we may be unable to continue the development of the affected product candidates.

Our ability to develop certain product candidates depends on an exclusive license we have obtained to patents that claim the use of Kainos's KM10544 IRAK4 inhibitor to treat cancers. The license could be terminated if we fail to satisfy our obligations under it. In the event any claims in the patents that we have been licensed are challenged, the court or patent authority could determine that such patent claims are invalid or unenforceable or not sufficiently broad in scope to protect our proprietary rights. As the licensee of such patents, our ability to participate in the defense or enforcement of such patents could be limited.

If we are unable to protect proprietary technology that we invent and develop, we may not be able to compete effectively, and our business and financial prospects may be harmed.

Where appropriate, we seek patent protection for inventions we conceive and reduce to practice, however, patent protection may be limited or not available for all these inventions. In addition, we may need to design around patents held by others. If we must spend significant time and money protecting our patents, designing around patents held by others or in-licensing patent or other proprietary rights held by others, potentially for large fees, our business and financial prospects may be harmed.

The patent prosecution process is expensive and time consuming, and we may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. We also may have to relinquish to strategic partners or other third parties to whom we license our technology the right to control the preparation, filing and prosecution of patent applications claiming our inventions and to maintain any resulting patents.

Therefore, patent applications and patents claiming our inventions may not be prosecuted and enforced in a manner consistent with the best interests of our business.

Our pending and future patent applications may not result in patents being issued that protect our product candidates, in whole or in part, or which effectively prevent others from commercializing competitive product candidates. Changes in either the patent laws or interpretation of the patent laws in the U.S. and other countries may diminish the value of our patents or narrow the scope of our patent protection.

Even if our patent applications issue as patents, they may not issue in a form that will prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our patents by developing similar or alternative treatments in a non-infringing manner.

In addition, the issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our patents may be challenged in the courts or patent offices in the U.S. and abroad. Such challenges may result in loss of exclusivity, freedom to operate and/or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to prevent others from commercializing products similar or identical to our product candidates or products, or limit the duration of the patent protection of our product candidates or products. Given the amount of time required for the development, testing and regulatory review of new therapeutics, patents protecting our product candidates might expire before or shortly after such candidates are commercialized as products. For example, our patent protection for Endari® expired in May 2016. As a result, our patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

Risks Related to Regulatory Oversight of Our Business and Compliance with Law

Endari® is subject to ongoing and continued regulatory review, compliance with which may result in significant expense and limit our ability to commercialize Endari®.

We are subject to ongoing FDA obligations and continued regulatory review with respect to the manufacturing, processing, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion and recordkeeping for Endari®. These requirements include submission of safety and other post-marketing information and reports, as well as continued compliance with good clinical practices and good laboratory practices or cGMPs. In addition, our product advertising and promotion are subject to regulatory requirements and continuing regulatory review. The FDA strictly regulates the promotional claims that may be made about prescription drug products. In particular, a drug product may not be promoted for uses that are not approved by the FDA as reflected in the product's approved labeling, although the FDA does not regulate the prescribing practices of physicians.

Manufacturers of drug products and their facilities are subject to continual review and periodic inspections by the FDA and other regulatory authorities for compliance with cGMP regulations. If we or a regulatory agency discovers previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facility where, or processes by which, the product is manufactured, a regulatory agency may impose restrictions on that product, the manufacturer or us, including requiring product recall, notice to physicians, withdrawal of the product from the market or suspension of manufacturing.

The FDA's regulations, policies or guidance may change, and new or additional statutes or government regulations may be enacted that could further restrict or regulate post-approval activities relating to our commercialization of Endari®. We cannot predict the likelihood, nature or extent of adverse government regulation that may arise from future legislation or administrative action. If we are not able to achieve and maintain regulatory compliance, we may not be permitted to market Endari®, which would adversely affect our ability to generate revenue and achieve or maintain profitability.

We may not be able to receive regulatory approval of PGLG treatment for diverticulosis or other indications, which would adversely affect our financial and operating condition.

All our product candidates are still in preclinical or early-stage clinical development. Regulatory approval is required to market our prescription grade L-glutamine treatment for diverticulosis or other indications and for any other product candidates we may develop. Even if the FDA and other regulatory authorities approve our PGLG treatment for diverticulosis, or any of our other product candidates, the manufacture, packaging, labeling, distribution, marketing and sale of such products will be subject to strict and ongoing post-approval regulations. Compliance with such regulations will be expensive and consume substantial financial and management resources.

The FDA has the authority to regulate the claims we make in marketing our prescription products to ensure that such claims are true, not misleading, supported by scientific evidence, and consistent with the approved labeling of those products. Failure to comply with FDA requirements in this regard could result in, among other things, warning letters, withdrawal of approvals, seizures, recalls, injunctions prohibiting a product's manufacture and distribution, restricting promotional activities, requiring corrective actions regarding sales and marketing activities, other operating restrictions, civil money penalties, disgorgement, and criminal prosecution. In addition, if we make any marketing claims that are related to a health care provider's unlawful submission for reimbursement from government programs, we could be subject to potential liability for violations of the False Claims Act, which may lead to disqualification from government programs or criminal prosecution, or both. Any of these government enforcement actions, if taken against us, could negatively impact our product sales and profitability.

Additionally, regulatory approval of any of our prescription products may be conditioned on our agreement to conduct costly post-marketing follow-up studies to monitor the safety or effectiveness of such products or to implement specific risk mitigation strategies. In addition, as clinical experience with any of our products following such approval, if any, expands after approval because the product is used by a greater number and more diverse group of patients than during clinical trials, unknown side effects or other problems may be observed that were not observed or anticipated during pre-approval clinical trials. In any such case, one or more regulatory authorities could require additional risk information be added to the labeling of the product, restrict the indications for which the product may be sold, restrict the distribution channels, or revoke the product's regulatory approval, which could hinder our ability to generate revenues from that product. If we fail to develop and commercialize our product candidates as planned, our financial results and financial condition will be adversely affected, we will have to delay or terminate some or all of our research product development programs, and we may be forced to cease operations.

The development process to obtain FDA approvals for new drugs therapies is very costly and time consuming and if we cannot complete our clinical trials in a cost-effective manner, our operations may be adversely affected.

Before obtaining marketing approval from regulatory authorities for the sale of any product candidate, we or a collaborator must complete preclinical development and then complete one or more extensive clinical trials to demonstrate the safety and effectiveness of the product candidate in humans. Clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to outcome. Costs of clinical trials may vary significantly over the life of a development project owing, but not limited to, the following:

- the number of patients that participate in the trials;
- the per patient trial costs;
- the number of sites and clinical investigators involved in the trials;
- the number and types of trials and studies that may need to be performed;
- the length of time required to recruit, screen, and enroll eligible patients;
- the duration of the clinical trials;
- the countries in which the trials are conducted;
- the number of doses that patients receive;
- adverse events experienced by trial participants;
- the drop out or discontinuation rates of patients;
- potential additional safety monitoring or other studies requested by regulatory agencies;
- the extent and duration of patient follow up;
- difficulties that could arise in analyzing and reporting to regulators the results of clinical trials; and
- the efficacy and safety profile of the product candidate.

If we are unable to control the timing and costs of our clinical trials and conduct our trials and apply for regulatory approvals in a timely and cost-effective manner, our operations may be adversely affected.

Our product development costs will also increase if any regulatory agencies impose a clinical hold on any of our clinical studies or we experience delays in obtaining marketing approvals, particularly if we are required to conduct additional

clinical studies beyond those that we submit in any NDA. We do not know whether any of our preclinical studies or clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. Significant preclinical study or clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our approved product candidates or allow our competitors to bring products to market before we do, and thereby impair our ability to successfully commercialize our product candidates.

We may not be able to complete clinical trial programs for any of our product candidates successfully within any specific time period or at all, and if such clinical trials take longer to complete than we project, our ability to execute our current business strategy will be adversely affected.

Clinical testing is expensive, difficult to design and implement, can take many years to complete, and is uncertain as to outcome. A failure of one or more clinical trials can occur at any stage of development. The outcome of preclinical testing and early clinical trials may not be predictive of the success of later clinical trials, and interim results of a clinical trial do not necessarily predict final results. Moreover, clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of them.

Generally speaking, whether we complete our clinical trials in a timely manner, or at all, for any product candidate is dependent in part upon: (i) the date the applicable investigational new drug, or IND, becomes effective enabling us to commence the applicable clinical studies (which, under U.S. law, occurs no more than 30 days after the FDA receives the IND, unless the FDA places the IND on clinical hold, in which case the FDA may request us to provide additional data from completed preclinical studies or undertake additional preclinical studies, the latter of which could materially delay the clinical and regulatory development of the applicable product candidate); (ii) the engagement of clinical trial sites and clinical investigators; (iii) reaching an agreement with clinical investigators on acceptable clinical trial agreement terms, clinical trial protocols or informed consent forms; (iv) obtaining approval from the institutional review boards used by the clinical trial sites we seek to engage; (v) the rate of patient enrollment and retention; and (vi) the rate to collect, clean, lock and analyze the clinical trial database.

Clinical trials required for demonstration of substantial evidence of effectiveness and safety often require the enrollment of large numbers of patients, and suitable patients may be difficult to identify and recruit. Our ability to enroll sufficient numbers of patients in our clinical trials, especially when the disease or condition being studied is rare, depends on many factors, including the size of the relevant patient population, the nature and design of the protocol, the proximity of patients to clinical sites, the eligibility and exclusion criteria applicable for the trial, existence of competing clinical trials and the availability of already approved therapeutics for the indications being studied (whether or not such therapeutics are less safe or less effective than our product candidate under trial). If we fail to enroll and maintain the number of patients for which the clinical trial was designed, the statistical significance and/or statistical power of that clinical trial may be reduced which would make it harder to demonstrate that the product candidate being tested in such clinical trial is safe and effective for its intended use.

We may be required to suspend, repeat or terminate our clinical trials if they do not meet regulatory requirements, the results are negative or inconclusive, human subject protections are inadequate, the trials are not well designed, or clinical investigators fail to comply with all requirements for the conduct of trials under the applicable IND, any of which may result in significant negative repercussions on our business and financial condition.

We cannot market a pharmaceutical product in any jurisdiction until we have completed rigorous preclinical testing and clinical trials for that product, demonstrated the product's safety and substantial evidence of effectiveness for its intended use, obtained the approval of the applicable regulatory authority for our proposed labeling of the product, and met the other requirements of such jurisdiction's extensive regulatory approval process. Preclinical testing and the conduct of clinical trials are long and expensive. Data obtained from preclinical and clinical tests can be interpreted in different ways and could ultimately be deemed by regulatory authorities to be insufficient with respect to providing substantial evidence of effectiveness and safety required for regulatory approval, which could delay, limit or prevent regulatory approval. It may take us many years to complete the required testing of our product candidates to support an application for marketing approval and failure can occur at any stage during this process.

We cannot provide assurance that our preclinical testing and clinical trials will be completed successfully within any time period specified by us, or without significant additional resources or expertise provided by third parties to conduct such testing. We cannot provide assurance that any such testing will demonstrate that our product candidates meet regulatory approval requirements for safety and effectiveness or that any such product will be approved for a specific indication. Results from early clinical trials may not be indicative of the results that will be obtained in later-stage clinical trials or in the population of patients for whom the applicable product is prescribed following any approval. In addition, negative or inconclusive results

from the clinical trials we conduct, or adverse events experienced by the patients in such clinical trials, could cause us to have to suspend, repeat or terminate the clinical trials. Clinical trials are subject to continuing oversight by governmental regulatory authorities and institutional review boards and must meet the requirements of these authorities including but not limited to requirements for informed consent, human subject protection and good clinical practices; and we cannot guarantee that we will be able to comply, or that a regulatory authority will agree that we have complied, with such requirements.

We rely on third parties, such as CROs, contract laboratories, regulatory consultants and data management companies to assist us in overseeing and monitoring clinical trials as well as to process the clinical data and manage test requests, which may result in delays or failure to complete trials, if the third parties fail to perform or meet applicable regulatory requirements and standards. A failure by us or any such third parties to comply with the terms and conditions of the protocol for any clinical study or the regulatory requirements for a product candidate or to complete the clinical trials for a product candidate in the projected time frame could significantly delay or increase the cost of our studies and have a material adverse effect on our business and financial condition.

There are significant requirements imposed on us and on clinical investigators who conduct clinical trials under an IND. Although we are responsible for selecting qualified clinical investigators, providing them with the information they need to properly conduct an investigation, ensuring proper monitoring of the investigations and that the investigations are conducted in accordance with the general investigational plan and protocols contained in the IND, we cannot ensure the clinical investigators will maintain compliance with all regulatory requirements at all times. The pharmaceutical industry has experienced cases where clinical investigators have been found to incorrectly record data, omit data, or even falsify data. We cannot ensure that the clinical investigators in our trial will not make mistakes or otherwise compromise the integrity or validity of data, any of which would have a significant negative effect on our ability to obtain marketing approval.

Changes in regulatory requirements and guidance or unanticipated events during our clinical trials may occur, which may result in necessary changes to clinical trial protocols, informed consents and clinical trial budgets, any of which changes could result in increased costs to us, delay our development timeline or reduce the likelihood of successful completion of the clinical trial.

Changes in regulatory requirements or the FDA's interpretation of those requirements, which may be provided through guidance documents, or the occurrence of unanticipated events during our clinical trials could require us to amend clinical trial protocols, informed consent forms and trial budgets. If we experience delays in initiation, conduct or completion of any of our clinical trials, or if we terminate any of our clinical trials due to changes in regulatory requirements or guidance documents, unexpected and serious adverse events, or other unanticipated events, we may incur additional costs and have difficulty enrolling subjects or achieving clinical investigator or institutional review board acceptance of the changes and successfully completing the trial. Any such additional costs and difficulties could potentially materially harm the commercial prospects for our product candidates and delay our ability to generate product revenue.

There are various uncertainties related to the research, development and commercialization of Kainos's KM10544 IRAK4 inhibitor to treat cancers and the cell sheet engineering regenerative medicine products we are developing which could negatively affect our ability to commercialize such products.

We have historically focused on the research and development of our PGLG treatment for SCD and have little or no experience in the research, development or commercialization of potential cancer treatments such as Kainos's KM10544 IRAK4 inhibitor or cell sheet regenerative medicine products or any other biological product. We are not aware of any clinical trials of cell sheet regenerative products in the U.S. or of any biological products based on cell sheet engineering that have been approved by regulatory authorities in any jurisdiction. Such products must be manufactured in conformance with current cGMP requirements as well as Good Tissue Practice ("GTP") requirements and demonstrate that they are safe, pure and potent to be effective for their intended uses to obtain FDA approval. The GTP requirements, which are specifically applicable to all cellular-based products, are intended to prevent communicable disease transmission. It is uncertain what type and quantity of scientific data would be required to support initiation of clinical studies or to sufficiently demonstrate the safety, purity and potency of cell sheet regenerative medicine products for their intended uses. Such uncertainties could delay our ability to obtain FDA approval for and to commercialize such products. In addition, the research and commercialization of cell sheet regenerative medicine products could be hindered if third-party manufacturers of such products are not compliant with cGMP, GTP, and any other applicable regulations. Any delay in the development of, obtaining FDA approval for, or the occurrence of any problems with third-party manufacturers of cell sheet regenerative medicine products would negatively affect our ability to commercialize such products.

We are subject to numerous complex regulations and failure to comply with these regulations, or the cost of compliance with these regulations, may harm our business.

The research, testing, development, manufacturing, quality control, approval, labeling, packaging, storage, recordkeeping, promotion, advertising, marketing, distribution, possession and use of Endari® are subject to regulation by numerous governmental authorities in the U.S. The FDA regulates drugs under the Federal Food, Drug and Cosmetic Act and implementing regulations. Noncompliance with any applicable regulatory requirements can result in refusal to approve products for marketing, warning letters, product recalls or seizure of products, total or partial suspension of production, prohibitions or limitations on the commercial sale of products or refusal to allow the entering into of federal and state supply contracts, fines, civil penalties and/or criminal prosecution. Additionally, the FDA and comparable governmental authorities have the authority to withdraw product approvals that have been previously granted. Moreover, the regulatory requirements relating to Endari® may change from time to time, and it is impossible to predict what the impact of any such changes may be.

Health care reform measures and changes in policies, funding, staffing and leadership at the FDA and other agencies could hinder or prevent the commercial success of Endari®.

In the U.S., legislative and regulatory changes to the healthcare system could affect our future results of operations and the future results of operations of our potential customers. For example, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 established a Part D prescription drug benefit, under which Medicare beneficiaries can obtain prescription drug coverage from private sector plans that are permitted to limit the number of prescription drugs that are covered in each therapeutic category and class on their formularies. If Endari® is not widely included on the formularies of these plans, our ability to market Endari® may be adversely affected.

Furthermore, there have been and continue to be initiatives at the federal and state levels that seek to reduce healthcare costs. In March 2010, President Obama signed into law the Patient Protection and Affordable Health Care Act of 2010, as amended by the Health Care and Education Affordability Reconciliation Act of 2010 (jointly, the "PPACA"), which includes measures to significantly change the way health care is financed by both governmental and private insurers. Among the provisions of the PPACA of importance to the pharmaceutical industry are the following:

- an annual, nondeductible fee on any entity that manufactures or imports certain branded prescription drugs and biologic agents, apportioned among these entities according to their market share in certain government healthcare programs;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program, retroactive to January 1, 2010, to 23% and 13% of the average manufacturer price for most branded and generic drugs, respectively;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D (the required discount was increased to 70% on January 1, 2019 pursuant to subsequent legislation);
- extension of manufacturers' Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for certain individuals with income at or below 133% of the Federal Poverty Level, thereby potentially increasing both the volume of sales and manufacturers' Medicaid rebate liability;
- expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program;
- new requirements to report certain financial arrangements with physicians and teaching hospitals, as defined in the PPACA and its implementing regulations, including reporting any "transfer of value" made or distributed to teaching hospitals, prescribers, and other healthcare providers and reporting any ownership and investment interests held by physicians and their immediate family members and applicable group purchasing organizations during the preceding calendar year, with data collection required and reporting to the CMS required by the 90th day of each calendar year;
- a new requirement to annually report drug samples that manufacturers and distributors provide to physicians;

- expansion of health care fraud and abuse laws, including the False Claims Act and the Anti-Kickback Statute, new government investigative powers, and enhanced penalties for noncompliance;
- a licensure framework for follow-on biologic products;
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research;
- creation of the Independent Payment Advisory Board which, beginning in 2014, will have authority to recommend certain changes to the Medicare program that could result in reduced payments for prescription drugs and those recommendations could have the effect of law even if Congress does not act on the recommendations; and
- establishment of a Center for Medicare Innovation at the CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending.

Additionally, individual states have become increasingly aggressive in passing legislation and implementing regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access, and marketing cost disclosure and transparency measures, and encourage importation from other countries and bulk purchasing. Legally mandated price controls on payment amounts by third-party payors or other restrictions could harm our business, results of operations, financial condition and prospects.

In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other healthcare programs. This may reduce demand for Endari® or put pressure on our product pricing, which could negatively affect our business, results of operations, financial condition and prospects.

The commercial success of Endari® will depend, in part, upon the availability of coverage and reimbursement from third-party payors at the federal, state and private levels. Third-party payors include governmental programs such as Medicare or Medicaid, private insurance plans and managed care plans. These third-party payors may deny coverage or reimbursement for a product or therapy in whole or in part if they determine that the product or therapy was not medically appropriate or necessary. Also, third-party payors have attempted to control costs by limiting coverage through the use of formularies and other cost-containment mechanisms and the amount of reimbursement for particular procedures or drug treatments.

Additionally, given recent federal and state government initiatives directed at lowering the total cost of healthcare, Congress and state legislatures will likely continue to focus on healthcare reform, the cost of prescription drugs and the reform of the Medicare and Medicaid programs. While we cannot predict the full outcome of any such legislation, it may result in decreased reimbursement for prescription drugs, which may further exacerbate industry-wide pressure to reduce prescription drug prices. This could harm our ability to market Endari® and generate revenues. In addition, legislation has been introduced in Congress (the Affordable and Safe Prescription Drug Importation Act) that, if enacted, would permit more widespread importation or re-importation of pharmaceutical products from foreign countries into the U.S., including from countries where the products are sold at lower prices than in the U.S. Such legislation, or similar regulatory changes, could lead to a decision to decrease our prices to better compete, which, in turn, could adversely affect our business, results of operations, financial condition and prospects. It is also possible that other legislative proposals having similar effects will be adopted.

Furthermore, regulatory authorities' assessment of 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, changing policies and agency funding, staffing and leadership. We cannot be sure whether future changes to the regulatory environment will be unfavorable to our business prospects.

If we fail to comply with federal and state healthcare laws, including fraud and abuse and health information privacy and security laws, we could face substantial penalties and our business, results of operations, financial condition and prospects could be adversely affected.

As a pharmaceutical company, even though we do not and will not control referrals of healthcare services or bill directly to Medicare, Medicaid or other third-party payors, certain federal and state healthcare laws and regulations pertaining to fraud and abuse and patients' rights are and will be applicable to our business. We could be subject to healthcare fraud and abuse and patient privacy regulation by both the federal government and the states in which we conduct our business. The laws that may affect our ability to operate include:

- the federal Anti-Kickback Statute, which constrains our marketing practices, educational programs, pricing policies, and relationships with healthcare providers or other entities, by prohibiting, among other things,

soliciting, receiving, offering or paying remuneration, directly or indirectly, to induce, or in return for, either the referral of an individual or the purchase or recommendation of an item or service reimbursable under a federal healthcare program, such as the Medicare and Medicaid programs;

- federal civil and criminal false claims laws and civil monetary penalty laws, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, false or fraudulent claims for payment from Medicare, Medicaid, or other third-party payors;
- the federal Health Insurance Portability and Accountability Act of 1996 (“HIPAA”), which created new federal criminal statutes that prohibit executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009 (“HITECH”), and its implementing regulations, which imposes certain requirements relating to the privacy, security and transmission of individually identifiable health information; and
- state law equivalents of each of the above federal laws, such as anti-kickback and false claims laws which may apply to items or services reimbursed by any third-party payor, including commercial insurers, and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Because of the breadth of these laws and the narrowness of the statutory exceptions and safe harbors available under the U.S. federal Anti-Kickback Statute, it is possible that some of our business activities could be subject to challenge under one or more of such laws. If we or our operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to us, we may be subject to penalties, including civil and criminal penalties, damages, fines, exclusion from participation in U.S. federal or state health care programs, and the curtailment or restructuring of our operations. Any penalties, damages, fines, curtailment or restructuring of our operations could materially adversely affect our ability to operate our business and our financial results.

The FDA provides guidelines with respect to appropriate promotion and continuing medical and health education activities. Although we endeavor to follow these guidelines, the FDA or the Office of the Inspector General: U.S. Department of Health and Human Services may disagree, and we may be subject to significant liability, including civil and administrative remedies as well as criminal sanctions. In addition, management’s attention could be diverted, and our reputation could be damaged.

Although compliance programs can mitigate the risk of investigation and prosecution for violations of these laws, the risks cannot be eliminated entirely. Any action against us for violation of these laws, even if we successfully defend against it, could cause us to incur significant legal expenses and divert our management’s attention from the operation of our business. Moreover, achieving and sustaining compliance with applicable federal and state privacy, security and fraud laws may prove costly.

Even though we have obtained Orphan Drug designation for Endari®, we may not be able to maintain Orphan Drug marketing exclusivity for Endari® or any of our other product candidates.

Regulatory authorities in some jurisdictions, including the U.S. and the European Union, may designate therapeutic products under development for relatively small patient populations as “orphan drugs”. Under the Orphan Drug Act, the FDA may designate a therapeutic product as an Orphan Drug if it is intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals in the U.S. We have obtained Orphan Drug designation from the FDA, which will expire July 7, 2024, and Orphan Medicinal designation from the EC for L-glutamine treatment for SCD, and we may seek Orphan Drug designation for our other product candidates. Generally, if a product candidate with an Orphan Drug designation subsequently receives the first marketing approval for the indication for which it has been granted such designation, the drug is entitled to a period of marketing exclusivity, which precludes the FDA or EC, as applicable, from approving another marketing application for the same product candidate prior to the expiration of that time period. The applicable period is seven years in the U.S. and ten years in the EU. The exclusivity period in the EU can be reduced to six years if the product no longer meets the criteria for Orphan Medicinal designation or if its commercialization is sufficiently profitable so that market exclusivity is no longer justified. Orphan Drug and Orphan Medicinal exclusivity may be lost if the FDA or EC determines that the request for designation was materially defective or if the manufacturer is unable to ensure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. In the U.S., Orphan Drug exclusivity may be lost if another L-glutamine product for the same indication demonstrates clinical superiority, such as a better safety or efficacy profile, in which case the FDA would be permitted to approve the third-party product. Orphan Drug exclusivity does not bar the FDA from approving another L-glutamine product for any other indication. Nor does Orphan Drug designation bar

the FDA from granting Orphan Drug designation and approving another product such as Oxbraya, from Global Blood Therapeutics, Inc. for treating SCD, for the same orphan disease or condition.

Any product candidate for which we obtain marketing approval would be subject to post-marketing regulatory requirements and limitations and could be subject to recall or withdrawal from the market, and we may be subject to penalties if we fail to comply with such regulatory requirements or if we experience unanticipated problems in commercializing any of our product candidates, when and if any of them are approved by regulators.

Any product candidate for which we obtain marketing approval, along with the collection and reporting of post-approval clinical data, manufacturing processes, labeling, advertising and promotional activities for the resulting product, will be subject to continual requirements of and review by the FDA and other regulatory authorities. These requirements include submissions of safety and other post-marketing information and reports, establishment registration and product listing requirements, cGMP requirements relating to manufacturing, quality control, quality assurance and corresponding maintenance of records and documents, requirements regarding the distribution of samples to physicians and recordkeeping. Even if the FDA or other regulators outside the U.S. grant marketing approval to any of our product candidates, the approval may be subject to limitations on the indicated uses for which it may be marketed as a product or to the conditions of approval, including the requirement to implement a risk evaluation and mitigation strategy (“REMS”). If any of our product candidates receives marketing approval, the labeling (including the package insert) that must accompany its distribution as a product may limit its approved use, which could limit the total number of prescriptions written for such products.

In consultation with the FDA, Emmaus is designing clinical studies to generate data in stages to fulfill the post-marketing commitment for the current SCD indication of Endari®. These studies will require additional funding and are designed to include dosing and safety, particularly in those populations not yet given Endari®. On any future products, the FDA may also require additional costly post-marketing studies or clinical trials or surveillance to monitor the safety or effectiveness of any other approved product. The FDA closely regulates the post-approval marketing and promotion of therapeutic products to ensure they are marketed for the approved indications and in accordance with the provisions of the approved labeling, and that any marketing claims or communications by a person or company responsible for the manufacture and distribution of the product regarding off-label use are truthful and not misleading. If we market any of our products for indications that have not been approved in a manner that is considered misleading or not truthful, we may be subject to enforcement action for misbranding the product. Violations of the FDC&A relating to the promotion of prescription products may lead to investigations alleging violations of federal and state healthcare fraud and abuse laws, as well as state consumer protection laws. In recent years, several pharmaceutical companies have been or settled lawsuits for fined significant amounts for such violations.

In addition, later discovery of previously unknown adverse events or other problems with any of our product candidates that are approved for marketing as products, the contract manufacturers from which we obtain supplies of these products, the manufacturing processes they use to manufacture these products, or our or their failure to comply with regulatory requirements, may have negative consequences, including:

- restrictions on the manufacturers or manufacturing processes for such products;
- restrictions on the labeling or marketing of such products;
- restrictions on distribution or use of such products;
- requirements to conduct post marketing studies or clinical trials;
- warning letters;
- recall or withdrawal of such products from the market;
- refusal to approve pending applications or supplements to approved marketing applications that we submit;
- clinical holds on clinical studies of such products;
- fines, restitution or disgorgement of revenue or profit generated by sales of such products;
- suspension or withdrawal of the marketing approvals of such products;
- refusal to permit the import or export of such products;
- seizure of such products;
- injunctions prohibiting the manufacture, marketing, sale, distribution, or related action in respect of such products;

- the imposition of civil or criminal penalties; and/or
- debarment of our company and any of our officers or other employees responsible for such problems from future dealings with the FDA.

Noncompliance with applicable regulatory requirements regarding safety monitoring, also called pharmacovigilance, and with requirements related to the development of therapeutics for the pediatric population, can also result in significant financial penalties. Similarly, failure to comply with applicable regulatory requirements regarding the protection of personal information can also lead to significant penalties and sanctions.

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

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

Among policy makers and payors in the U.S. and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and expanding access. In the U.S., the pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives. In March 2010, President Obama signed into law the Patient Protection and Affordable Care Act (“PPACA”), which intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms.

Among the provisions of the PPACA of importance to us are:

- an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents, apportioned among these entities according to their market share in certain government healthcare programs;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program to 23.1% and 13.0% of the average manufacturer price for branded and generic drugs, respectively;
- expansion of healthcare fraud and abuse laws, including the False Claims Act and the Anti-Kickback Statute, new government investigative powers and enhanced penalties for noncompliance;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point of sale discounts off negotiated prices of applicable brand medicines to eligible beneficiaries during their coverage gap period, as a condition for a manufacturer’s medicines purchased outside a hospital setting to be covered under Medicare Part D;
- extension of a manufacturer’s Medicaid rebate liability to covered medicines dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding a new eligibility category for certain individuals with income at or below 133% of the federal poverty level beginning in 2014, thereby potentially increasing a manufacturer’s Medicaid rebate liability;
- expansion of the entities eligible for discounts under the 340B Public Health Service pharmaceutical pricing program;
- the new requirements under the federal Open Payments program and its implementing regulations;
- a new requirement to annually report samples of medicines that manufacturers and distributors provide to physicians; and
- a new Patient Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research.

In addition, other legislative changes have been proposed and adopted since the PPACA was enacted. These changes include aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, starting in 2013. On March 1, 2013, the President signed an executive order implementing the 2% Medicare payment reductions, and on April 1, 2013, these

reductions went into effect. In January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws may result in additional reductions in Medicare and other healthcare funding, which could have a material adverse effect on customers for any of our products, and, accordingly, our financial operations. Further, there have been multiple attempts through legislative action and legal challenge to repeal or amend the PPACA, and we cannot predict the impact that such a repeal or amendment would have on our business and operations.

On November 20, 2020, the U.S. Department of Health and Human Services published a Final Rule entitled “Removal of Safe Harbor Protection for Rebates to Plans or PBMs Involving Prescription Pharmaceuticals and Creation of New Safe Harbor Protection,” referred to as the Rebate Rule, which amends the discount safe harbor by eliminating protection for price concessions, including rebates, that are offered by pharmaceutical manufacturers to plan sponsors, or pharmacy benefit managers under contract with them, under the Medicare Part D program and Medicare Advantage Plans, unless the price reduction is one required by law. Effective January 1, 2022, in advance of the calendar year 2022 Part D plan year, safe harbor protection will be eliminated for manufacturer rebates paid directly (or indirectly through a pharmacy benefit manager) to Part D prescription drug plans and Medicare Advantage prescription drug plans. Effective December 30, 2020, the Rebate Rule will establish two new safe harbors. The first new safe harbor will protect price reductions paid by manufacturers to prescription drug plans (including prescription drug plans offered by Medicare Advantage organizations) and Medicaid managed care organizations, which are fully reflected at the point-of-sale. The second new safe harbor will protect fair-market-value service fees paid to pharmacy benefit managers by manufacturers. This new rule could result in a change in incentives for health plans and PBMs in negotiating rebates and discounts with manufacturers for preferred formulary placement. Because the rule is not yet in effect, at this time we cannot predict how these changes would impact our business and operations.

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

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

Risks Related to Our Investment in EJ Holdings, Inc.

EJ Holdings has no revenues and is dependent on us to fund its business and operations, and there is no assurance that we can continue to provide needed funding or that EJ Holdings will be able to continue its activities.

EJ Holdings, Inc., or EJ Holdings, a Japanese corporation 40% owned by us, is engaged in phasing in its amino acid manufacturing plant in Ube, Japan and obtaining regulatory clearances for the manufacture of PGLG in accordance with cGMP. EJ Holdings has had no revenues since its inception, has depended on loans from us to acquire the Ube plant and fund its operations and will continue to be dependent on loans from us or other financing unless and until its plant is activated and it can secure customers, including us, for its products. There is no assurance that we can continue to provide needed funding to EJ Holdings, or that needed funding will be available from other sources. EJ Holdings has no commitments or understandings regarding any additional funding. If EJ Holdings fails to obtain needed funding, it may need to suspend activities at the Ube plant. Under the asset purchase agreement by which EJ Holdings purchased the Ube plant, the seller has the right to repurchase the plant at the purchase price, plus certain taxes, paid by EJ Holdings if the plant does not become operational within a reasonable period of time (not to exceed five years). In that event, it is likely that we would lose some or all of our investment in EJ Holdings.

EJ Holdings may not be able to obtain needed financing or repay our loans, and our ownership interest in EJ Holdings may be diluted by additional financing.

As of December 31, 2021, we had loaned EJ Holdings a total of \$22.6 million, and EJ Holdings will continue to be reliant upon loans from us to fund its planned activities at the Ube plant unless and until it is able to secure additional debt or equity financing to fund such activities. EJ Holdings also will need to raise substantial debt or equity financing to fund the

plant's operations if the phase-in of the plant is completed, including, but not limited to, maintaining the physical plant and maintaining regulatory approvals for the manufacture of its products. To the extent EJ Holdings raises additional debt or equity financing from sources other than us, its ability to repay our loans may be adversely affected or our ownership interest may be diluted.

If EJ Holdings fails to reactivate its plant and obtain customers, it may not be able to sell its plant and property and we may lose our investment.

If EJ Holdings fails to reactivate the Ube plant or to secure customers for its products, it may need to sell its plant and property. There is no assurance that it will be able to do so at an attractive price or at all. Our loans to EJ Holdings are general unsecured obligations of EJ Holdings and we have no mortgage or other security interest in the plant or other property of EJ Holdings. Depending on the price at which the plant and property can be sold if it becomes necessary, EJ Holdings may be unable to repay our loans and its other secured or unsecured obligations, and we may lose some or all of our investment in EJ Holdings.

EJ Holdings is subject to risks inherent in a new business and may not be successful.

EJ Holdings was formed in February 2017 for the purpose of acquiring, owning and operating Kyowa's phased-out amino acid manufacturing plant in Ube, Japan. EJ Holdings is engaged in phasing in the plant and obtaining regulatory clearances to reactivate the plant, including FDA and other regulatory approvals for the manufacture of PGLG in accordance with cGMP. EJ Holdings has no operating history, and there is no assurance that it will be successful in bringing the plant online on a timely basis, or at all, or if it does so that it will be able to secure customers for its products or successfully implement its business plan.

We do not control EJ Holdings, and EJ Holdings may engage in activities contrary to our best interests.

JIP owns 60% of EJ Holdings and is entitled to designate a majority of EJ Holdings' board of directors, its Chief Executive Officer and outside auditors, and, as such, controls the management, business and operations of EJ Holdings. It is possible that EJ Holdings will engage in actions or business activities that we believe are inconsistent with the MOU and not in our best interests and that may have an adverse effect on the economic or strategic value of our ownership interest in EJ Holdings.

EJ Holdings retains discretion over its use of any funds that we provide to it.

We do not control EJ Holdings' day-to-day operations. Accordingly, funds provided by us to EJ Holdings may be used by it in any manner its management deems appropriate, including making capital expenditures and paying of salaries and other compensation of its officers and other employees. There is no assurance that EJ Holdings will use our funds in a manner that will enhance the value of our ownership interest in EJ Holdings.

Risks Related to Our Securities

We have been delinquent in our past SEC reporting obligations and if we fail to timely file our future SEC reports, our security holders and prospective investors will not have current information regarding our financial statements and status of our business and operations and our common stock may no longer be eligible for quotation on the OTC Markets Group, Inc.

We were unable to timely file with the SEC our Annual Reports on Form 10-K for the years ended December 31, 2019 and December 31, 2020 and our Quarterly Reports on Form 10-Q for 2020 or our Quarterly Report for the quarter ended March 31, 2021. Our failure to timely file our periodic SEC reports adversely affects the ability of our security holders and prospective investors to have current information regarding our financial statements and status of our business and operations and is likely to have adversely affected the liquidity and trading prices of our common stock. Under applicable rules of the Financial Industry Regulatory Authority, or FINRA, our failure to timely file our periodic reports with the SEC may result in the disqualification of our common stock for quotation on the OTC Markets Group, Inc. In such event, there may be no established trading market for our common stock unless and until we are in compliance with our SEC reporting obligations and our common stock once again becomes eligible for quotation on the OTC Markets Group, Inc. or is listed on a national securities exchange.

We have experienced, and may continue to experience, significant volatility in our stock price.

The trading price for our common stock has historically been volatile and traded at higher or lower prices that are seemingly uncorrelated with our results of operations, financial condition or prospects. Between January 1, 2021 and December 31, 2021, the closing sale price of our common stock as reported on the OTC Markets Group, Inc. ranged from a low of \$0.72 to a high of \$2.16 and may continue to exhibit volatility. Factors such as the following may affect the volatility in our stock price:

- our quarterly operating results;
- marketing approvals or other developments regarding Endari® or competing products;
- announcements of regulatory developments or technological innovations by us or our competitors;
- changes in our relationship with our vendors, distributors or other strategic partners;
- government regulation of drug pricing; and
- developments in patent or other intellectual property rights;

Other factors which may affect our stock price include general economic conditions or changes in the economy, the financial markets or the pharmaceutical or biotechnology industries driven by extraordinary events such as the COVID-19 pandemic. We may be particularly vulnerable to volatility caused by these conditions or events, as we have only a single approved product and have relatively thin trading volume in our common stock.

Trading on the OTC Markets is volatile and sporadic, which could depress the market price of our common stock and make it difficult for our stockholders to resell their common stock.

Until July 31, 2020, our common stock was quoted on the OTCQB tier of the OTC Markets Group, Inc., or OTC Markets. On August 3, 2020, our common stock was relegated to the OTC Pink tier of the OTC Markets, pending the filing of our delinquent SEC reports and posting of our OTCQB Certification and verification of the company profile through OTCIQ.com. On or about September 13, 2021, public quotations for our common stock became available on the OTCQX tier of the OTC Markets. Trading in securities quoted on the OTC Markets is often thin and characterized by wide fluctuations in trading prices due to many factors, some of which may have little to do with our operations or business prospects. This volatility could depress the market price of our common stock for reasons unrelated to our business or operating performance. Moreover, the OTC Markets is not a stock exchange, and trading of securities on the OTC Markets is often more sporadic than the trading of securities listed on a quotation system such as The Nasdaq Capital Market or a stock exchange like the NYSE American. These factors may result in investors having difficulty purchasing and reselling shares of our common stock.

Our outstanding warrants and convertible promissory notes may result in further dilution to our stockholders.

Certain of our outstanding warrants to purchase a total of up to approximately 3,607,200 shares of our common stock provided for so-called full-ratchet anti-dilution adjustments in the event we sell or issue shares of common stock or common stock equivalents at an effective price less than the exercise price of such warrants, subject to certain exceptions. These anti-dilution adjustments resulted in a reduction in the exercise price of such warrants to \$1.54 per share in February 2021. We also have outstanding approximately \$14.5 million principal amount of convertible promissory notes which are convertible into shares of our common stock at a conversion price of \$1.48 per share that is subject to possible future reductions on a quarterly basis in the event the prevailing trading price of our common stock is less than the then-conversion price. The anti-dilution adjustments of our outstanding warrants would be triggered by future issuances by us of shares of our common stock upon conversion of the convertible promissory notes, or otherwise, at a price per share below the then-exercise price of such warrants, which adjustments would have a further dilutive effect on our stockholders.

Stockholders may experience future dilution from future equity offerings.

To raise additional capital in the future we may sell and issue additional shares of our common stock or securities convertible into or exchangeable for our common stock, which sales would have a dilutive effect on the percentage ownership of our existing stockholders.

A substantial number of shares of common stock may be sold in the market, which may depress the market price for our common stock.

Sales of a substantial number of shares of our common stock in the public market, or the possibility such sales upon the exercise or conversion of our outstanding warrants or convertible promissory notes, could cause the market price of our common stock to decline or serve to depress the market price of our common stock. A substantial majority of the outstanding shares of our common stock are, and the shares of common stock issuable upon the exercise of our outstanding warrants and

other convertible securities or shares which may be sold in future offerings by us will be, freely tradable without restriction or further registration under the Securities Act.

Our common stock is not traded on a national securities exchange, which may adversely affect our ability to raise needed financing.

The OTC Markets is not a national securities exchange within the meaning of federal and state securities laws, so our common stock is not eligible for the exemption from state securities, or “blue sky,” laws for “covered securities” within the meaning of the National Securities Markets Improvement Act of 1996, which may adversely affect our ability to sell our securities to raise needed financing and increase transactions costs of such financing.

As long as our common stock is quoted on the OTC Markets, our stockholders may face significant restrictions on the resale of our common stock due to state “blue sky” laws.

Each state has its own securities laws, often called “blue sky” laws, which limit sales of securities to a state’s residents, unless the securities are registered in that state or qualify for an exemption from registration and govern the reporting requirements for broker-dealers doing business directly or indirectly in the state. Before a security is sold in a state, there must be a registration in place to cover the transaction, or the transaction must be exempt from registration. The applicable broker must also be registered in that state. As long as our common stock is quoted on the OTCQX, a determination regarding registration will be made by those broker-dealers, if any, who agree to serve as market-makers for our common stock. There may be significant state blue sky law restrictions on the ability of investors to sell, and on purchasers to buy, our common stock. You should therefore consider the resale market for our common stock warrants to be limited, as you may be unable to resell your common stock without the significant expense of state registration or qualification.

We may effect a reverse stock split of our common stock, but it may not result in the intended benefits.

At the Annual Meeting of stockholders held on November 23, 2021, our stockholders approved an amendment to our restated certificate of incorporation to authorize our board of directors in its discretion to effect a reverse stock split of the outstanding shares of our common stock within one year following the Annual Meeting at a ratio of not less than 1-for-3 nor greater than 1-for-6. We may choose to effect a reverse stock split for the purpose of facilitating the uplisting of our common stock to a national securities exchange such as the NYSE American. Absent other factors, reducing the number of outstanding shares of our common stock through a reverse stock split would tend to increase the per share market price of our common stock. However, other factors, such as our financial results, market conditions and the market perception of our business may adversely affect the market price of our common stock and there can be no assurance that a reverse stock split, if completed, will result in the intended benefits, that the market price of our common stock will increase in proportion to the reduction in the number of shares of our common stock outstanding before the reverse stock split or that the market price of our common stock will not decrease in the future.

We may issue preferred stock in the future, and the terms of the preferred stock may reduce the value of our common stock.

We are authorized to issue up to 15,000,000 shares of preferred stock in one or more series. Our board of directors may determine the terms of future preferred stock offerings without further action by our stockholders. If we issue preferred stock, it could affect your rights or reduce the value of our outstanding common stock. In particular, specific rights granted to future holders of preferred stock may include voting rights, preferences as to dividends and liquidation, conversion and redemption rights, sinking fund provisions, and restrictions on our ability to merge with or sell our assets to a third party.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

ITEM 2. PROPERTIES

We lease office space under operating leases from unrelated entities. The rent expense for the years ended December 31, 2021 and 2020 was approximately \$1,187,000 and \$1,201,000, respectively.

We lease 21,293 square feet of office space for our headquarters in Torrance, California, at a base rental of \$81,717 per month, which the lease will expire on September 30, 2026. We also lease 1,850 square feet office space in New York, New York, at a base rent of \$8,908 per month, which the lease will expire on January 31, 2023, 1,322 square feet of office space in Tokyo, Japan, 465 square feet of office space in Seoul, Korea, and 1,163 square feet of office space in Dubai, UAE, which leases will expire on September 30, 2022, November 29, 2022, and June 19, 2023, respectively.

We believe our existing facilities are adequate for our current and planned future operations, and we expect to be able to renew the leases on commercially reasonable terms.

ITEM 3. LEGAL PROCEEDINGS

Not applicable.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON STOCK, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information

Until July 31, 2020, our common stock was quoted on the OTCQB tier of the OTC Markets Group, Inc., or OTC Markets. On August 3, 2020, our common stock was relegated to the OTC Pink tier of the OTC Markets, pending the filing of our delinquent SEC reports and posting of our OTCQB Certification and verification of the company profile through OTCIQ.com. On or about September 13, 2021, public quotations for our common stock became available on the OTCQX tier of the OTC Markets. The ticker symbol for our common stock is "EMMA." The information reported on the OTC Markets reflect inter-dealer prices, without retail mark-up, mark-down or commission and may not necessarily represent actual transactions.

Holdings

As of March 15, 2022, we had approximately 387 stockholders of record.

Dividends

We have never paid cash dividends on our common stock and do not expect to do so in the foreseeable future. The decision whether to pay cash dividends on our common stock will be made by our board of directors in its discretion and will depend on our financial condition, operating results, capital requirements and other factors that the board of directors considers relevant.

Securities Authorized for Issuance under Equity Compensation Plans

The following table provides information as of December 31, 2021, regarding compensation plans, including any individual compensation arrangements, under which our equity securities are authorized for issuance:

<u>Plan Category</u>	<u>Number of securities to be issued upon exercise of outstanding options, warrants and rights</u>	<u>Weighted average exercise price of outstanding options, warrants and rights</u>	<u>Number of securities remaining available for future issuance under equity compensation plans</u>
Equity compensation plans approved by security holders	4,000,000	\$ —	4,000,000
Equity compensation plans not approved by security holders	1,365,189	\$ 4.76	0

Recent Sales of Unregistered Securities

Not applicable.

Additional Information

Copies of our annual reports, quarterly reports, current reports, and any amendments to those reports are available free of charge on the Internet at www.sec.gov and on our website at www.emmausmedical.com. Such reports are not part of this Annual Report or incorporated by reference herein. All statements made in any of our reports, including all forward-looking statements, are made as of the date of such reports and we do not assume or undertake any obligation to update any of those statements or documents, except as required by law.

ITEM 6. SELECTED CONSOLIDATED FINANCIAL DATA

Not required for a smaller reporting company.

Forward-Looking Statements

The following discussion of our financial condition and results of operations should be read in conjunction with our financial statements and the related notes, and the other financial information included in this Annual Report. This discussion contains forward-looking statements based upon current expectations that involve risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth under "Risk Factors" or in other parts of this Annual Report.

Company Overview

We are a commercial-stage biopharmaceutical company engaged in the discovery, development, marketing and sale of innovative treatments and therapies, primarily for rare and orphan diseases. Our lead product, Endari® (prescription-grade L-glutamine oral powder) is approved by the U.S. Food and Drug Administration, or FDA, to reduce the severe complications of sickle cell disease ("SCD") in adult and pediatric patients five years of age and older. Endari® has received Orphan Drug designation from the FDA and Orphan Medical designation from the European Commission, which designations afford marketing exclusivity for Endari® for a seven-year period in the U.S. and a ten-year period in the European Union, respectively, following marketing approval. The Orphan Drug designation for Endari® will expire July 7, 2024.

Endari® is marketed and sold in the U.S. by our internal commercial sales team. Endari® is reimbursable by the Centers for Medicare and Medicaid Services, and every state provides coverage for Endari® for outpatient prescriptions to all eligible Medicaid enrollees within their state Medicaid programs. Endari® is also reimbursable by many commercial payors. We have agreements in place with the nation's leading distributors as well as physician group purchasing organizations and pharmacy benefits managers, making Endari® available at selected retail and specialty pharmacies nationwide.

Until we began marketing and selling Endari® in the U.S. in early 2018, we had minimal revenues and relied upon funding from sales of equity securities and debt financings and loans, including loans from related parties to fund our business and operations. As of December 31, 2021, our accumulated deficit was \$241.3 million, and we had cash and cash equivalents of \$2.3 million. We expect net revenues to increase as we expand our commercialization of Endari® in the U.S. and expand or commence early access programs and eventual marketing and commercialization abroad.

Until we can generate sufficient net revenues, our future cash requirements are expected to be financed through public or private equity or debt financings, loans from related parties and possible corporate collaboration and licensing arrangements. We are unable to predict if or when we will become profitable.

Critical Accounting Estimates

Management's discussion and analysis of financial condition and results of operations is based on our financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States ("GAAP"). The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of certain assets, liabilities and expenses. On an ongoing basis, we evaluate these estimates and judgments, including those described below. We base our estimates on our historical experience and on various other assumptions that we believe to be reasonable under the present circumstances. These estimates and assumptions 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 materially from these estimates.

While our significant accounting policies are more fully described in Note 2 of the Notes to Financial Statements included in this Annual Report, we believe that the accounting policies discussed below under "Revenues, net" are the most critical to assist you in fully understanding and evaluating our reported financial results and affect the more significant judgments and estimates that we use in the preparation of our financial statements.

Financial Overview

Revenues, net

We realize net revenues primarily from sales of Endari® to our distributors and specialty pharmacy providers. Distributors resell our products to other pharmacy and specialty pharmacy providers, health care providers, hospitals, and clinics. In addition to agreements with these distributors, we have contractual arrangements with specialty pharmacy providers, in-office dispensing providers, physician group purchasing organizations, pharmacy benefits managers and government entities that provide for government-mandated or privately negotiated rebates, chargebacks and discounts with respect to the purchase of our products. These various discounts, rebates, and chargebacks are referred to as “variable consideration.” Revenue from product sales is recorded net of variable consideration.

Under the Accounting Standards Codification (“ASC”) 606, we recognize revenue when our customers obtain control of our product, which typically occurs on delivery. Revenue is recognized in an amount that reflects the consideration that we expect to receive in exchange for the product, or transaction price. To determine revenue recognition for contracts with customers within the scope of ASC 606, we perform the following: (i) identify the contract with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to our performance obligations in the contract; and (v) recognize revenue when (or as) we satisfy the relevant performance obligations.

Revenue from product sales is recorded at the transaction price, net of estimates for variable consideration consisting of sales discounts, returns, government rebates, chargebacks and commercial discounts. Management estimates variable consideration using the expected-value amount method, which is the sum of probability-weighted amounts in a range of possible transaction prices. Actual variable consideration may differ from our estimates. If actual results vary from the estimates, we adjust the variable consideration in the period such variances become known, which adjustments are reflected in net revenues in that period. The following are our significant categories of variable consideration:

Sales Discounts: We provide our customers prompt payment discounts and from time to time offer additional discounts to encourage bulk orders to generate needed working capital. Sales attributable to one-time discounts offered by us increased in 2021 over 2020 and may adversely affect sales in subsequent periods.

Product Returns: We offer our distributors a right to return product principally based upon (i) overstocks, (ii) inactive product or non-moving product due to market conditions, and (iii) expired product. Product return allowances are estimated and recorded at the time of sale.

Government Rebates: We are subject to discount obligations under state Medicaid programs and the Medicare Part D prescription drug coverage gap program. We estimate Medicaid and Medicare Part D prescription drug coverage gap rebates based upon a range of possible outcomes that are probability-weighted for the estimated payor mix. These reserves are recorded in the same period the related revenues are recognized, resulting in a reduction of product revenues and the establishment of a current liability that is included as accounts payable and accrued expenses on our balance sheet. Our liability for these rebates consists primarily of estimates of claims expected to be received in future periods related to recognized revenues.

Chargebacks and Discounts: Chargebacks for fees and discounts represent the estimated obligations resulting from contractual commitments to sell products to certain specialty pharmacy providers, in-office dispensing providers, group purchasing organizations, and government entities at prices lower than the list prices charged to distributors. The distributors charge us for the difference between what they pay for the products and our contracted selling price to these specialty pharmacy providers, in-office dispensing providers, group purchasing organizations, and government entities. In addition, we have contractual agreements with pharmacy benefit managers who charge us for rebates and administrative fee in connection with the utilization of product. These reserves are established in the same period that the related revenues are recognized, resulting in a reduction of revenues. Chargeback amounts are generally determined at the time of resale of product by our distributors.

Cost of Goods Sold

Cost of goods sold consists primarily of expenses for raw materials, packaging, shipping and distribution of Endari®.

Research and Development Expenses

Research and development expenses consist of expenditures for new products and technologies consisting primarily of fees paid to contract research organizations (“CRO”) that conduct clinical trials of our product candidates, payroll-related expenses, study site payments, consultant fees and activities related to regulatory filings, manufacturing development costs and other related costs. The costs of later stage clinical studies such as Phase 2 and 3 trials are generally higher than those of earlier studies. This is primarily due to the larger size, expanded scope, patient related healthcare and regulatory compliance costs, and generally longer duration of later stage clinical studies.

Our contracts with CROs are generally based on time and materials expended, whereas study site agreements are generally based on costs per patient as well as other pass-through costs, including start-up costs and institutional review board fees. The financial terms of these agreements are subject to negotiation and vary from contract to contract and may result in uneven payment flows. Payments under some of these contracts depend on factors such as the successful enrollment of patients and the completion of clinical trial milestones.

Future research and development expenses will depend on any new product candidates or technologies that we may introduce into our research and development pipeline. In addition, we cannot predict which product candidates may be subject to future collaborations, when such arrangements will be secured, if at all, and to what degree, if any, such arrangements would affect our development plans and capital requirements.

Due to the inherently unpredictable nature of the drug approval process and the interpretation of the regulatory requirements, we are unable to estimate the amount of costs of obtaining regulatory approvals of Endari® outside of the U.S. or the development of our other preclinical and clinical programs. Clinical development timelines, the probability of success and development costs can differ materially from expectations and can vary widely. These and other risks and uncertainties relating to product development are described in this Annual Report under the headings “Risk Factors—Risks Related to Our Business” and “Risk Factors—Risks Related to Regulatory Oversight of our Business and Compliance with Law.”

General and Administrative Expense

General and administrative expense consists principally of salaries and related employee costs, including share-based compensation for our directors, executive officers and employees. Other general and administrative expense includes facility costs, patent filing costs, and professional fees and expenses for legal, consulting, auditing and tax services.

Selling Expenses

Selling expenses consist principally of salaries and related costs for personnel involved in the launch, promotion, sales and marketing of our products. Other selling cost include advertising, third party consulting costs, the cost of contracted and in-house sales personnel and travel-related costs. We expect selling expenses to increase as we acquire additional sales personnel to support the commercialization of Endari® in the U.S. and abroad.

Inflation

Inflation has not had a material impact on our expenses or results of operations over the past two years, but may result in increased manufacturing, research and development, general and administrative and selling expenses in the foreseeable future.

Environmental Expenses

The cost of compliance with environmental laws has not been material over the past two years and any such costs are included in general and administrative costs.

Inventories

Inventories consist of raw materials, finished goods and work-in-process and are valued on a first-in, first-out basis and at the lower of cost or net realizable value. Substantially all raw materials purchased during the years ended December 31, 2021 and 2020 were supplied by one supplier.

Notes Payable, Convertible Notes Payable and Warrants

From time to time, we obtain financing from the sale and issuance of promissory notes or other debt instruments with detachable stock purchase warrants, some of which notes or debt instruments are convertible into shares of our common

stock and some of which are issued to related parties. We analyze all of the terms of our notes payable and promissory notes issued with warrants to determine the appropriate accounting treatment, including determining whether conversion features are required to be bifurcated and treated as a discount, proper allocation of proceeds and issuance costs between the notes or debt instrument and the detachable warrants and the applicable classification of the notes payable and warrants as debt, derivative liabilities, equity or temporary equity (*i.e.*, mezzanine capital).

We allocate the proceeds from the issuance of debt instruments with detachable stock purchase warrants to the two elements based on the relative fair values of the debt instruments without the warrants and of the warrants themselves at the time of issuance. We account for the portion of the proceeds allocated to warrants in additional paid-in capital and the remaining proceeds are allocated to the debt instruments. The allocation to warrants results in a discount to notes payable which is amortized using the effective interest method to interest expense over the expected term of the note. We also include the intrinsic value of the embedded conversion feature of convertible debentures and promissory notes in the discount to notes payable, which is amortized and charged to interest expense over the expected term of the debentures and promissory notes.

We also estimate the total value of any beneficial conversion feature and accompanying warrants in allocating debt proceeds. The proceeds allocated to the beneficial conversion feature are determined by taking the estimated fair value of shares issuable under the convertible debentures and promissory notes less the fair value of the number of shares that would be issued if the conversion rate equaled the fair value of our common stock as of the date of issuance. In situations where the debt includes both a beneficial conversion feature and a warrant, the proceeds are allocated to the warrants and beneficial conversion feature based on the pro-rata fair value. We used the Binomial Monte-Carlo Cliquet (aka Ratchet) Option Pricing Model option pricing model to determine the fair value of our warrants prior to the Merger and Black-Scholes after the Merger.

Notes payable to related parties, interest expense and accrued interest to related parties are separately identified in our consolidated financial statements. We also disclose significant terms of all transactions with related parties.

Share-based Compensation

We recognize compensation expense for share-based compensation awards during the service term of the recipients of the awards. The fair value of share-based awards is calculated using the Black-Scholes-Merton pricing model. The Black-Scholes-Merton model requires subjective assumptions regarding future stock price volatility and expected time to exercise, which greatly affect the calculated values. The expected term of awards granted is calculated using the simplified method allowed under the Securities and Exchange Commission (“SEC”) Staff Accounting Bulletin Nos. 107 and 110. The risk-free rate used to value an award is based on the U.S. Treasury rate as of the date of the award that corresponds to the vesting period of the award. Until July 2019, as the accounting acquirer in the Merger, our common stock was not publicly traded and we lacked company specific historical and implied volatility information for our common stock. Therefore, the expected volatility was based on the historical volatility of the common stock of comparable publicly traded companies.

Fair Value Measurements

We define 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 in accordance with ASC 820. We measure fair value under a framework that provides a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). The three levels of the fair value hierarchy are described as follows:

Level 1: Inputs to the valuation methodology are unadjusted quoted prices for identical assets or liabilities in active markets.

Level 2: Inputs to the valuation methodology include:

- Quoted prices for similar assets or liabilities in active markets;
- Quoted prices for identical or similar assets or liabilities in inactive markets;
- Inputs other than quoted prices that are observable for the asset or liability; and

- Inputs that are derived principally from or corroborated by observable market data by correlation or other means.

If the asset or liability has a specified (contractual) term, the Level 2 input must be observable for substantially the full term of the asset or liability.

Level 3: Inputs to the valuation methodology that are unobservable and significant to the fair value measurement.

An asset's or liability's fair value measurement level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. Valuation techniques used need to maximize the use of observable inputs and minimize the use of unobservable inputs. The fair value of our debt instruments is not materially different from their carrying values as presented. The fair value of our convertible debt instruments was determined based on Level 2 inputs. The carrying value of the debt was discounted based on allocating proceeds to other financial instruments within the arrangement as discussed in Note 7 to our consolidated financial statements.

Certain of our outstanding warrants contain price adjustment provisions and, consequently, are accounted for as liabilities that are remeasured at fair value on a recurring basis using Level 3 inputs. The Level 3 inputs in the valuation of warrants include expected term and expected volatility.

Related Party Transactions

For a discussion of our related party transactions, refer to Note 12 of the Notes to Consolidated Financial Statement included elsewhere in this Annual Report, which information is incorporated herein by reference.

Financial Highlights

	Twelve Months Ended December 31,	
	2021	2020
CONSOLIDATED STATEMENTS OF OPERATIONS (in thousands)		
REVENUES, NET	\$ 20,610	\$ 23,167
COST OF GOODS SOLD	3,312	2,248
GROSS PROFIT	17,298	20,919
OPERATING EXPENSES		
Research and development	4,110	2,408
Selling	5,878	4,865
General and administrative	13,438	13,678
Total operating expenses	23,426	20,951
LOSS FROM OPERATIONS	(6,128)	(32)
OTHER INCOME (EXPENSE)		
Net loss on debt extinguishment	(365)	(1,425)
Change in fair value of warrant derivative liabilities	(432)	392
Change in fair value of conversion feature derivative, notes payable	(1,906)	112
Net gain on investment in marketable securities	—	7,672
Net loss on equity method investment	(2,733)	(2,060)
Foreign exchange gain (loss)	(2,017)	1,502
Interest and other income	761	801
Interest expense	(3,101)	(5,989)
Total other income (expenses)	(9,793)	1,005
INCOME (LOSS) BEFORE INCOME TAXES	(15,921)	973
INCOME TAXES (BENEFIT)	25	(381)
NET INCOME (LOSS)	\$ (15,946)	\$ 1,354
EARNINGS (LOSS) PER COMMON SHARE	\$ (0.32)	\$ 0.03
WEIGHTED AVERAGE COMMON SHARES OUTSTANDING	49,253,156	48,897,004

Years ended December 31, 2021 and 2020

Net Income (Loss). Net loss increased by \$17.3 million, or 1,278% to \$15.9 million for the year ended December 31, 2021 compared to net income of \$1.4 million for the year ended December 31, 2020. The increase was due primarily to a \$10.8 million increase in other expense as discussed below, a \$2.6 million decrease in net revenues, and a \$2.5 million increase in operating expenses. As of December 31, 2021, we had an accumulated deficit of approximately \$241.3 million. Our net loss for the year ended December 31, 2021 included approximately \$2.7 million of net loss on equity method investment attributable to our equity interest in EJ Holdings, a variable interest entity, or VIE. The loss attributable to our equity interest in EJ Holdings for the year ended December 31, 2020 was \$2.1 million.

Revenues, Net. Net revenues decrease by \$2.6 million, or 11% to \$20.6 million for the year ended December 31, 2021 compared to \$23.2 million in 2020. Substantially all net revenues were attributable to Endari® sales. The decrease was due to lower volume sales of Endari® in 2021 and a higher level of price discounts related to large volume orders in 2021 than in 2020. We expect net revenues to increase in the foreseeable future as we expand our distribution channels for Endari® in the U.S. and commercialize Endari® in the MENA region.

Cost of Goods Sold. Cost of goods sold increased by \$1.1 million, or 47% to \$3.3 million for the year ended December 31, 2021 compared to \$2.2 million in 2020 due primarily to the establishment of \$2.2 million reserve relating to Endari® inventory with a shelf-life of less than two years.

Research and Development Expenses. Research and development expenses increased by \$1.7 million, or 71%, to \$4.1 million for the year ended December 31, 2021 compared to \$2.4 million in 2020. This increase was primarily due to a \$1.5 million paid to Kainos Medicine, Inc. in connection with the parties' collaboration agreement and Licensing Agreement regarding Kainos's patented IRA4 inhibitor. We expect our research and development expenses to increase as the study progresses and as we undertake additional studies.

Selling Expenses. Selling expenses increased by \$1.0 million, or 21%, to \$5.9 million for the year ended December 31, 2021 compared to \$4.9 million in 2020. The increase was due to an increase of \$0.4 million in travel related expenses, an increase of \$0.2 million in distribution fees, an increase of \$0.2 million in sales team compensation, and an increase of \$0.1 million in promotional expenses. We expect that our selling expenses will continue to increase as we expand Endari® marketing and sales activities both in the U.S. and outside the U.S.

General and Administrative Expenses. General and administrative expense decreased by \$0.2 million, or 2%, to \$13.4 million for the year ended December 31, 2021 compared to \$13.7 million in 2020. We expect general and administrative expenses to increase as we add additional sales and administrative personnel to support the commercialization of Endari outside of the U.S.

Other Income (Expense). Other expense increased by \$10.8 million, or 1,074%, to \$9.8 million for the year ended December 31, 2021 compared to other income of \$1.0 million in 2020. The increase was primarily due to a \$3.5 million increase in foreign exchange loss and \$2.0 million increase in change in fair value of conversion feature derivatives partially offset by a \$2.9 million decrease in interest expense in 2021. We also realize a net gain on investment in marketable securities of \$7.7 million in 2020 from sales of Telcon securities. There was no similar net gain in 2021.

Income Tax (Expense). Income tax expenses increased by \$0.4 million, or 106%, to \$25,000 for the year ended December 31, 2021 compared to income tax benefit of \$0.4 million in 2020. A valuation allowance for net deferred tax assets recorded when it is more likely than not that we will not realize these assets through future operations. The valuation allowance increased by approximately \$2.7 million for the year ended December 31, 2021, while it decreased by \$0.6 million for the years ended December 31, 2020. As of December 31, 2021 and 2020, we had no unrecognized tax benefits or position which, in the opinion of management would be reversed if challenged by a tax authority.

Seasonality

There may be seasonal variations in our Endari® sales due to factors such as year-end holidays, severe winter weather conditions in certain regions of the U.S., seasonal conditions that may affect medical practices and provider activity, including influenza or the Covid-19 outbreaks that may inhibit patients from seeking treatment for their SCD or filling or refilling prescriptions for Endari® and possibly other factors relating to the timing of patient deductibles and co-insurance limits.

COVID-19

We do not believe that the COVID-19 pandemic and related governmental responses have adversely affected our sales efforts but have not had a material impact on our financial condition or results of operations. We believe the ongoing elimination of travel and other restrictions may benefit our sales efforts and contribute to increased Endari® sales in 2022.

Liquidity and Capital Resources

Based on our losses to date, anticipated future net revenues and operating expenses, debt repayment obligations, funding commitment to EJ Holdings and cash and cash equivalents balance of \$2.3 million as of December 31, 2021, we do not have sufficient operating capital for our business without raising additional capital. We realized a net loss of \$15.9 million for the year ended December 31, 2021 and anticipate that we will continue to incur net losses for the foreseeable future and until we can generate increased net revenues from Endari® sales. While we anticipate increased net revenues as we expand our commercialization of Endari® in the U.S. through telehealth and other initiatives, as well as in the MENA region, there is no assurance that we will be able to increase our Endari® sales or attain sustainable profitability or that we will have sufficient capital resources to fund our operations until we are able to generate sufficient cash flow from operations.

Our subsidiary, Emmaus Medical, Inc., or Emmaus Medical, is party a purchase and sale agreement with Prestige Capital Finance, LLC, or Prestige Capital, pursuant to which Emmaus Medical may offer and sell to Prestige Capital from time to time eligible accounts receivable in exchange for Prestige Capital's down payment, or advance, to Emmaus Medical of 70% (subject to increase to 75%) of the face amount of the accounts receivable, subject to a \$7,500,000 cap on advances at any time. The balance of the face amount of the accounts receivable will be reserved by Prestige Capital and paid to Emmaus Medical, less discount fees of Prestige Capital ranging from 2.25% to 7.25% of the face amount, as and when Prestige Capital collects the entire face amount of the accounts receivable.

Liquidity represents our ability to pay our liabilities when they become due, fund our business operations, fund the operations and retrofitting of EJ Holdings' amino acid production plant in Ube, Japan, and meet our contractual obligations, including our obligations to purchase API under our supply arrangements with Telcon, and execute our business plan. Our primary sources of liquidity are our cash balances at the beginning of each period, proceeds from our accounts receivable factoring arrangement with Prestige Capital and proceeds from related-party loans and other financing activities. Our short-term and long-term cash requirements consist primarily of working capital requirements, general corporate needs, our contractual obligations to purchase API from Telcon, debt service under our convertible notes payable and notes payable and planned ongoing loan funding to sustain EJ Holdings' operations. We have no contractual commitment to provide funding to EJ Holdings, but plan to continue to do so in the foreseeable to the extent we have cash available for this purpose.

As of December 31, 2021, we had outstanding \$17.6 million in principal amount of convertible promissory notes and \$4.7 million in principal amount of other notes payable. Our minimum lease payment obligations were \$5.1 million, of which \$1.2 million was payable within 12 months.

Our API supply agreement with Telcon provides for an annual API purchase target of \$5 million and a target "profit" (*i.e.*, gross margin) to Telcon of \$2.5 million. To the extent these targets are not met, Telcon may be entitled to payment of the shortfall or to offset the shortfall against the Telcon convertible bond and proceeds thereof that are pledged as collateral to secure our obligations. With our consent, in February 2022 Telcon retained cash collateral and made offsets against the outstanding balance of our Telcon convertible bond for shortfalls under the API supply agreement for 2020 and 2021.

Due to uncertainties regarding our ability to meet our current and future operating and capital expenses, there is substantial doubt about our ability to continue as a going concern for 12 months from the date of this filing and the report of our independent public accounting firm on our financial statements as of and for the year ended December 31, 2021 included in Item 15 of this Annual Report contains a going concern qualification.

Cash Flows

Net cash used in operating activities

Net cash used in operating activities decreased by \$1.2 million, or 48.8% to \$ 1.3 million for the year ended December 31, 2021 from \$2.5 million for the year ended December 31, 2020. The decrease was primarily due to an increase of \$17.3 million in net loss, partially offset by an \$12.4 million increase in non-cash adjustments to net loss and a \$6.1 million increase in working capital. The increase in non-cash adjustments to net loss was primarily attributable to the lack of net gain on investment in marketable securities in 2021 compared to a \$7.7 million net gain in 2020, a \$2.8 million

decrease in the fair value of conversion feature derivative and warrant derivative liabilities, \$2.7 million attributable to foreign exchange adjustments and \$0.7 million attributable to loss on equity method investment, partially offset by a \$2.2 million decrease in amortization of discount on convertible notes payable.

Net cash used in investing activities

Net cash used in investing activities increased by \$11.8 million, or 217%, to a \$6.4 million for the year ended December 31, 2021 from net cash provided by investing activities of \$5.5 million for the year ended December 31, 2020. The decrease was primarily due to \$35.6 million of proceeds realized in 2020 from the sale of Telcon shares, partially offset by \$26.1 million used to purchase of a Telcon convertible bond in 2021 and a \$2.3 million increase in loans made to EJ Holding in 2021.

Net cash from financing activities

Net cash from financing activities increased by \$9.7 million, or 421%, to \$7.4 million for the year ended December 31, 2021 from net cash used in financing activities of \$2.3 million for the year ended December 31, 2020. The increase was primarily due to a \$13.4 million increase in cash proceeds from the issuance of promissory notes and convertible notes, partially offset by a \$3.7 million decrease in cash used for repayment of convertible notes.

Off-Balance-Sheet Arrangements

We had no off-balance sheet arrangements in the periods presented.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Not required for a smaller reporting company.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The information required by this Item 8 is incorporated by reference to the information that begins on Page F-1 of this Annual Report.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We are responsible for establishing and maintaining disclosure controls and procedures (“DCP”) that are designed to ensure that information required to be disclosed by us in the reports filed by us under the Securities Exchange Act of 1934, as amended, or the Exchange Act, is: (a) recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms; and (b) accumulated and communicated to our management, including our principal executive and principal financial officers, to allow timely decisions regarding required disclosures. In designing and evaluating our DCP, we recognize that any controls and procedures, no matter how well designed and implemented, can provide only reasonable assurance of achieving the desired control objectives.

We conducted an evaluation pursuant to Rule 13a-15 of the Exchange Act of the effectiveness of the design and operation of our DCP as of December 31, 2021 under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our DCP were not effective as of December 31, 2021, because of the continuance of a material weakness (the “Material Weakness”) in our internal control over financial reporting relating to inadequate financial closing process, segregation of duties including access control over information technology, especially financial information, inadequate documentation of policies and procedures over risk assessments, internal control and significant account processes and insufficient entity risk assessment processes. Notwithstanding the ongoing Material Weakness, our management concluded that our consolidated financial statements for the periods covered by and included in this Annual Report are fairly stated in all material respects in accordance with GAAP for each of the periods presented in this Annual Report.

We are engaged in ongoing efforts to remediate the control deficiencies that constituted the Material Weakness by implementing changes to our internal control over financial reporting, including, without limitation:

- engaging third-party accounting consulting firms to assist us in the review of our application of GAAP on complex debt financing transactions and revenue recognition under ASC 606;
- using GAAP Disclosure and SEC Reporting Checklists;
- continuing professional training and academic education on accounting subjects for accounting staff;
- enhancing attention to review controls related to our financial close and reporting; and
- subscribing to relevant online services other supplemental internal and external resources relating to SEC reporting.

Our management concluded, however that as of December 31, 2021, our ongoing corrective measures were insufficient to remediate entirely the Material Weakness.

Management's Plan for Remediation

Our management and board of directors are committed to the remediation of the Material Weakness, as well as the continued improvement of our overall system of internal control over financial reporting. We are in the process of implementing measures to remediate the underlying causes of the control deficiency that gave rise to the Material Weakness, which primarily include engaging additional and supplemental internal and external resources with the technical expertise in GAAP to ensure the appropriate accounting treatment for complex and unusual transactions involving convertible securities and other financial instruments and intend to seek to hire additional accounting staff personnel with expertise and experience in GAAP to support our financial department, as well as to implement new policies and procedures to provide more effective controls to track, process, analyze, and consolidate the financial data and reports. Most importantly, we are in the process of implementing an integrated cloud-based enterprise resource planning (ERP) system to manage our financial information to replace our outdated financial accounting systems and software, which we expect to complete before the end of 2022 as our finances permit. Further, in 2021 we established a Disclosure Committee to ensure more effective internal communication regarding significant transactions.

We believe these most recent measures will remediate the control deficiencies that gave rise to the Material Weakness, but the Material Weakness will not be considered fully remediated until controls have been designed and implemented for a sufficient period of time for our management to conclude that the control environment is operating effectively. Additional remediation measures may be required, which may require additional implementation time. There is no assurance that our remediation efforts will be successful or that our internal control over financial reporting or DCP will be effective. In the meantime, we will continue to assess the effectiveness of our remediation efforts in connection with our evaluation of our internal control over financial reporting and DCP.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) under the Exchange Act. Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP. Our internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect our transactions and our dispositions of the assets, (ii) 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 (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risks that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. 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 the criteria set forth in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, our management concluded that our internal control over financial reporting was not effective as of December 31, 2021.

A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of a company's annual or interim financial statements will not be prevented or detected on a timely basis. In conducting our review of our internal control over financial reporting, we identified the continuing Material Weakness described above.

Attestation Report

This Annual Report does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting. As a non-accelerated filer, we are not subject to the attestation requirement.

Changes in Internal Control Over Financial Reporting

Except as described above, based on the evaluation of our management as required by paragraph (d) of Rule 13a-15 of the Exchange Act, we believe that there were no changes in our internal control over financial reporting that occurred during the quarter ended December 31, 2021 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Directors and Executive Officers

The following individuals constitute our board of directors and executive officers:

Name	Age	Position
Yutaka Niihara, M.D., M.P.H.	62	Chairman and Chief Executive Officer
Willis C. Lee, M.S.	61	Director, Chief Operating Officer
Yasushi Nagasaki, C.P.A.	54	Chief Financial Officer
George Sekulich	56	Senior Vice President of Global Commercialization and Chief Information Officer
Charles Stark, Pharm.D.	66	Senior Vice President of Medical Affairs, Clinical, Regulatory
Robert Dickey IV	66	Director
Alfred Lui, M.D., FCAP.	73	Director
Masaharu Osato, M.D.	67	Director
Lori Teranishi	52	Director
Jane Pine Wood	59	Director
Wei Peu Zen	69	Director

Background of Officers and Directors

The following is a summary of the background of each of our directors and executive officers. Except as noted in their respective biographies below, each of our directors and officers became a director or officer as of the completion of our merger transaction with EMI Holding, Inc., or EMI Holding, on July 17, 2019. All directors serve until the next annual meeting of stockholders at which their successor is elected or their earlier resignation or removal as a director. One or more of our directors or officers also serve as directors or officers of one or more of our wholly owned subsidiaries.

Yutaka Niihara, M.D., M.P.H. served as Chairman and Chief Executive Officer since January 2016, as Chief Scientific Officer from April 2015 until December 2015, as President and Chief Executive Officer from April 2011 to April 2015 and as a director since April 2011 of EMI Holding, and as a director of EMI Holding's predecessor, Emmaus Medical, from 2003 to April 2011. Since May 2005, Dr. Niihara has also served as the President, Chief Executive Officer and Medical Director of Hope International Hospice, Inc., or Hope Hospice, a Medicare-certified hospice program. From June 1992 to October 2009, Dr. Niihara served as a physician specialist for Los Angeles County. Dr. Niihara is the principal inventor of the patented L-glutamine treatment for SCD. Dr. Niihara has been involved in patient care and research for sickle cell disease during most of his career and is a widely published author on sickle cell disease. Dr. Niihara is board-certified by the American Board of Internal Medicine/Medical Oncology and by the American Board of Internal Medicine/Hematology. He is licensed to practice medicine in both the United States and Japan. Dr. Niihara is a Professor of Medicine at the David Geffen School of Medicine at UCLA. Dr. Niihara holds B.A. degree in Religion from Loma Linda University, a M.D. degree from the Loma Linda University School of Medicine and a M.P.H. degree from Harvard School of Public Health. We believe Dr. Niihara is qualified to serve as a director due to his critical involvement in the research and development of Endari® and extensive knowledge and experience in treating sickle cell disease in the primary care setting.

Willis C. Lee, M.S. served as Chief Operating Officer since May 2011, as a director since December 2015, as Vice-Chairman of the board of directors since January 2016 and as Chief Financial Officer from October 2016 to July 2018 of EMI Holding. Mr. Lee also previously served as a director of EMI Holding from May 2011 to May 2014 and again from December 2015 to January 2016. Mr. Lee served as the Co-Chief Operating Officer and Chief Financial Officer and as a director of Emmaus Medical from March 2010 to May 2011. Prior to that time, he was the Controller at Emmaus Medical from February 2009 to February 2010. From 2004 to 2010, Mr. Lee led worldwide sales and business development of Yield Dynamics product group at MKS Instruments, Inc., a provider of instruments, subsystems, and process control solutions for the semiconductor, flat panel display, solar cell, data storage media, medical equipment, pharmaceutical manufacturing, and energy generation and environmental monitoring industries. Prior to that time, Mr. Lee held various managerial and senior positions at various public and private companies in the semiconductor and other industries. Mr. Lee received his B.S. degree and a M.S. degree in Physics from University of Hawaii and University of South Carolina, respectively. We believe Mr. Lee is qualified to serve as a director due to his extensive knowledge and experience, as well as his intimate knowledge of the company through his service as an executive officer of the company and Emmaus Medical.

Yasushi Nagasaki, C.P.A. has served as Chief Financial Officer since September 1, 2020 and served as our Senior Vice President Finance from July 2019 to August 2020. Mr. Nagasaki also served as Senior Vice President Finance from April 2012 to July 2019 and as Chief Financial Officer from May 2011 to April 2012 of EMI Holding, with which we merged in July 2019. From September 2005 until joining EMI Holding, Mr. Nagasaki was the Chief Financial Officer of Hexadyne Corporation, an aerospace and defense supplier. Mr. Nagasaki also served on the board of directors at Hexadyne Corporation from September 2005 to April 2011. From May 2003 to August 2005, Mr. Nagasaki was the Controller at Upsilon Intertech Corporation, an international distributor of defense and aerospace parts and subsystems. Mr. Nagasaki is a Certified Public Accountant and received a B.A. in Commerce from Waseda University and a M.A. in International Policy Studies from the Monterey Institute of International Studies, a graduate school of Middlebury College.

George Sekulich served as Senior Vice President of Global Commercialization and Chief Information Officer of EMI Holding Since May 2019, responsible for overseeing the commercial launch of Endari® in the United States. More recently, he has been engaged in laying the groundwork for the launch of Endari® and Xyndari® in overseas markets, with a special emphasis on the MENA region. Prior to becoming Senior Vice President of Global Commercialization, Mr. Sekulich served since September, 2014 as Chief Information Officer of EMI Holdings. Mr. Sekulich has over 25 years of experience and training in computer information services and is active in the design and support of our computer information systems. Prior to joining EMI Holding, Mr. Sekulich was the owner and operator of Magellan Net, a software provider services company. Mr. Sekulich received a B.S. in Computer Information Systems Management from California State University Dominguez Hills.

Charles Stark, Pharm.D. was appointed as Senior Vice President of Medical Affairs, Clinical, Regulatory on November 23, 2021, and served as our Senior Vice President of Research and Development since July 19, 2019 and in the same capacity with EMI Holding since 2013. He has more than 30 years of experience in medical affairs, research and academia. Previously, Dr. Stark was Director of Clinical Development at Bavarian Nordic, an immunotherapeutic company, and prior to that Associate Director of Medical Affairs for the Dendreon Corporation, an immunotherapeutic company. He has served as, Director, Medical Science Liaisons (cardiovascular, metabolic and oncology) at Pfizer, Inc., a pharmaceutical company. Dr. Stark has served as the Director of Investigational Drug Services and Clinical Research at LA BioMed at Harbor UCLA and at the Health Research Association at USC Medical Center. He has also served as a faculty member at the University of Southern California School of Pharmacy. Dr. Stark received his Pharm.D. from the University of Southern California and completed his residency at the Veteran's Affairs Medical Center in West Los Angeles.

Robert Dickey IV has served as Managing Director at Foresite Advisors since March 2020 and was previously a Managing Director at Danforth Advisors from August 2018 to March 2020. Foresite Advisors provides finance support and strategy for life science companies, including CFO advisory, financial analysis, capital raising, and transactional support/execution for public offerings and M&A. Mr. Dickey served as a member on the board of directors at Sanuthera, Inc., a privately held medical device company, from 2013 to 2017, and was employed as Chief Financial Officer of Motif Bio Plc., a NASDAQ and London AIM exchange-listed antibiotics company, from January 2017 to February 2018. He also previously was employed with several other biotechnology companies, including as the Chief Financial Officer of Tyme Technologies, Inc. from May 2015 to January 2017, the Chief Financial Officer of NeoStem, Inc. from August 2013 to January 2015 and the Senior Vice President of Hemispherx Biopharma, Inc. from November 2008 to August 2013. Prior to that time, among other things, Mr. Dickey served as a Managing Director at Legg Mason Wood Walker, Inc. and as a Senior Vice President at Lehman Brothers. He received his undergraduate degree from Princeton University and an M.B.A. from The Wharton School of the University of Pennsylvania. We believe Mr. Dickey is qualified to serve as a director due to his experience as Chief Financial Officer of stock exchange listed life sciences company and other experiences in the life sciences industry, including as a former investment banker.

Alfred Lui, M.D., FCAP was elected as a director at the Annual Meeting of Stockholders held on November 23, 2021. He is an anatomic and clinical pathologist with more than forty years of experience in the active practice of pathology and laboratory medicine. His personal professional corporation dba Innovative Pathology Medical Group was established in 2016. Prior to that time, he was the Laboratory Director for more numerous hospitals and independent clinical laboratories in Southern California and elsewhere. He currently serves as the Laboratory Director for Veracyte, Inc. (NASDAQ:VCYT), Marseille, France and Richmond, Virginia, and Bridge Diagnostics, Irvine, California, and for Lawrence Livermore National Laboratory, Livermore, California. He has founded or co-founded five medical companies and served as the Chairman of the Board, Chief Executive Officer and Laboratory Director of three of the companies. He currently serves as a member of the Board of Directors of two independent laboratory companies. He is a former-President, Board member, and current Education Committee member of the California Society of Pathologists. He is a Fellow of the College of American Pathologists (CAP) where he has served on multiple counsels and committees, including as a former Chair of the Publications Committee. He is a recipient of the CAP's Distinguished Service award (2013) and the President's Honors award (2015). He holds a B.A. degree from Andrews University and a M.D. from Loma Linda University. Dr. Lui's

qualifications as a director include his extensive experience as a director and Chief Executive Officer of numerous commercial medical laboratory companies. He is expected to enhance our Board of Directors' oversight of the company's expanding commercialization activities in the U.S. and abroad and to lend his extensive expertise and experience in the life sciences industry in support of our patient and healthcare provider outreach programs.

Masaharu Osato, M.D. has been practicing gastroenterology and internal medicine ("GI") at his private practice, the Osato Medical Clinic, Inc. in Torrance, California, since 2001. Between 1998 and 2001 he completed a GI Fellowship at the Harbor-UCLA Medical Center. Between 1993 and 1997 and 1988 and 1993, respectively, Dr. Osato served as General Internist and Director of Health Screening Center at the Tokyo Adventist Hospital in Tokyo, Japan, and at the Kobe Adventist Hospital in Kobe, Japan. He attended the Loma Linda University School of Medicine in California between 1979 and 1983 and completed an internal medicine residency at the Kettering Memorial Medical Center at Wright State University between 1983 and 1986. Between 1986 and 1988 he completed a pediatric residency at the Loma Linda University Medical Center. We believe Dr. Osato is qualified to serve as a director due to his extensive knowledge of and experience in the GI sector.

Lori Teranishi was appointed as a director on January 6, 2022 and is the founder and Chief Executive Officer of iQ 360, a privately held strategic communications company with offices in Honolulu, San Francisco, New York and Washington DC. She is an expert in business consulting, crisis communications, issues management, corporate positioning and marketing strategy. She has a successful track record repositioning brands, launching and executing major change initiatives, counseling companies in the sustainability and ESG (environmental, social and corporate governance) space and protecting reputations in the face of high-profile litigation, mass company layoffs and regulatory investigations. Before founding iQ 360 in 2010, Ms. Teranishi oversaw product development as a vice president at Visa, as chief of staff to Visa's chief operating officer and held a variety of communications roles. She holds bachelor's degrees in mass communications and political science from the University of Utah and earned her MBA from the University of San Francisco. Ms. Teranishi was named a Ragan's Top Woman Leader in Communications in 2020 and received a Distinguished Alumni Award from the University of Utah in 2019. Our Board of Directors believes that Ms. Teranishi's expertise and experience in corporate communications will lend support to the Company's expanding public and investor relations initiatives. Our Board also believes that her personal characteristics and perspectives as a female business owner will further enhance the diversity of our Board of Directors and help to guide our Board of Directors' oversight of emerging ESG matters.

Jane Pine Wood was appointed as a director on March 25, 2020. She has served since October 3, 2016 as Chief Legal Counsel of BioReference Laboratories, Inc., Elmwood Park, New Jersey, a wholly owned subsidiary of OPKO Health, Inc. (NASDAQ: OPK), a diversified healthcare company. BioReference Laboratories, Inc. is the nation's third-largest clinical laboratory with a core genetic testing business and 400-person sales and marketing team. Ms. Wood has over 30 years of experience representing clinical and anatomic laboratories, physicians, imaging centers, home health agencies, mental health providers, hospitals, other healthcare providers, and professional societies in corporate, regulatory, reimbursement, contractual, and other matters. She holds a B.A. degree, summa cum laude, from Texas A&M University and a J.D. degree from Vanderbilt University School of Law and is a member of the State Bars of New Jersey, Massachusetts, Ohio, and Tennessee. Ms. Wood is well suited to serve as a director in light of her extensive education and experiences in legal and regulatory affairs in the life science industry, including in advising a broad range of physicians and other healthcare providers and commercial healthcare companies. She also adds her unique perspective as an expert in federal and state regulatory affairs and the only female director of the company.

Wei Peu Zen is the Vice Chairman and Chief Executive Officer of Wai Kee Holdings Limited, a Hong Kong-based construction and infrastructure company whose shares are listed on the Main Board of Hong Kong Stock Exchange. He is also the Chairman, Chief Executive Officer and Managing Director of Build King Holdings Limited, a subsidiary of Wai Kee Holdings Limited. In addition, he is the Chairman of Road King Infrastructure Limited, an associated corporation of Wai Kee Holdings Limited. The shares of both Build King Holdings Limited and Road King Infrastructure Limited are listed on the Main Board of Hong Kong Stock Exchange. Mr. Zen has over 45 years of experience in civil engineering and is responsible for the overall management of Wai Kee Group and oversees the operations of Wai Kee Group. Mr. Zen holds a B.Sc. degree in Engineering from The University of Hong Kong and a M.B.A. degree from The Chinese University of Hong Kong and is a member of both the Institution of Civil Engineers and the Hong Kong Institution of Engineers and a fellow member of the Institute of Quarrying, UK. He is a past Honorary Treasurer of Hong Kong Construction Association and a member of HKTDC Infrastructure Development Advisory Committee. He is also the President of Hong Kong Contract Bridge Association. We believe Mr. Zen is qualified to serve as a director due to his executive experience and business expertise. Mr. Zen also brings to the board of directors his diverse experience as a foreign national and board member and executive officer of Hong Kong-based publicly traded companies.

Family and Other Relationships

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

Mr. Zen was originally appointed to the board of directors of EMI Holding on June 18, 2018 pursuant to the terms of outstanding convertible promissory notes dated November 6, 2017 and January 15, 2018 held by Mr. Zen and Wealth Threshold Limited, respectively, which entitled the note holders to designate one director if the aggregate investment in EMI Holding by the note holders and related note holders exceeded \$20 million.

Board of Directors and Committees and Director Independence

Our board of directors currently consists of eight members. Our board of directors has determined that each of Robert Dickey IV, Alfred Lui, Masaharu Osato, Lori Teranishi, Jane Pine Wood and Wei Peu Zen is an “independent” director as defined by The NASDAQ Marketplace Rules currently in effect and all applicable rules and regulations of the SEC. All members of the Audit, Compensation, and Governance and Nominations Committees satisfy the “independence” standards of The NASDAQ Marketplace Rules applicable to members of such committees. The board of directors made this affirmative determination regarding these directors’ independence based on discussions with the directors and its review of the directors’ responses to a standard questionnaire regarding employment and compensation history, affiliations, family and other relationships and transactions between each director or any member of his or her immediate family and the Company or its subsidiaries or affiliates.

Audit Committee

Our Audit Committee consists of Mr. Dickey, Ms. Wood and Dr. Lui, each of whom is an independent director as defined by The NASDAQ Marketplace Rules. Mr. Dickey serves as Chair of the Audit Committee and qualifies as an “audit committee financial expert” as defined under Item 407(d) of Regulation S-K. The purpose of the Audit Committee is to represent and assist our board of directors in its general oversight of our accounting and financial reporting processes, audits of the financial statements and internal control and audit functions. The Audit Committee’s primary responsibilities and duties are to:

- Serve as an independent and objective party to monitor the Company’s financial reporting process, internal control system and disclosure control system.
- Review and appraise the audit efforts of the company’s independent accountants.
- Assume direct responsibility for the appointment, compensation, retention and oversight of the work of the outside auditors and for the resolution of disputes between the outside auditors and the company’s management regarding financial reporting issues,
- Provide an open avenue of communication among the independent accountants, financial and senior management and the board of directors.

The board of directors has adopted a written charter for the Audit Committee. A copy of the Audit Committee Charter is available on our website at www.emmausmedical.com.

Governance and Nominations Committee

The purpose of the Governance and Nominations Committee is to:

- Assist the board of directors by identifying qualified candidates for director, and to recommend to the board the director nominees for the next annual meeting of stockholders
- To lead the board in its annual review of the board’s performance.
- To recommend to the board nominees for each board Committee.

- To develop and recommend to the board corporate governance guidelines applicable to the company.

The Governance and Nominations Committee currently consists of Dr. Osato, Mr. Zen and Ms. Wood. Ian Zwicker, a former director, served as Chair of the Governance and Nominations Committee until his retirement on November 23, 2021. The Committee has yet to appoint a Chair for 2022. A copy of the Governance and Nominations Committee Charter is available on our website at www.emmausmedical.com.

Compensation Committee

The purpose of the Compensation Committee is to review and approve of the company's compensation and benefit programs. The Compensation Committee also currently consists of Ms. Wood, Mr. Dickey and Dr. Lui. Ms. Wood serves as Chair of the Compensation Committee. A copy of the Compensation Committee Charter is available on our website at www.emmausmedical.com.

Section 16(a) Beneficial Ownership Reporting Compliance

Our common stock is currently registered under Section 12 of the Securities Exchange Act of 1934, as amended. As a result, and pursuant to Rule 16a-2, our directors and executive officers and beneficial owners of 10% or more of our common stock are currently required to file statements of beneficial ownership with respect to their ownership of our equity securities under Sections 13 or 16 of the Exchange Act. Based on a review of written representations from our executive officers and directors and a review of Forms 3, 4 and 5 furnished to us, we believe that during the fiscal year ended December 31, 2021 our directors and, officers and owners of more than 10% of our common stock filed, on a timely basis, all reports required by Section 16(a) of the Exchange Act, except that the initial statements of beneficial ownership of securities of Mr. Sekulich and Dr. Stark were filed late due to delays in obtaining notarized signature required to obtain SEC filer codes on their behalf after they were designated as "executive officers" for the first time on November 23, 2021.

Code of Conduct and Ethics

Our board of directors has approved a Code of Conduct and Ethics, which we refer to as the Code of Ethics, which applies to our directors, officers and employees. The Code of Ethics addresses, among other things, honesty and ethical conduct, conflicts of interest, compliance with laws, regulations, and policies, including disclosure requirements under the federal securities laws, confidentiality, trading on inside information, and reporting of violations of the Code of Ethics. A copy of the Code of Ethics is available on our website at www.emmausmedical.com. Requests for copies of the Code of Ethics should be sent to Emmaus License Sciences, Inc., Attention: Secretary, 21250 Hawthorne Boulevard, Suite 800, Torrance, California 90503.

ITEM 11. EXECUTIVE COMPENSATION

Summary Compensation Table

The following table sets forth information concerning the compensation earned by our Chief Executive Officer, and our two other most highly compensated executive officers, whom we refer to as our "named executive officers," for the fiscal years ended December 31, 2021 and 2020:

Name and Position	Year ended December 31	Salary	Bonus	Stock Awards	Option Awards	All Other Compensation	Total
Yutaka Niihara, M.D., MPH Chairman and Chief Executive Officer	2021	385,000	—	—	99,204	(1)	484,203
	2020	385,000	—	—	—	—	385,000
Willis C. Lee, M.S. Chief Operating Officer	2021	240,000	100,000	—	—	—	340,000
	2020	240,000	—	—	—	—	240,000
Yasushi Nagasaki Chief Financial Officer	2021	250,000	100,000	(2)	—	—	349,998
	2020	240,000	—	—	—	—	240,000

(1) In April 2021, the Compensation Committee of our Board of Directors approved a one-year extension of the exercise period of a five-year compensatory warrant to purchase 1,365,189 shares of common stock granted to Dr. Niihara in May 2016 and which otherwise would have expired on May 9, 2021. The amount shown represents the incremental value of the warrant modification over the grant date value.

(2) Mr. Nagasaki's bonus for 2021 was awarded and is expected to be paid in 2022.

The compensation of Dr. Niihara and Mr. Lee does not reflect annual performance bonuses contemplated by their respective employment agreements. No specific performance criteria were established for payment of such bonuses for 2021 or 2020, although Mr. Lee was awarded a discretionary bonus in 2021 as shown in the summary compensation table.

Outstanding Equity Awards at 2021 Fiscal Year End

The following table sets forth information regarding outstanding equity awards held by our named executive officers as of December 31, 2021:

Name	Number of Securities Underlying Unexercised Awards Exercisable	Number of Securities Underlying Unexercised Awards Unexercisable	Exercise Price	Expiration Date
Yutaka Niihara, M.D., MPH	262,536	—	\$ 3.42	4/1/2022
	525,072	—	\$ 3.42	2/28/2023
	315,043	—	\$ 4.76	5/10/2026
Willis C. Lee, M.S.	1,365,189	—	\$ 4.76	5/9/2022
	262,536	—	\$ 3.42	4/1/2022
	525,072	—	\$ 3.42	2/28/2023
Yasushi Nagasaki	315,043	—	\$ 4.76	5/10/2026
	262,536	—	\$ 3.42	4/1/2022
	525,072	—	\$ 3.42	2/28/2023
	315,043	—	\$ 4.76	5/10/2026

Employment Agreements

On April 5, 2011, we entered into employment agreements with Dr. Niihara and Mr. Lee. Each of the Employment Agreements had an initial two-year term, which renews automatically for consecutive one-year periods unless we or the officer provides notice of non-renewal at least 60 days prior to the expiration of the then current term.

Base Salary, Bonus and Other Compensation. Dr. Niihara's, and Mr. Lee's current base salaries are \$385,000 and \$240,000 per year, respectively, which will be reviewed at least annually. In addition to the base salary, each officer may be entitled to receive an annual performance bonus based on the officer's performance. The Employment Agreements provide that the respective officer's performance will be measured against a set of targets and goals as mutually established by us and the officer. Historically, our board of directors and the Compensation Committee of the board have evaluated each officer's performance on an overall basis related to our progress on major milestones, without reliance on specific position by position pre-established targets and goals. The officers are also eligible to receive paid vacation and to participate in health and other benefit plans and to be reimbursed for reasonable and necessary business expenses on the same basis as our other employees.

Equity Compensation. The Employment Agreements provide that on December 31 of each calendar year, or as soon as reasonably practicable after such date (each a "Grant Date"), we will grant non-qualified 10-year stock options with a Black-Scholes-Merton value of \$100,000 to Dr. Niihara, and \$50,000 to Mr. Lee in each case with an exercise price per share equal to the "Fair Market Value" (as such term is defined in our 2011 Stock Incentive Plan) on the applicable Grant Date. The options are to vest as to one-third of the option shares on each of the first three anniversaries of the Grant Date. Any unvested options are to vest immediately upon a change in control (as defined below), termination of the officer's employment other than a voluntary termination by the officer or our termination of the officer for cause. In the event the officer is terminated for any reason other than cause, death or disability or retirement, each option, to the extent that it is exercisable at the time of such termination, shall remain exercisable for the 90-day period following such termination, but in no event following the expiration of its term. In the event the officer's employment terminates on account of death, disability or, with respect to any non-qualified stock option, retirement, each option granted that is outstanding and vested as of the date of such termination shall remain exercisable by such officer (or the officer's legal representatives, heirs or legatees) for the one-year period following such termination, but in no event following the expiration of its term. No such stock option grants were made for either of the years ended December 31, 2021 or 2020.

Severance Compensation. If Dr. Niihara's or Mr. Lee's employment is terminated for any reason during the term of his Employment Agreement, other than for cause or without good reason, he will be entitled to receive his or her base salary

prorated through the termination date, any expense reimbursement due and owing for reasonable and necessary business expenses, and unpaid vacation benefits (the “Voluntary Termination Benefits”). If Dr. Niihara’s or Mr. Lee’s employment is terminated due to his death or disability during the term of his employment agreement, he will also receive an amount equal to his target annual performance bonus, if any, and in the case of a termination due to disability, six additional months of his base salary to be paid out over a six-month period and payment of COBRA benefits for six months following the termination. If Dr. Niihara’s employment is terminated without cause or he resigns with good reason (but not within two years following a change in control), he will receive the Voluntary Termination Benefits and, subject to his signing a Release of all claims relating to his employment, a severance package equal to one year’s base salary to be paid out over a 12-month period, a pro rata amount of the annual performance bonus for the calendar year in which the termination date occurs based on the achievement of any applicable performance terms or goals for the year, and payment of COBRA benefits for 12 months following the termination. If Mr. Lee’s employment is terminated without cause or he resigns with good reason (but not within two years following a change in control) during the term of his employment agreement, he will receive the Voluntary Termination Benefits and, subject to his signing a Release if all claims relating to his employment, a severance package equal to six months’ base salary to be paid out over a six-month period, an amount equal to half of the targeted annual performance bonus, if any, and payment of COBRA benefits for six months following the termination.

Termination with cause includes a proven act of dishonesty, fraud, embezzlement or misappropriation of company proprietary information; a conviction of, or plea of nolo contendere to, a felony or a crime involving moral turpitude; willful misconduct which cannot be cured on reasonable notice to the officer; or the officer’s habitual failure or refusal to perform his duties if such failure or refusal is not cured within 20 days after receiving written notice thereof from the board of directors. Good reason includes a reduction of more than 10% to the officer’s base salary or other compensation (except as part of a general reduction for all executive employees); a material diminution of the officer’s authority, responsibilities, reporting or job duties (except for any reduction for cause); the company’s material breach of the Employment Agreement; or a relocation of the business requiring the officer to move or drive to work more than 40 miles from the location of our former offices. The officer may terminate the Employment Agreement for good reason if he provides written notice to the Company within 90 days of the event constituting good reason and the Company fails to cure the good reason within 30 days after receiving such notice.

Change of Control. The Employment Agreements will not be terminated upon a “change of control,” which means any merger or reorganization where the holders of the company’s capital stock prior the transaction own fewer than 50% of the shares of capital stock after the transaction, an acquisition of 50% of the voting power of the company’s outstanding securities by another entity, or a transfer of at least 50% of the fair market value of the company’s assets. Upon Dr. Niihara’s termination without cause or good reason that occurs within two years after a change of control, he will be entitled to receive the Voluntary Termination Benefits and, subject to his signing a Release of all claims relating to his employment, a severance package equal to two years’ base salary to be paid out over a 12-month period, an amount equal to double his targeted annual performance bonus, if any, payment of COBRA benefits for 18 months following the termination, and a one-time cash payment of \$3.0 million. Upon Mr. Lee’s termination without cause or good reason that occurs within two years after a change of control, he will be entitle to receive the Voluntary Termination Benefits and, subject to his signing a Release of all claims relating to his employment, a severance package equal to one year’s base salary to be paid out over a 12-month period, an amount equal to the full-year targeted annual performance bonus, payment of COBRA benefits for 12 months following the termination, and a one-time cash payment of \$200,000. In addition, each officer’s unvested equity awards shall vest upon such termination and the officer will have 36 months in which to sell or exercise such awards (subject to expiration of the term of such options). The officer will also be free from all lock-up or other contractual restrictions upon the free sale of shares that are subject to waiver by the company upon such termination.

Director Compensation

The following is a summary of the compensation of our non-employee directors for 2021:

- \$100,000 cash compensation, payable in quarterly instalments;
- possible awards of stock options as determined by the Compensation Committee or the Board.

The following table sets forth information regarding the compensation earned by our non-employee directors for the fiscal year ended December 31, 2021. Our employee directors, Dr. Niihara, and Mr. Lee, are not compensated for their services as directors.

Name	Fees Earned or Paid in Cash	Option Awards	Total
Ian Zwicker (1)	\$ 91,667	\$ —	\$ 91,667
Masaharu Osato, M.D.	100,000	—	100,000
Wei Peu Zen	100,000	—	100,000
Robert Dickey IV	100,000	—	100,000
Jane Pine Wood	100,000	—	100,000
Alfred Lui, M.D. (1)	16,667	—	16,667
Total	<u>\$ 508,334</u>	<u>\$ —</u>	<u>\$ 508,334</u>

(1) Mr. Zwicker retired as a director and Dr. Lui was elected as a director on November 23, 2021.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The following table sets forth certain information as of March 15, 2022 with respect to beneficial ownership of our common stock based on issued and outstanding shares of common stock owned by:

- Each person known to be the beneficial owner of 5% or more of our outstanding common stock;
- Each named executive officer;
- Each director; and
- All our executive officers and directors as a group.

Beneficial ownership is determined in accordance with the rules of the SEC. In computing the number of shares beneficially owned by a person and the percentage of ownership of that person, shares of common stock subject to options, warrants and convertible notes held by that person that are currently exercisable or become exercisable within 60 days of March 15, 2022 are deemed outstanding even if they have not actually been exercised. Those shares, however, are not deemed outstanding for the purpose of computing the percentage ownership of any other person.

Unless otherwise indicated, the persons and entities named in the table have sole voting and sole investment power with respect to the shares set forth opposite the stockholder's name, subject to community property laws, where applicable.

Unless otherwise indicated in the table or footnotes, the address of each 5% or more owner is c/o Emmaus Life Sciences, Inc., 21250 Hawthorne Boulevard, Suite 800, Torrance, California 90503.

Name of Beneficial Owner	Title	Amount and Nature of Beneficial Ownership of Shares of Common Stock	Percent of Class (1)
Directors and Executive Officers			
Yutaka Niihara, M.D., M.P.H.	Chairman and Chief Executive Officer	13,927,140 (2)	26.9%
Willis C. Lee	Director, Chief Operating Officer	1,609,419 (3)	3.2%
Yasushi Nagasaki	Chief Financial Officer	1,169,753 (4)	2.3%
George Sekulich	SVP of Global Commercialization	100,147 (5)	*
Charles Stark	SVP of Clinical Development and Medical Affairs, Clinical, Regulatory	228,210 (6)	*
Robert Dickey IV	Director	—	*
Alfred Lui, M.D., FCAP	Director	42,358	*
Masaharu Osato, M.D.	Director	738,896 (7)	1.5%
Lori Teranishi	Director	18,161 (8)	*
Jane Pine Wood	Director	—	*
Wei Peu Zen	Director	2,278,048 (9)	4.6%
Officers and Directors as a Group (11 persons)		20,112,132 (10)	36.9%
5% or More Owners			
Telcon RF Pharmaceutical, Inc.		4,147,491 (11)	8.4%

* Represents beneficial ownership of less than one percent (1%).

(1) Based on 49,311,864 shares of common stock issued and outstanding as of March 15, 2022.

(2) Includes 11,303,506 shares of common that are held jointly by Dr. Niihara and Soomi Niihara, his wife. Also includes 63,000 shares held by Soomi Niihara and 92,794 shares owned by Hope International Hospice, Inc., or Hope Hospice. Dr. Niihara is the chief executive officer and a co-director of Hope Hospice and shares voting and investment power over such shares. Also includes 1,102,651 shares underlying stock options and 1,365,189 shares underlying warrants."

(3) Includes 1,102,651 shares underlying stock options.

(4) Includes 1,102,651 shares underlying stock options.

(5) Includes 99,762 shares underlying stock options.

(6) Includes 210,028 shares underlying stock options.

(7) Includes 516,152 shares held by Osato Medical Clinic and its pension plan. Also includes 217,029 shares underlying stock options.

(8) Includes 18,161 shares held by IQ PR, Inc.

(9) Includes 1,270,214 shares owned by Profit Preview International Group Limited, a Hong Kong limited company wholly owned by Mr. Zen. Excludes 521,827 shares owned by Smart Start investments Limited, a Hong Kong corporation and wholly owned subsidiary of Build King Holdings Limited, a Hong Kong stock exchange listed company, of which the Mr. Zen is a director and 9.96% shareholder, and 350,048 shares owned by Wealth Threshold Limited, a British Virgin Islands limited company and wholly owned subsidiary of Wai Kee Holdings Limited, a Hong Kong stock exchange listed company of which Mr. Zen is a director and 31.45% shareholder, as to which shares Mr. Zen disclaims beneficial ownership.

(10) Includes 3,838,272 shares underlying stock options and 1,365,189 shares underlying warrants.

(11) The information regarding Telcon RF Pharmaceutical, Inc. is based solely on its Schedule 13/G filed with the SEC on August 26, 2019. The address for the stockholder is S-Tower 14th Floor 439 Bongunsa-ro, Gangnam-gu, Seoul, South Korea.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Except as described below in this section, since the beginning of our last fiscal year, there has not been, nor is there currently proposed, there has not been any transaction or series of similar transactions to which we were a party:

- in which the amount involved exceeds the lesser of \$120,000 or 1% of the average of our total assets at year-end for the last two completed fiscal years; and
- in which any director, executive officer, or other stockholder of more than 5% of our common stock or any member of their immediate family had or will have a direct or indirect material interest.

Loans by Related Persons

In January 2020, we entered into revolving line of credit agreement with Dr. Yutaka Niihara. Under the agreement, at our request from time to time, Dr. Niihara may, but is not obligated to, loan or re-loan to us up to \$1,000,000, including \$600,000 loaned to us in December 2019. Outstanding amounts under the agreement are due and payable upon demand and bear interest, payable monthly, at a variable annual rate equal to the Prime Rate in effect from time to time plus 3%. In addition to the payment of interest, we agreed to pay Dr. Niihara an amount, which we refer to as a “tax gross-up,” intended to make him whole for federal and state income taxes payable by him with respect to interest paid to him the previous year. As of December 31, 2021, the outstanding balance under the revolving line of credit agreement of \$400,000 was reflected on our consolidated balance sheet. With the tax-gross up, the effective interest rate on the outstanding balance as of December 31, 2021 was 10.4%. The revolving line of credit agreement will expire on November 22, 2022.

The following table sets forth information relating to loans from related parties evidenced by promissory notes payable and convertible promissory notes payable to related persons outstanding at any time during the fiscal year ended December 31, 2021 (amounts in thousands).

Class	Lender	Interest Rate	Date of Loan	Term of Loan	Principal Amount Outstanding at December 31, 2021	Highest Principal Outstanding	Amount of Principal Repaid	Amount of Interest Paid
Current, Promissory note payable to related parties:								
	Willis Lee (2)	12%	10/29/2020	Due on Demand	100	100	—	—
	Soomi Niihara (1)	12%	1/20/2021	Due on Demand	—	700	700	13
	Soomi Niihara (1)	12%	9/15/2021	Due on Demand	—	300	300	3
	Soomi Niihara (1)	12%	12/7/2021	Due on Demand	700	700	—	—
				Subtotal	\$ 800	\$ 1,800	\$ 1,000	\$ 16
Revolving line of credit								
	Yutaka Niihara (1)	5.25%	12/27/2019	Due on Demand	400	800	400	35
				Subtotal	\$ 400	\$ 800	\$ 400	\$ 35
				Total	\$ 1,200	\$ 2,600	\$ 1,400	\$ 51

- (1) Soomi Niihara is the wife of Dr. Niihara, our Chairman and Chief Executive Officer.
(2) Officer.

The proceeds of the above loans were used working capital purposes.

Policy for Approval of Related Party Transactions

The Audit Committee of our Board of Directors is responsible for reviewing and approving all related party transactions.

Board Independence

Our board of directors has determined that each of Masaharu Osato, M.D., Wei Peu Zen, Robert Dickey IV Jane Pine Wood, Alfred Lui, M.D. and Lori Teranishi is an “independent” director as defined by The NASDAQ Marketplace Rules currently in effect and all applicable rules and regulations of the SEC.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The following table presents all fees, including reimbursements for expenses, billed for professional services rendered by Baker Tilly US, LLP, our independent registered public accounting firm, for the years ended December 31, 2021 and 2020 (in thousands):

	2021		2020	
Audit Fees	\$	218	\$	352
Audit-Related Fees		—		—
Tax Fees		—		—
All Other Fees		—		—
Total	\$	218	\$	352

The Audit Committee has adopted a formal policy on auditor independence requiring the advance approval by the Audit Committee of all audit and non-audit services provided by our independent registered public accounting firm. In determining whether to approve any services by our independent registered public accounting firm, the Audit Committee reviews the scope of and estimated fees for the services and considers whether the proposed services may adversely affect the firm’s independence. On an annual basis, our management reports to the Audit Committee all audit services performed during the previous 12 months and all fees billed by our independent registered public accounting firm for such services.

In fiscal 2021 and 2020, all audit services and the corresponding fees were approved by the Audit Committee.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

1. Financial Statements: See “Index to Consolidated Financial Statements” on page F-1 of this Annual Report.
2. Financial Statement Schedule: See Notes to Consolidated Financial Statements starting on page F-8 of this Annual Report.
3. Exhibits: The exhibits listed in the following “Exhibit Index” are filed or incorporated by reference as part of this Annual Report.

Exhibit Index

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed/ Furnished
		Form	File No.	Exhibit	Filing Date	
2.1	Agreement and Plan of Merger and Reorganization dated as of January 4, 2019 by and among MYnd Analytics, Inc., Athena Merger Subsidiary, Inc. and Emmaus Life Sciences, Inc., as amended by Amendment No. 1 dated as of May 27, 2019.	424B3	333-229660	Annex A	June 14, 2019	
3.1	Restated Certificate of Incorporation.	10-K	001-35527	3.1	January 25, 2021	
3.2	Amended and Restated By-Laws.	8-K	001-35527	3.4	July 22, 2019	
4.1	Specimen Common Stock Certificate.					*
4.2+	MYnd Analytics, Inc. Amended and Restated 2012 Omnibus Incentive Compensation Plan	DEF14A	001-35527	Appendix A	November 2, 2018	
4.3+	Form of Restricted Share Agreement under Amended and Restated 2012 Omnibus Incentive Compensation Plan.	10-K	001-35527	4.4	December 22, 2016	
4.4+	Form of ISO Stock Option Award Certificate under Amended and Restated 2012 Omnibus Incentive Compensation Plan.	10-K	001-35527	4.5	December 22, 2016	
4.5+	Form of NQSO Stock Option Award Certificate under Amended and Restated 2012 Omnibus Incentive Compensation Plan.	10-K	001-35527	4.6	December 22, 2016	
4.6	Common Stock Purchase Warrant dated December 29, 2017.	10-K	000-142031	4.32	April 16, 2018	
4.7	Convertible Promissory Note dated January 15, 2018.	10-Q	000-142031	4.1	May 15, 2018	
4.8+	Emmaus Life Sciences, Inc. Amended and Restated 2011 Equity Incentive Plan.	DEF14A	000-53072	Annex A	September 19, 2014	
4.9+	Form of Incentive Stock Option Agreement (Time-Based and Performance-Based Vesting) under 2011 Stock Incentive Plan.	8-K	000-142031	10.3a	May 4, 2011	

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed/ Furnished
		Form	File No.	Exhibit	Filing Date	
4.10+	Form of Incentive Stock Option Agreement (Time-Based Vesting) under 2011 Equity Incentive Plan.	8-K	000-142031	10.3b	May 4, 2011	
4.11+	Form of Non-Qualified Stock Option Agreement (Time-Based and Performance-Based Vesting) under 2011 Equity Incentive Plan.	8-K	000-142031	10.3c	May 4, 2011	
4.12+	Form of Non-Qualified Stock Option Agreement (Time-Based Vesting) under 2011 Equity Incentive Plan.	8-K	000-142031	10.3d	May 4, 2011	
4.13+	Form of the Restricted Stock Agreement (Time-Based and Performance-Based Vesting) under 2011 Equity Incentive Plan.	8-K	000-142031	10.3e	May 4, 2011	
4.14+	Form of Restricted Stock Agreement (Time-Based Vesting) under 2011 Equity Incentive Plan.	8-K	000-142031	10.3f	May 4, 2011	
4.15	Form of Warrant to Purchase Shares of Common Stock dated as of September 24, 2018 by and between MYnd Analytics, Inc. and the holder party thereto.	10-K	001-35527	10.14	December 11, 2018	
4.16	Warrant Agreement dated as of July 25, 2017 by and between MYnd Analytics, Inc. and American Stock Transfer & Trust Company, LLC, including form of Warrant Certificate attached thereto.	10-Q	001-35527	4.9	August 14, 2017	
4.17	Amendment dated June 28, 2019 to Warrant Agreements, dated July 19, 2017 and July 25, 2017, respectively, between MYnd Analytics, Inc. and American Stock Transfer & Trust Company, LLC.	8-K	001-35527	4.1	June 28, 2019	
4.18	Form of Warrant dated as of March 29, 2018 by and between MYnd Analytics, Inc. and the holder signatory thereto.	8-K	001-35527	10.2	April 3, 2018	
4.19	Form of Second Amended and Restated Common Stock Purchase Warrant.	8-K	001-35527	4.2	February 27, 2020	
4.20	Contingent Common Stock Purchase Warrant	10-K	001-35527	4.24	May 4, 2021	
4.21	Form of July 31, 2020 Common Stock Purchase Warrants	10-K	001-35527	4.25	May 4, 2021	
4.22	Form of September 22, 2020 Common Stock Purchase Warrants	8-K	001-35527	10.1	September 24, 2020	
4.23	Form of October 8, 2020 Common Stock Purchase Warrants	10-K	001-35527	4.27	May 4, 2021	

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed/ Furnished
		Form	File No.	Exhibit	Filing Date	
10.1	Form of Registration Rights Agreement dated as of March 28, 2018 by and between MYnd Analytics, Inc. and the holder(s) signatory thereto.	8-K	001-35527	10.1	April 3, 2018	
10.2	Amended and Restated Separation Agreement dated as of March 27, 2019 by and among MYnd Analytics, Inc., a Delaware corporation, and MYnd Analytics, Inc., a California corporation.	424B3	333-229660	Annex B	June 14, 2019	
10.3	Loan Agreement dated as October 3, 2018 between EMI Holding, Inc. (formerly, Emmaus Life Sciences, Inc.) and EJ Holdings, Inc.	10-Q	001-35527	10.7	November 13, 2019	
10.4+	Executive Employment Agreement dated as of April 5, 2011 by and between Emmaus Medical, Inc. and Yutaka Niihara, M.D., M.P.H.	8-K	000-142031	10.12	May 4, 2011	
10.5+	Executive Employment Agreement dated as of April 5, 2011 by and between Emmaus Medical, Inc. and Willis Lee.	8-K	000-142031	10.13	May 4, 2011	
10.6+	Form of Indemnification Agreement between Emmaus Life Sciences, Inc. (formerly EMI Holding, Inc.) and its former and current directors and officers.	8-K	000-142031	10.20	May 4, 2011	
10.7	Letter of Intent by and between Ajinomoto Aminoscience LLC and Emmaus Medical, Inc.	8-K/A	000-142031	10.24	July 5, 2011	
10.8	Office Lease dated October 20, 2014 by and between EMI Holding, Inc. (formerly, Emmaus Life Sciences, Inc.) and Bixby Torrance LLC.	10-K	001-35527	10.23(F)	March 31, 2015	
10.9	First Amendment to Office Lease Agreement dated February 1, 2018 between EMI Holding, Inc. (formerly, Emmaus Life Sciences, Inc.) and RREF Pacific Center LLC.	10-K	000-142031	10.24a	March 21, 2019	
10.10	Second Amendment to Office Lease Agreement dated December, 2018 between EMI Holding, Inc. (formerly, Emmaus Life Sciences, Inc.) and RREF Pacific Center LLC.	10-K	000-142031	10.24b	March 21, 2019	
10.11	Third Amendment to Office Lease Agreement dated September 10, 2019 between EMI Holding, Inc. (formerly, Emmaus Life Sciences, Inc.) and RREF Pacific Center LLC.	10-K	001-35527	10.23	January 25, 2021	

Incorporated by Reference

Exhibit Number	Exhibit Description	Form	File No.	Exhibit	Filing Date	Filed/ Furnished
10.12	Revised Management Control Acquisition Agreement dated September 29, 2017 by and among the registrant, Telcon Holdings, Inc. and Telcon, Inc. (now known as Telcon RF Pharmaceutical Inc.)	10-Q	000-142031	10.3	November 14, 2017	
10.13	Distributor agreement entered into as of June 15, 2017 between Telcon Inc. (now known as Telcon RF Pharmaceutical Inc.) and Emmaus Life Sciences, Inc. (now known as EMI Holding, Inc.)	10-K	001-35527	10.25	January 25, 2021	
10.14	Amendment for Distributor Agreement entered into as of January 11, 2018 between Telcon Inc. (now known as Telcon RF Pharmaceutical Inc.) and Emmaus Life Sciences, Inc. (now known as EMI Holding, Inc.)	10-K	001-35527	10.26	January 25, 2021	
10.15	Raw Material Supply Agreement dated July 12, 2017 between Telcon Inc. (now known as Telcon RF Pharmaceutical Inc.) and Emmaus Life Sciences, Inc. (now known as EMI Holding, Inc.)	10-K	001-35527	10.27	January 25, 2021	
10.16	API Supply Agreement made as of June 16, 2017 between Telcon Inc. (now known as Telcon RF Pharmaceutical Inc.) and Emmaus Life Sciences, Inc. (now known as EMI Holding, Inc.)	10-K	001-35527	10.28	January 25, 2021	
10.17	Additional Agreement made as of July 2, 2018 between Telcon Inc. (now known as Telcon RF Pharmaceutical Inc.) and Emmaus Life Sciences, Inc. (now known as EMI Holding, Inc.) and add asterixis in Filed/Furnished column.	10-K	001-35527	10.29	January 25, 2021	
10.18	Convertible Bond Purchase Agreement between Emmaus Life Sciences, Inc. and Telcon RF Pharmaceutical, Inc.	10-K	001-35527	10.34	January 25, 2021	
10.19	Right to Sell (Call Option) Agreement between Emmaus Life Sciences, Inc. and Telcon RF Pharmaceutical, Inc.	10-K	001-35527	10.35	January 25, 2021	
10.20	Loan Agreement Dated October 28, 2020 Between Emmaus Life Sciences, Inc. and EJ Holdings, Inc.	8-K	001-35527	10.1	November 13, 2020	
10.21	Amendment No. 1 to Loan Agreement dated January 5, 2022 between Emmaus Life Sciences, Inc. and EJ Holdings, Inc.					*

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed/ Furnished
		Form	File No.	Exhibit	Filing Date	
10.22	License Agreement with Kainos Medicine, Inc. and Emmaus Life Sciences, Inc.					*
10.23	Promissory Note dated April 24, 2021 issued by registrant to Eastwind, Ltd.	10-Q	001-35527	10.1	September 1, 2021	
10.24	Promissory Note dated February 17, 2021 issued by registrant to Shigeru Matsuda.	10-Q	001-35527	10.2	September 1, 2021	
10.25	Promissory Note dated May 26, 2021 issued by registrant to Shigeru Matsuda.	10-Q	001-35527	10.2	September 1, 2021	
10.26	Promissory Note dated December 7, 2021 issued by registrant to Soomi Niihara.					*
10.27+	Credit Access and Loan Agreement dated as of January 10, 2020 by and between Emmaus Life Sciences, Inc. and Yutaka Niihara, M.D., M.P.H.	10-K	001-35527	10.37	January 25, 2021	
10.28	Amendment No. 2 to Convertible Promissory Note of EMI Holding, Inc. (formerly, Emmaus Life Sciences, Inc.) dated as of January 15, 2020	10-K	001-35527	10.37	May 4, 2021	
10.29	Amendment No. 3 to Convertible Promissory Note as of June 15, 2020 of EMI Holding, Inc. (formerly, Emmaus Life Sciences, Inc.)	10-K	001-35527	10.38	May 4, 2021	
10.30	Securities Purchase Agreement dated as of February 8, 2021 among Emmaus Life Sciences, Inc. and the “Purchasers” thereunder, including form of Convertible Promissory Note attached thereto as Exhibit A	8-K	001-35527	10.1	February 16, 2021	
10.31	Transfer Restriction and Voting Agreement dated as of February 8, 2021 between Emmaus Life Sciences, Inc. and the “Purchasers” thereunder.	8-K	001-35527	10.2	February 16, 2021	
10.32	Warrant to Purchase Shares of Common Stock issued on May 10, 2016 as amended.	10-Q	000-53072	4.3	November 14, 2016	
10.33	Guaranty dated December 9, 2020 by Emmaus Life Sciences, Inc. in favor of Prestige Capital, Inc.	8-K	001-35527	10.2	February 22, 2021	
21.1	List of Subsidiaries.	10-K	001-35527	21.1	January 25, 2021	
23.1	Consent of Independent Registered Public Accounting Firm Baker Tilly US, LLP.					*

Incorporated by Reference

Exhibit Number	Exhibit Description	Form	File No.	Exhibit	Filing Date	Filed/ Furnished
31.1	Certification of Chief Executive Officer pursuant to Item 601(b)(31) of Regulation S-K, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					*
31.2	Certification of Chief Financial Officer pursuant of Item 601(b)(31) of Regulation S-K, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					*
32.1	Certification of Chief Executive Office and Chief Financial Officer Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					*
101.INS	Inline XBRL Instance Document – the instance document does not appear in the Interactive Data File because XBRL tags are embedded within the Inline XBRL document					
101.SCH	Inline XBRL Taxonomy Extension Schema Document					
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document					
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document					
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document					
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document					
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)					

+ Management contract or compensatory plan, contract or arrangement

* Filed herewith.

SIGNATURES

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

Emmaus Life Sciences, Inc.

By: /s/ YUTAKA NIIHARA
Yutaka Niihara, M.D., M.P.H.
Title: Chairman and Chief Executive Officer
Date: March 31, 2022

By: /s/ YASUSHI NAGASAKI
Yasushi Nagasaki
Title: Chief Financial Officer (Principal Financial and Accounting Officer)
Date: March 31, 2022

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.

POWER OF ATTORNEY

Each person whose signature appears below constitutes and appoints Yutaka Niihara, M.D., M.P.H. and Yasushi Nagasaki, jointly and severally, as his or her attorneys-in-fact, each with the power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact, or his substitute or substitutes, may do or cause to be done by virtue hereof.

By: /s/ WILLIS LEE
Willis Lee

Title: Director and Chief Operating Officer

Date: March 31, 2022

By: /s/ MASAHARU OSATO
Masaharu Osato, M.D.

Title: Director

Date: March 31, 2022

By: /s/ ROBERT DICKEY
Robert Dickey IV

Title: Director

Date: March 31, 2022

By: /s/ JANE PINE WOOD
Jane Pine Wood

Title: Director

Date: March 31, 2022

By: /s/ ALFRED LUI
Alfred Lui, M.D.

Title: Director

Date: March 31, 2022

By: /s/ LORI TERANISHI
Lori Teranishi

Title: Director

Date: March 31, 2022

INDEX TO FINANCIAL STATEMENTS

EMMAUS LIFE SCIENCES, INC.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

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To the Stockholders and the Board of Directors of Emmaus Life Sciences, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Emmaus Life Sciences, Inc. and its subsidiaries (the “Company”) as of December 31, 2021 and 2020, the related consolidated statements of operations and comprehensive income (loss), changes in stockholders' deficit, and cash flows, for the years then ended, and the related notes to the consolidated financial statements (collectively, the “financial statements”). In our opinion the financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2021 and 2020, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

Going Concern Uncertainty

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 2 to the financial statements, the Company has incurred recurring operating losses and its current liabilities exceed its current assets. These conditions raise substantial doubt about the Company’s ability to continue as a going concern. Management’s plans in regard to these matters are also described in Note 2. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

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

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

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

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current-period audit of the financial statements that were communicated or required to be communicated to the Company's Audit Committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

REVENUE RECOGNITION - VARIABLE CONSIDERATION

Critical Audit Matter Description

As described in Note 2 to the financial statements, the Company records revenue at the transaction price, net of estimates for variable consideration consisting primarily of chargebacks, discounts, and returns, which are established at the time of sales. The Company recorded sales deductions of \$6.2 million during the year ended of December 31, 2021. Actual amounts of consideration ultimately received may differ from estimates. If actual results vary materially from estimates, the Company will adjust these estimates, which will affect net sales of the products and results from operations in the period such estimates are adjusted.

We identified the determination of variable consideration as a critical audit matter. Significant judgment is exercised by the Company in estimating variable consideration when determining the amount of revenue to recognize. Given these factors, the related audit effort in evaluating management's judgments in determining the amount of variable consideration used to determine the transaction price was extensive and required a high degree of auditor judgment.

How We Addressed the Matter in Our Audit

The primary procedures we performed to address this critical audit matter included:

- Obtained an understanding of the Company's process and key controls related to the determination of sales deductions.
- Evaluating the Company's accounting policies related to the determination of variable consideration in the calculation of the transaction price.
- Evaluating the reasonableness of management's estimate of variable consideration in accordance with their accounting policies based on contractual terms and historical data and variable consideration estimates.
- Tested variable consideration amounts on a sample basis by recalculating recorded amounts based on contractual terms.
- Tested the mathematical accuracy of management's calculations of net revenue and the associated timing of net revenue recognized in the financial statements.

INVESTMENT IN CONVERTIBLE BOND AND CONVERTIBLE NOTES PAYABLE – DETERMINATION OF FAIR VALUE

Critical Audit Matter Description

As described in Note 5 to the financial statements, the Company purchased a convertible bond and elected the fair value accounting option. The fair value of the convertible bond was \$26.1 million as of December 31, 2021. The fair value was determined using a Lattice pricing model and the change in fair value was recorded as part of other comprehensive income (loss).

As described in Note 7 to the financial statements, the Company issued convertible notes payable resulting in liability treatment of the conversion feature. The fair value of the conversion feature was \$7.5 million as of December 31, 2021. The fair value was determined using a Lattice pricing model and the change in fair value was recorded as part of other comprehensive income (loss).

We identified the determination of the fair value using the binomial lattice model as a critical audit matter. Significant judgment is exercised by the Company in determining the fair value of the convertible bond and the conversion feature of the convertible notes payable. Given these factors, the related audit effort in evaluating management's judgments in determining the fair value of the convertible bond and the conversion feature of the convertible notes payable was complex and required a high degree of auditor judgment.

How We Addressed the Matter in Our Audit

The primary procedures we performed to address this critical audit matter included:

- Obtaining an understanding of the Company's process of accounting for convertible bonds and the conversion feature of the convertible notes payable.
- Obtaining and reviewing the agreements.
- Evaluating the methods and significant assumptions used by the Company's valuation professional.
- Testing the accuracy and the completeness of the underlying data and the mathematical accuracy of the valuation report.
- Utilizing auditor's valuation specialist to assist in the evaluation of the methodology used by the Company and assumptions included in determining the fair value of the convertible bond and the conversion feature of the convertible notes payable.
- Evaluating the related disclosures in the financial statements.

/s/ **BAKER TILLY US, LLP**

We have served as the Company's auditor since 2020.

San Diego, California
March 31, 2022

EMMAUS LIFE SCIENCES, INC.
CONSOLIDATED BALANCE SHEETS
(In thousands, except share and per share amounts)

	As of	
	December 31, 2021	December 31, 2020
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	\$ 2,279	\$ 2,487
Accounts receivable, net	1,040	198
Inventories, net	4,392	7,087
Prepaid expenses and other current assets	1,380	1,485
Total current assets	<u>9,091</u>	<u>11,257</u>
Property and equipment, net	147	120
Equity method investment	17,616	15,925
Right of use assets	3,485	4,072
Investment in convertible bond	26,100	27,866
Other assets	295	296
Total assets	<u>\$ 56,734</u>	<u>\$ 59,536</u>
LIABILITIES AND STOCKHOLDERS' DEFICIT		
CURRENT LIABILITIES		
Accounts payable and accrued expenses	\$ 9,189	\$ 7,460
Operating lease liabilities, current portion	740	1,143
Conversion feature derivative, notes payable	7,507	7
Other current liabilities	4,404	2,699
Revolving line of credit from related party	400	800
Warrant derivative liabilities	1,503	1,071
Notes payable, current portion	2,399	4,588
Notes payable to related parties	800	134
Convertible debentures, net of discount	—	5,480
Convertible notes payable, net of discount	10,158	—
Total current liabilities	<u>37,100</u>	<u>23,382</u>
Operating lease liabilities, less current portion	3,261	3,470
Other long-term liabilities	33,173	34,470
Notes payable, less current portion	1,500	222
Convertible notes payable, net of discount	3,150	3,150
Total liabilities	<u>78,184</u>	<u>64,694</u>
STOCKHOLDERS' DEFICIT		
Preferred stock — par value \$0.001 per share, 15,000,000 shares authorized, none issued and outstanding	—	—
Common stock — par value \$0.001 per share, 250,000,000 shares authorized, shares 49,311,864 and 48,987,189 shares issued and outstanding at December 31, 2021 and December 31, 2020, respectively	49	49
Additional paid-in capital	220,022	218,728
Accumulated other comprehensive income (loss)	(255)	1,144
Accumulated deficit	(241,266)	(225,079)
Total stockholders' deficit	<u>(21,450)</u>	<u>(5,158)</u>
Total liabilities & stockholders' deficit	<u>\$ 56,734</u>	<u>\$ 59,536</u>

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

EMMAUS LIFE SCIENCES, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE INCOME (LOSS)
(In thousands, except share and per share amounts)

	Twelve Months Ended December 31,	
	2021	2020
REVENUES, NET	\$ 20,610	\$ 23,167
COST OF GOODS SOLD	3,312	2,248
GROSS PROFIT	17,298	20,919
OPERATING EXPENSES		
Research and development	4,110	2,408
Selling	5,878	4,865
General and administrative	13,438	13,678
Total operating expenses	23,426	20,951
LOSS FROM OPERATIONS	(6,128)	(32)
OTHER INCOME (EXPENSE)		
Loss on debt extinguishment, net	(365)	(1,425)
Change in fair value of warrant derivative liabilities	(432)	392
Change in fair value of conversion feature derivative, notes payable	(1,906)	112
Net gain on investment in marketable securities	—	7,672
Net loss on equity method investment	(2,733)	(2,060)
Foreign exchange gain (loss)	(2,017)	1,502
Interest and other income	761	801
Interest expense	(3,101)	(5,989)
Total other income (expense)	(9,793)	1,005
INCOME (LOSS) BEFORE INCOME TAXES	(15,921)	973
INCOME TAXES (BENEFIT)	25	(381)
NET INCOME (LOSS)	(15,946)	1,354
COMPONENTS OF OTHER COMPREHENSIVE INCOME (LOSS)		
Unrealized gain (loss) on debt securities available for sale (net of tax)	(1,766)	1,280
Foreign currency translation adjustments	367	(57)
Other comprehensive income (loss)	(1,399)	1,223
COMPREHENSIVE INCOME (LOSS)	\$ (17,345)	\$ 2,577
EARNINGS (NET LOSS) PER COMMON SHARE - BASIC and DILUTED	\$ (0.32)	\$ 0.03
WEIGHTED AVERAGE COMMON SHARES OUTSTANDING	49,253,156	48,897,004

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

EMMAUS LIFE SCIENCES, INC.
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' DEFICIT
(In thousands, except share and per share amounts)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' deficit
	Shares	Amount				
Balance, January 1, 2020	48,471,446	\$ 48	\$ 215,207	\$ (79)	\$ (226,229)	\$ (11,053)
Fair value of warrants including down-round protection adjustments	—	—	2,641	—	(204)	2,437
Common stock issued for cash (net of issuance cost)	515,743	1	141	—	—	142
Share-based compensation	—	—	739	—	—	739
Unrealized gain on debt securities available for sale (net of tax)	—	—	—	1,280	—	1,280
Foreign currency translation effect	—	—	—	(57)	—	(57)
Net income	—	—	—	—	1,354	1,354
Balance, December 31, 2020	<u>48,987,189</u>	<u>\$ 49</u>	<u>\$ 218,728</u>	<u>\$ 1,144</u>	<u>\$ (225,079)</u>	<u>\$ (5,158)</u>
Fair value of warrants including down-round protection adjustments	—	—	241	—	(241)	—
Common stock issued for services	324,675	—	500	—	—	500
Share-based compensation	—	—	553	—	—	553
Unrealized loss on debt securities available for sale (net of tax)	—	—	—	(1,766)	—	(1,766)
Foreign currency translation effect	—	—	—	367	—	367
Net loss	—	—	—	—	(15,946)	(15,946)
Balance, December 31, 2021	<u>49,311,864</u>	<u>\$ 49</u>	<u>\$ 220,022</u>	<u>\$ (255)</u>	<u>\$ (241,266)</u>	<u>\$ (21,450)</u>

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

EMMAUS LIFE SCIENCES, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Twelve Months Ended December 31,	
	2021	2020
CASH FLOWS FROM OPERATING ACTIVITIES		
Net income (loss)	\$ (15,946)	\$ 1,354
Adjustments to reconcile net loss to net cash flows used in operating activities		
Depreciation and amortization	59	60
Inventory reserve	2,221	1,134
Amortization of discount of notes payable and convertible notes payable	1,810	4,027
Foreign exchange adjustments	2,004	(679)
Tax benefit recognized on unrealized gain on debt securities	—	(427)
Net gain on investment in marketable securities	—	(7,672)
Loss on equity method investment, net	2,733	2,060
Loss on debt extinguishment, net	365	1,425
Gain on disposal of property and equipment	(1)	—
Share-based compensation	553	739
Shares issued for services	500	—
Change in fair value of warrant derivative liabilities	432	(392)
Change in fair value of conversion feature derivative, note payable	1,906	(112)
Net changes in operating assets and liabilities		
Accounts receivable	(845)	1,953
Inventories	462	(245)
Prepaid expenses and other current assets	93	33
Other non-current assets	566	380
Income tax receivable and payable	(30)	(100)
Accounts payable and accrued expenses	2,060	(3,345)
Other current liabilities	707	(3,052)
Other long-term liabilities	(903)	408
Net cash flows used in operating activities	(1,254)	(2,451)
CASH FLOWS FROM INVESTING ACTIVITIES		
Sale of marketable securities	—	35,601
Purchases of property and equipment	(73)	(15)
Purchase of convertible bonds	—	(26,160)
Loan to equity method investee	(6,304)	(3,956)
Net cash flows (used in) provided by investing activities	(6,377)	5,470
CASH FLOWS FROM FINANCING ACTIVITIES		
Proceeds from notes payable issued, net of issuance cost and discount	1,700	2,765
Proceeds from convertible notes payable issued	14,490	—
Payments of notes payable	(1,579)	(1,717)
Payments of convertible notes	(7,200)	(3,500)
Proceeds from issuance of common stock, net of issuance cost	—	142
Net cash flows provided by (used in) financing activities	7,411	(2,310)
Effect of exchange rate changes on cash	12	9
Net (decrease) increase in cash, cash equivalents and restricted cash	(208)	718
Cash, cash equivalents and restricted cash, beginning of period	2,487	1,769
Cash, cash equivalents and restricted cash, end of period	\$ 2,279	\$ 2,487
SUPPLEMENTAL DISCLOSURES OF CASH FLOW ACTIVITIES		
Interest paid	\$ 945	\$ 1,481
Income taxes paid	\$ 21	\$ 144
NON-CASH INVESTMENT AND FINANCING ACTIVITIES		
Debt discount due to conversion features derivative	\$ 5,555	\$ —
Debt discount due to warrant issued with debt	\$ —	\$ 3,808

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

NOTE 1—DESCRIPTION OF BUSINESS

Organization—On July 17, 2019 Emmaus Life Sciences, Inc. (formerly, “MYnd Analytics, Inc.” and herein the “Company” or “Emmaus”) completed its merger transaction (the “Merger”) with EMI Holding, Inc., formerly known as Emmaus Life Sciences, Inc. (“EMI”). In the Merger, a wholly owned subsidiary of the Company merged into EMI Holding, with EMI Holding surviving the Merger as a wholly owned subsidiary. Immediately after completion of the Merger, the Company changed its name to “Emmaus Life Sciences, Inc.”

The Merger was treated as a reverse recapitalization under the acquisition method of accounting in accordance with accounting principles generally accepted in the U.S. (“GAAP”) For accounting purposes, EMI Holding was considered to have acquired the Company.

In connection with and prior to the Merger, the Company contributed and transferred to Telemynd, Inc. (“Telemynd”), a newly formed, subsidiary of the Company, all or substantially all of the Company’s historical business, assets and liabilities and the Company’s board of directors declared a stock dividend of share of the Telemynd common stock held by the Company for each outstanding share of Company common stock after giving effect to a 1-for-6 reverse stock of the Company’s outstanding shares of common stock. The dividend, together with the contribution and transfer of the Company’s historical business, assets, and liabilities described above, is referred to as the “spin-off.”

As a result of the spin-off and the Merger, the Company’s ongoing business became EMI Holding’s business, which is that of a commercial-stage biopharmaceutical company focused on the development, marketing and sale of innovative treatments and therapies, including those in the rare and orphan disease categories.

References herein to the “Company” or “Emmaus” means Emmaus Life Sciences, Inc. and its direct and direct subsidiaries.

Nature of Business—The Company is a commercial-stage biopharmaceutical company engaged in the discovery, development, marketing and sales of innovative treatments and therapies, primarily for rare and orphan diseases. The Company’s lead product Endari® (prescription grade L-glutamine oral powder) is approved by the U.S. Food and Drug Administration, or FDA, to reduce the acute complications of sickle cell disease (“SCD”) in adult and pediatric patients five years of age and older. Endari® has received Orphan Drug designation from the FDA and Orphan Medicinal designation from the European Commission, which designations generally afford marketing exclusivity for Endari® for a seven-year period in the U.S. and for a ten-year period in the European Union, respectively, following marketing approval.

Endari® is marketed and sold by the internal commercial sales team. Endari® is reimbursable by the Centers for Medicare and Medicaid Services, and every state provides coverage for Endari® for outpatient prescriptions to all eligible Medicaid enrollees within their state Medicaid programs. Endari® is also reimbursable by many commercial payors. The Company has agreements in place with the nation’s leading distributors, as well as physician group purchasing organizations and pharmacy benefits managers, making Endari® available at selected retail and specialty pharmacies nationwide.

On July 4, 2018, the FDA acknowledged receipt of the Company’s investigational new drug application, or IND, for the treatment of diverticulosis using the same prescription-grade L-glutamine (“PGLG”) oral powder used in Endari®. The Company subsequently received a “Study May Proceed” letter from the FDA. In April 2019 the Company commenced a Pilot/Phase 1 study of the safety and efficacy of PGLG oral powder in diverticulosis. The study will evaluate the change in the number and size of colonic diverticula and assess safety in a total of up to 10 to 15 patients at multiple study sites.

NOTE 2—SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of presentation—The accompanying consolidated financial statements have been prepared in accordance with GAAP codified in the Accounting Standards Codification (“ASC”) and Accounting Standards Updates (“ASU”) of the Financial Accounting Standards Board (“FASB”).

Going concern— The accompanying consolidated financial statements have been prepared on the basis that the Company will continue as a going concern. The Company incurred a net loss of \$15.9 million for the year ended December 31, 2021. In addition, the Company has a significant amount of notes payable and other obligations due within the next twelve months and is projecting that its operating losses and expected capital needs, including the expected costs

relating to the commercialization of Endari® in the Middle East North Africa region and elsewhere, will exceed its existing cash balances and cash expected to be generated from operations for the foreseeable future. In order to meet the Company's expected obligations, the Company will need to raise additional funds through related-party loans, equity and debt financings or licensing or other strategic agreements. The Company has no understanding or arrangement for any additional financing, and there can be no assurance that the Company will be able to complete any additional equity or debt financings on favorable terms, or at all, or enter into licensing or other strategic arrangements. Due to the uncertainty of the Company's ability to meet its current operating and capital expenses, there is substantial doubt about the Company's ability to continue as a going concern for 12 months from the date of this filing. The consolidated financial statements do not include any adjustments that might result from the outcome of these uncertainties.

Principles of consolidation—The consolidated financial statements include the accounts of the Company and its Holding, Inc. subsidiary and EMI Holding's wholly-owned subsidiary, Emmaus Medical Inc., and Emmaus Medical, Inc.'s wholly-owned subsidiaries. All significant intercompany transactions have been eliminated.

Estimates—Financial statements prepared in accordance with GAAP require 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 revenues and expenses during the reporting period. Significant assumptions made by management include those relating to revenue recognition on product sales, the estimated useful lives of equipment, impairment of assets, the variables used to calculate the valuation of conversion features, stock options and warrants, and estimated accruals on an ongoing basis. The Company' bases its estimates on historical experience and on various other assumptions that management believes to be reasonable under the circumstances. Actual results could differ from those estimates under different assumptions or conditions. To the extent there are material differences between these estimates and actual results, the Company's financial statements will be affected.

Revenue recognition— The Company realizes net revenues primarily from sales of Endari® to distributors and specialty pharmacy providers. Distributors resell Endari® to other pharmacy and specialty pharmacy providers, health care providers, hospitals, and clinics. In addition to agreements with these distributors, the Company has contractual arrangements with specialty pharmacy providers, in-office dispensing providers, physician group purchasing organizations, pharmacy benefits managers and government entities that provide for government-mandated or privately negotiated rebates, chargebacks and discounts with respect to the purchase of Endari®. These various discounts, rebates, and chargebacks are referred to as "variable consideration." Revenue from product sales is recorded net of variable consideration.

Under ASC 606 *Revenue from Contracts with Customers*, the Company recognizes revenue when its customers obtain control of the Company's product, which typically occurs on delivery. Revenue is recognized in an amount that reflects the consideration that the Company expects to receive in exchange for the product, or transaction price. To determine revenue recognition for contracts with customers within the scope of ASC 606, the Company performs the following 5 steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the Company's performance obligations in the contract; and (v) recognize revenue when (or as) the Company satisfies the relevant performance obligations.

Revenue from product sales is recorded at the transaction price, net of estimates for variable consideration consisting of sales discounts, returns, government rebates, chargebacks and commercial discounts. Variable consideration is estimated using the expected-value amount method, which is the sum of probability-weighted amounts in a range of possible transaction prices. Actual variable consideration may differ from the Company's estimates. If actual results vary from the Company's estimates, the Company adjusts the variable consideration in the period such variances become known, which would affect net revenues in that period. The following are our significant categories of variable consideration:

Sales Discounts: The Company provides its customers prompt payment discounts and from time to time offers additional discounts for bulk orders that are recorded as a reduction of revenues in the period the revenues are recognized.

Product Returns: The Company offers distributors a right to return product purchased principally based upon (i) overstocks, (ii) inactive product or non-moving product due to market conditions, and (iii) expired products. Product return allowances are estimated and recorded at the time of sale.

Government Rebates: The Company is subject to discount obligations under state Medicaid programs and the Medicare Part D prescription drug coverage gap program. Management estimates Medicaid and Medicare Part D prescription drug coverage gap rebates based upon a range of possible outcomes that are probability-weighted for the estimated payor mix. These reserves are recorded in the same period the related revenues are recognized, resulting in a reduction of product revenues and the establishment of a current liability that is included as an accounts payable and accrued expenses in the

balance sheet. The liability for these rebates consists primarily of estimates of claims expected to be received in future periods related to recognized revenues.

Chargebacks and Discounts: Chargebacks for fees and discounts represent the estimated obligations resulting from contractual commitments to sell products to certain specialty pharmacy providers, in-office dispensing providers, group purchasing organizations, and government entities at prices lower than the list prices charged to distributors. The distributors charge the Company for the difference between what they pay for the products and the Company's contracted selling price to these specialty pharmacy providers, in-office dispensing providers, group purchasing organizations, and government entities. In addition, we have contractual agreements with pharmacy benefit managers who charge us for rebates and administrative fee in connection with the utilization of product. These reserves are established in the same period that the related revenues are recognized, resulting in a reduction of revenues. Chargeback amounts are generally determined at the time of resale of products by the distributors.

Leases — In accordance with ASC 842 *Leases*, the Company determines whether an arrangement is a lease at inception. For leases where the Company is the lessee, right-of-use assets and operating lease liabilities are recognized based on the present value of remaining lease payments over the lease term. As the Company's leases do not provide an implicit rate, the Company has used an estimated incremental borrowing rate based on the information available at lease commencement date in determining the present value of lease payments. Operating lease expense is recognized on a straight-line basis over the lease term. Variable lease costs such as common area costs and other operating costs are expensed as incurred. For all lease agreements, lease and non-lease components are combined. No right-of-use asset and related lease liability are recorded for leases with an initial term of 12 months or less.

Cash and cash equivalents—Cash and cash equivalents include short-term securities with original maturities of less than ninety days. The Company maintains its cash and cash equivalents at insured financial institutions, the balances of which may, at times, exceed federally insured limits. Management believes that the risk of loss due to the concentration is minimal.

Accounts receivable—Accounts receivables are primarily attributable to product sales to customers. The Company makes judgements as to its ability to collect outstanding receivables and provides an allowance for receivables if and when collection becomes doubtful. Provisions are made based upon a specific review of all significant outstanding invoices and the quality and age of those invoices. The Company believes the credit risks associated with its customers are not significant.

Factoring accounts receivable— Emmaus Medical, Inc., or Emmaus Medical, the Company's indirect wholly owned subsidiary, entered into a purchase and sales agreement with Prestige Capital Finance, LLC or Prestige Capital, pursuant to which Emmaus Medical may offer and sell to Prestige Capital from time to time eligible accounts receivable in exchange for Prestige Capital's down payment, or advance, to Emmaus Medical of 75% of the face amount of the accounts receivable, subject to a \$7.5 million cap on advances at any time. The balance of the face amount of the accounts receivables will be reserved by Prestige Capital and paid to Emmaus Medical, less discount fees of Prestige Capital ranging from 2.25% to 7.25% of the face amount, as and when Prestige Capital collects the entire face amount of the accounts receivable. Emmaus Medical's obligations to Prestige Capital under the purchase and sale agreement are secured by a security interest in the accounts receivable and all or substantially all other assets of Emmaus Medical. In connection with the purchase and sale agreement, Emmaus guarantees Emmaus Medical's obligations under the purchase and sale agreement. At December 31, 2021, accounts receivable included approximately \$587,000 of factoring accounts receivable, and other current liabilities included approximately \$12,000 of liabilities from factoring. For year ended December 31, 2021, the Company incurred approximately \$317,000 of factoring fees.

Inventories—Inventories consist of raw materials, finished goods and work-in-process and are valued on a first-in, first-out basis at the lesser of cost or net realizable value. Work-in-process inventories consist of L-glutamine for the Company's products that has not yet been packaged and labeled for sale. Substantially all raw materials purchase during the years ended December 31, 2021 and 2020 were supplied, directly or indirectly by one supplier. Inventories are presented net of reserves totaling \$3.4 million and \$1.2 million for the year ended December 31, 2021 and 2020, respectively.

Prepaid expenses and other current assets— Prepaid expenses and other current assets consist primarily of cost paid for future services or refunds from vendors which will occur within a year. Prepaid expenses include prepayment in insurance, subscription services, consulting and other services which are being amortized over the contract terms or recognized upon services are performed.

Property and equipment— Equipment, Furniture and fixtures are recorded at historical cost and amortized on a straight-line basis over their estimated useful lives of five to seven years. Leasehold improvements are recorded at historical cost and amortized on a straight-line basis over the shorter of their estimated useful lives or the lease terms. Maintenance and repairs are expensed as incurred, while major additions and improvements are capitalized. Gains and losses on disposition are included in other income (expenses), if any.

Impairment of long-lived assets—The Company evaluates the carrying value of its long-lived assets for impairment whenever events or changes in circumstances indicate that such carrying values may not be recoverable. The Management uses its best judgment based on the current facts and circumstances relating to the Company's business when determining whether any significant impairment factors exist.

If the Company determines that the carrying values of long-lived assets may not be recoverable based upon the existence of one or more indicators of impairment, the Company performs an undiscounted cash flow analysis to determine if impairment exists. If impairment exists, the Company measures the impairment based on the difference between the asset's carrying amount and its fair value, and the impairment is reflected in the consolidated statement of operations in the period in which the long-lived asset impairment is determined to have occurred. No impairment existed as of December 31, 2021 and 2020.

Research and development—Research and development consists of expenditures for the research and development of the Company's products and product candidates, which primarily involve contract research, payroll-related expenses and other related supplies. Research and development costs are expensed as incurred.

Share-based compensation—The Company recognizes compensation cost for share-based compensation awards over the service term of the recipients of the share-based awards. The fair value of share-based compensation is calculated using the Black-Scholes-Merton pricing model. The Black-Scholes-Merton model requires subjective assumptions regarding future stock price volatility and expected time to exercise, which greatly affect the calculated values. The expected term of awards granted is calculated using the simplified method allowed under the Securities and Exchange Commission ("SEC") Staff Accounting Bulletin Nos. 107 and 110. The risk-free rate selected to value any grant is based on the U.S. Treasury rate on the grant date that corresponds to the expected term of the award.

Income taxes—The Company accounts for income taxes under the asset and liability method, wherein deferred tax assets and liabilities are recognized for the future tax consequences attributable to the differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period the enactment occurs. A valuation allowance is provided for certain deferred tax assets if it is more likely than not that the Company will not realize tax assets through the generation of future taxable income for the related jurisdictions.

When tax returns are filed, it is highly probable that some positions taken would be sustained upon examination by the taxing authorities, while others are subject to uncertainty about the merits of the position taken or the amount of the position that would be ultimately sustained. The benefit of a tax position is recognized in the financial statements in the period during which, based on all available evidence, management believes it is more likely than not that the position will be sustained upon examination, including the resolution of appeals or litigation processes, if any. Tax positions taken are not offset or aggregated with other positions. Tax positions that meet the more-likely-than-not recognition threshold are recorded at the largest amount of tax benefit that is more than 50 percent likely of being realized upon examination by the applicable taxing authority. The portion of the benefits associated with tax positions taken that exceeds the amount measured as described above is reflected as a liability for unrecognized tax benefits along with any associated interest and penalties that would be payable to the taxing authorities upon examination.

As of December 31, 2021 and December 31, 2020, the Company had no unrecognized tax benefits and no positions which, in the opinion of management, would be reversed if challenged by a taxing authority. In the event the Company is assessed interest or penalties, such amounts will be classified as income tax expense in the financial statements.

Comprehensive income (loss)—Comprehensive income (loss) includes net loss and other comprehensive income (loss) relating to foreign translation adjustments of the Company's subsidiaries and change in fair value of investment in convertible bond classified as available for sale.

Equity method investment – The Company owns 40% of the capital shares of EJ Holdings. A variable interest entity (“VIE”) such as EJ Holdings is to be consolidated by its primary beneficiary if the beneficiary has both a) the power to direct the activities of the VIE that most significantly impact the VIE’s economic performance and b) the obligation to absorb losses of, or the right to receive benefits from, the VIE that could potentially be significant to the VIE. The Company determined that it does not meet the power criterion for consolidating EJ Holdings and, accordingly, accounts for its variable interest in EJ Holdings under the equity method.

Investment in convertible bond – The Company has elected the fair value option measuring investment in convertible bond. The convertible bond is classified as available for sales and the changes in fair value are reported in other comprehensive income for each reporting period.

Foreign currency translation—The Company’s reporting currency is the U.S. dollar. The functional currencies of its foreign subsidiaries are the primary currencies within the countries in which they operate. Assets and liabilities of their operations are translated into U.S. dollars at period-end exchange rates, and revenues, if any, and expenses are translated into U.S. dollars at average exchange rates in effect during each reporting period. Adjustments resulting from the translation are reported in other comprehensive income or loss.

Financial instruments—Financial instruments included in the financial statements are comprised of cash and cash equivalents, restricted cash, investment in convertible bond, accounts receivable, warrant derivative liabilities, accounts payable, certain accrued liabilities, convertible notes payable, notes payable, conversion feature liabilities and other contingent liabilities.

Fair value measurements—The Company 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 in accordance with ASC 820. The Company measures fair value under a framework that provides a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). The three levels of the fair value hierarchy are described as follows:

Level 1: Inputs to the valuation methodology are unadjusted quoted prices for identical assets or liabilities in active markets.

Level 2: Inputs to the valuation methodology include:

Quoted prices for similar assets or liabilities in active markets;

Quoted prices for identical or similar assets or liabilities in inactive markets;

Inputs other than quoted prices that are observable for the asset or liability; and

Inputs that are derived principally from or corroborated by observable market data by correlation or other means.

If the asset or liability has a specified (contractual) term, the Level 2 inputs must be observable for substantially the full term of the asset or liability.

Level 3: Inputs to the valuation methodology are unobservable and significant to the fair value measurement.

An asset’s or liability’s fair value measurement level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. Valuation techniques used need to maximize the use of observable inputs and minimize the use of unobservable inputs. The carrying values of cash and cash equivalents, accounts receivables, other current assets, account payable and accrued expenses and revolving line of credit approximate fair value due to the short-term maturity of those instruments. The fair value of the Company’s convertible debt instruments was determined based on Level 2 inputs. The carrying value of the debt was discounted based on allocating proceeds to other financial instruments within the arrangement as discussed in Note 7.

Certain outstanding warrants contain price adjustment provisions and, consequently, are accounted for as liabilities that are remeasured at fair value on a recurring basis using Level 3 inputs. The level 3 inputs in the valuation of the warrants include expected term and expected volatility as discussed in Note 8.

Earnings (loss) per share—In accordance with ASC 260, “*Earnings per Share*,” the basic loss per common share is computed by dividing net loss available to common stockholders by the weighted-average number of common shares outstanding. Dilutive income (loss) per share is computed in a manner similar to the basic income (loss) per common share except that the denominator is increased to include the number of additional common shares that would have been outstanding if the potential common shares had been issued and if the additional common shares were dilutive. As of December 31, 2021 and 2020, there were 23,310,698 shares and 18,449,925 shares, respectively of potentially dilutive securities outstanding. None of the potentially dilutive securities were included in the calculation of diluted loss per share since their effect would be anti-dilutive for all periods presented.

Segment reporting—The Company operates in one reportable segment.

Recent accounting pronouncements— In June 2016, the FASB issued ASU 2016-13, *Financial Instruments Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*, which represents a new credit loss standard that will change the impairment model for most financial assets and certain other financial instruments. Specifically, this guidance will require entities to utilize a new “expected loss” model as it relates to trade and other receivables. In addition, entities will be required to recognize an allowance for estimated credit losses on available-for-sale debt securities, regardless of the length of time that a security has been in an unrealized loss position. This guidance is effective for annual reporting periods beginning after December 15, 2023 for small reporting companies, including interim periods within those annual reporting periods. Early adoption is permitted. The Company is currently evaluating the potential impact that the adoption of this may have on the Company’s financial position and results of operations.

In December 2019, the FASB issued ASU No. 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* (“ASU 2019-12”), which is intended to simplify various aspects related to accounting for income taxes. ASU 2019-12 removes certain exceptions to the general principles in Topic 740 and clarifies and amends existing guidance to improve consistent application. This guidance was effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2020. The adoption of this ASU did not have a material impact on its financial statements.

NOTE 3—REVENUES, NET

Revenues by category were as follows (in thousands):

	Year Ended December 31,	
	2021	2020
Endari®	\$ 20,117	22,564
Other	493	603
Revenues, net	\$ 20,610	\$ 23,167

The following table summarizes the revenue allowance and accrual activities for the years ended December 31, 2021 and 2020 (in thousands):

	Trade Discounts, Allowances and Chargebacks	Government Rebates and Other Incentives	Returns	Total
Balance as of December 31, 2019	\$ 228	\$ 1,354	\$ 315	1,897
Provision related to sales in the current year	2,686	3,752	245	6,683
Adjustments related to prior period sales	16	(44)	(87)	(115)
Credit and payments made	(2,796)	(2,943)	—	(5,739)
Balance as of December 31, 2020	134	2,119	473	2,726
Provision related to sales in the current year	3,065	3,845	234	7,144
Adjustments related to prior period sales	13	226	(148)	91
Credit and payments made	(1,731)	(3,057)	(20)	(4,808)
Balance as of December 31, 2021	\$ 1,481	\$ 3,133	\$ 539	\$ 5,153

The following table sets forth information regarding customers that accounted for 10% or more of net revenues:

	Revenue for year ended December 31,	
	2021	2020
Customer A	50%	60%
Customer B	29%	20%
Customer C	10%	8%

The Company is party to a distributor agreement with Telcon RF Pharmaceutical, Inc., or Telcon, pursuant to which it granted Telcon exclusive rights to the Company's PGLG oral powder for the treatment of diverticulosis in South Korea, Japan and China in exchange for Telcon's payment of a \$10 million upfront fee and agreement to purchase from the Company specified minimum quantities of the finished product. In a related license agreement with Telcon, the Company agreed to use commercially reasonable best efforts to obtain product registration in these territories within three years of obtaining FDA marketing authorization for PGLG in this indication. Telcon has the right to terminate the distributor agreement in certain circumstances for failure to obtain such product registrations, in which event the Company would be obliged to repay Telcon the \$10 million upfront fee. The upfront fee of \$10 million is included in other long-term liabilities as unearned revenue as of December 31, 2021 and 2020. Refer Notes 11 and 12 for additional details of the Company's agreement with Telcon.

The Company received a non-refundable deposit of \$500,000 in connection with entering into a distribution agreement with a strategic partner in 2018 to distribute Endari® in the Middle East and North Africa region. The payment was originally recorded as unearned revenue and included in other long-term liabilities to be recognized as revenue when the performance obligations are satisfied. During 2020, the agreement was terminated, and the Company recognized \$500,000 in other income.

NOTE 4—SELECTED FINANCIAL STATEMENT ASSETS

Inventories consisted of the following (in thousand):

	As of December 31,	
	2021	2020
Raw materials and components	\$ 1,439	\$ 1,486
Work-in-process	115	721
Finished goods	6,228	6,064
Inventory reserve	(3,390)	(1,184)
Total	\$ 4,392	\$ 7,087

Prepaid expenses and other current assets consisted of the following (in thousands):

	As of December 31,	
	2021	2020
Prepaid insurance	\$ 660	\$ 388
Prepaid expenses	326	454
Other current assets	394	643
Total	\$ 1,380	\$ 1,485

Property and equipment consisted of the following (in thousands):

	As of December 31,	
	2021	2020
Equipment	\$ 342	\$ 347
Leasehold improvements	39	39
Furniture and fixtures	103	99
Construction-in-progress	57	—
Total property and equipment	541	485
Less: accumulated depreciation	(394)	(365)
Property and equipment, net	\$ 147	\$ 120

For each of the years ended December 31, 2021 and 2020, depreciation expense was approximately \$46,000.

NOTE 5 — INVESTMENTS

Investment in convertible bond - On September 28, 2020, the Company entered into a convertible bond purchase agreement pursuant to which it purchased at face value a convertible bond of Telcon in the principal amount of approximately \$26.1 million which matures on October 16, 2030 and bears interest at the rate of 2.1% a year, payable quarterly. Beginning October 16, 2021, the Company became entitled on a quarterly basis to call for early redemption of all or any portion of the principal amount of the convertible bond. The convertible bond is convertible at the holder's option at any time and from time to time into common shares of Telcon at an initial conversion price of KRW9,232, or approximately \$8.00, per share. The initial conversion price is subject to downward adjustment on a monthly basis on the volume-weighted average market price of Telcon shares as reported on Korean Securities Dealers Automated Quotations ("KOSDAQ") Market and in the event of the issuance of Telcon shares or share equivalents at a price below the market price of Telcon shares and to customary antidilution adjustments upon a merger or similar reorganization of Telcon or a stock split, reverse stock split, stock dividend or similar event. The conversion price as of December 31, 2021 is set forth in the "investment in convertible bond" table below. The convertible bond and any proceeds therefrom, including proceeds from any exercise of the early redemption right described above or the call option described below, are pledged as collateral to secure the Company's obligations under the revised API Supply Agreement with Telcon described in Note 6 and Note 11. Refer to Note 14 for a description of subsequent events relating to the pledge of collateral to Telcon.

Concurrent with the purchase of the convertible bond, the Company entered into an agreement dated September 28, 2020 with Telcon pursuant to which Telcon or its designee is entitled to repurchase, at par, up to 50% in principal amount of the convertible bond commencing October 16, 2021 and prior to maturity. If the Company transfers the convertible bond, it will be obliged under the agreement to see to it that the transferee is bound by such option.

The Company has elected fair value option to measure the investment in convertible bond. The investment in convertible bonds is classified available for sale and remeasured at fair value on a recurring basis using Level 3 inputs, with any changes in the fair value option recorded in other comprehensive income (loss). The fair value and any changes in fair value in convertible bonds are determined using a binomial lattice model. The model produces an estimated fair value based on changes in the price of the underlying common stock over successive periods of time.

The following table sets forth the fair value of the investment in convertible bond as of December 31, 2021 and 2020 (in thousands):

Investment in convertible bonds	December 31, 2021	December 31, 2020
Balance, beginning of period	\$ 27,866	\$ —
Fair value at issuance date	—	22,059
Change in fair value included in the statement of other comprehensive income (loss)	(1,766)	5,807
Balance, end of period	\$ 26,100	\$ 27,866

The fair values as of December 31, 2021 and December 31, 2020 were based upon following assumptions:

	December 31, 2021	December 31, 2020
Principal outstanding (South Korean won)	KRW 30 billion	KRW 30 billion
Stock price	KRW 2,925	KRW 6,060
Expected life (in years)	8.79	9.79
Selected yield	10.50%	10.50%
Expected volatility (Telcon common stock)	81.31%	85.80%
Risk-free interest rate (South Korea government bond)	2.19%	1.72%
Expected dividend yield	0.00%	0.00%
Conversion price	KRW 2,847 (US\$2.39)	KRW 6,028 (US\$5.54)

Equity method investment – During 2018, the Company and Japan Industrial Partners, Inc., or JIP, formed EJ Holdings Inc., or EJ Holdings, to acquire, own and operate an amino acids manufacturing facility in Ube, Japan. In connection with the formation, the Company invested approximately \$32,000 in exchange for 40% of EJ Holdings voting shares. JIP owns 60% of EJ Holdings voting shares. In October 2018, the Company entered into a loan agreement with EJ Holdings under which the Company made an unsecured loan to EJ Holdings in the amount of \$13.6 million. The loan proceeds were used by EJ Holdings to purchase the Ube facility in December 2019 and pay related taxes. The loan matures on September 30, 2028 and bears interest at the rate of 1% payable annually. The parties also contemplated that the Ube facility will eventually supply the Company with the facility's output of amino acids, that the operation of the facility will be principally for the Company's benefit and, as such, that major decisions affecting EJ Holdings and the Ube facility will be made by EJ Holdings' board of directors, a majority of which are representatives of JIP, in consultation with the Company. During the years ended December 31, 2021 and 2020, the Company made additional loans to EJ Holdings of \$6.3 million and \$4.0 million, respectively. As of December 31, 2021, and 2020, the loan receivables from EJ Holdings were approximately \$22.6 million and \$18.6 million, respectively included in Equity method investment on the consolidated balance sheet.

EJ Holdings is engaged in retrofitting the Ube facility in order to seek regulatory approvals for the manufacture of PGLG in accordance with cGMP. EJ Holdings has had no revenues since its inception, has depended on loans from the Company to acquire the Ube facility and fund its operations and will continue to be dependent on loans from the Company or other financing unless and until the Ube facility is activated and EJ Holdings can secure customers for its products.

The Company has determined that EJ Holdings is a variable interest entity, or VIE, based upon the facts that the Company provided the loan financing to acquire the Ube facility and the EJ Holdings activities at the facility are principally for the Company's benefit. JIP, however, owns 60% of EJ Holdings and is entitled to designate a majority of EJ Holdings' board of directors and its Chief Executive Officer and outside auditors, and, as such, controls the management, business and operations of EJ Holdings. Accordingly, the Company accounts for its variable interest in EJ Holdings under the equity method.

The Company's share of the losses reported by EJ Holdings are classified as net losses on equity method investment. The investment is evaluated for impairment if facts and circumstances indicate that the carrying value may not be recoverable, an impairment charge would be recorded.

The following table sets forth certain financial information of EJ Holdings as for December 31, 2021 and 2020 and for the 12 months ended December 31, 2021 and 2020 (in thousands)

	As of December 31,	
	2021 (Unaudited)	2020 (Unaudited)
ASSETS		
Current assets	\$ 505	\$ 1,136
Other assets	10,585	11,824
Total assets	<u>\$ 11,090</u>	<u>\$ 12,960</u>
LIABILITIES		
Current liabilities	\$ 931	\$ 987
Long-term liabilities	22,589	18,560
Total liabilities	<u>\$ 23,520</u>	<u>\$ 19,547</u>
Noncontrolling interest	<u>\$ (7,458)</u>	<u>\$ (3,952)</u>
12 Month Ended December 31,		
	2021 (Unaudited)	2020 (Unaudited)
Revenue, net	\$ 234	\$ 261
Net loss	<u>\$ (6,833)</u>	<u>\$ (5,150)</u>

NOTE 6—SELECTED FINANCIAL STATEMENT LIABILITIES

Accounts payable and accrued expenses consisted of the following (in thousands):

	December 31, 2021	December 31, 2020
Accounts payable:		
Clinical and regulatory expenses	\$ 534	\$ 262
Professional fees	477	252
Selling expenses	932	395
Manufacturing cost	378	596
Other vendors	262	518
Total accounts payable	2,583	2,023
Accrued interest payable, related parties	91	41
Accrued interest payable	579	627
Accrued expenses:		
Payroll expenses	1,097	1,053
Government rebates and other rebates	4,371	2,659
Due to equity method investee	—	545
Other accrued expenses	468	512
Total accrued expenses	5,936	4,769
Total accounts payable and accrued expenses	\$ 9,189	\$ 7,460

Other current liabilities consisted of the following (in thousands):

	As of December 31,	
	2021	2020
Trade discount	\$ 3,000	\$ 2,000
Other current liabilities	1,404	699
Total other current liabilities	\$ 4,404	\$ 2,699

Other long-term liabilities consisted of the following (in thousands):

	As of December 31,	
	2021	2020
Trade discount	\$ 23,148	\$ 24,453
Unearned revenue	10,000	10,000
Other long-term liabilities	25	17
Total other long-term liabilities	\$ 33,173	\$ 34,470

On June 12, 2017, the Company entered into an API Supply Agreement with Telcon pursuant to which Telcon advanced to the Company approximately \$31.8 million as an advance trade discount in consideration of the Company's agreement to purchase from Telcon the Company's estimated annual target for bulk containers of PGLG. On July 12, 2017, the Company entered into a raw material supply agreement with Telcon which revised certain items of the API Supply Agreement (the "revised API agreement"). The Company purchased \$0.4 million and \$2.2 million of PGLG from Telcon during years ended December 31, 2021, and 2020, respectively, of which \$382,000 and \$208,000 were reflected in accounts payable as of December 31, 2021 and 2020, respectively. The revised API agreement provided for an annual API purchase target of \$5 million and a target "profit" (*i.e.*, gross margin) to Telcon of \$2.5 million. To the extent these targets are not met, Telcon may be entitled to payment of the shortfall or to offset the shortfall against the Telcon convertible bond and proceeds there of that are pledged as a collateral to secure our obligations. See Note 11 and Note 14 for additional details.

NOTE 7—NOTES PAYABLE

Notes payable consisted of the following at December 31, 2021 and 2020 (in thousands except for conversion price and shares):

Year Issued	Interest Rate Range	Term of Notes	Conversion Price	Principal Outstanding December 31, 2021	Unamortized Discount December 31, 2021	Carrying Amount December 31, 2021	Shares Underlying December 31, 2021
Notes payable							
2013	10%	Due on demand	—	\$ 869	\$ —	\$ 869	—
2021	11%	Due on demand - 2 years	—	3,030	—	3,030	—
				<u>\$ 3,899</u>	<u>\$ —</u>	<u>\$ 3,899</u>	<u>—</u>
		Current		\$ 2,399	\$ —	\$ 2,399	—
		Non-current		\$ 1,500	\$ —	\$ 1,500	—
Notes payable - related parties							
2020	12%	Due on demand	—	100	—	100	—
2021	12%	Due on demand	—	700	—	700	—
				<u>\$ 800</u>	<u>\$ —</u>	<u>\$ 800</u>	<u>—</u>
		Current		\$ 800	\$ —	\$ 800	—
Convertible notes payable							
2020	12%	3 years	\$ 10.00 (b)	3,150	—	3,150	316,756
2021	2%	3 years	\$ 1.48 (a)	14,490	4,332	10,158	9,856,343
				<u>\$ 17,640</u>	<u>\$ 4,332</u>	<u>\$ 13,308</u>	<u>10,173,099</u>
		Current		\$ 14,490	\$ 4,332	\$ 10,158	9,856,343
		Non-current		\$ 3,150	\$ —	\$ 3,150	316,756
		Grand 'Total		<u>\$ 22,339</u>	<u>\$ 4,332</u>	<u>\$ 18,007</u>	<u>10,173,099</u>

Year Issued	Interest Rate Range	Term of Notes	Conversion Price	Principal Outstanding December 31, 2020	Unamortized Discount December 31, 2020	Carrying Amount December 31, 2020	Shares Underlying Notes December 31, 2020
Notes payable							
2013	10%	Due on demand	—	\$ 969	\$ —	\$ 969	—
2019	11%	Due on demand	—	2,899	—	2,899	—
2020	1%-11%	Due on demand - 2 years	—	942	—	942	—
				<u>\$ 4,810</u>	<u>\$ —</u>	<u>\$ 4,810</u>	<u>\$ —</u>
		Current		\$ 4,588	\$ —	\$ 4,588	—
		Non-current		\$ 222	\$ —	\$ 222	—
Notes payable - related parties							
2016	10%	Due on demand	—	20	—	20	—
2019	10%	Due on demand	—	14	—	14	—
2020	12%	Due on demand	—	100	—	100	—
				<u>\$ 134</u>	<u>\$ —</u>	<u>\$ 134</u>	<u>—</u>
		Current		\$ 134	\$ —	\$ 134	—
Convertible debentures							
2019	10%	18 months	\$2.00-\$9.52 (a)	7,200	1,720	5,480	3,630,000
				<u>\$ 7,200</u>	<u>\$ 1,720</u>	<u>\$ 5,480</u>	<u>3,630,000</u>
		Current		\$ 7,200	\$ 1,720	\$ 5,480	3,630,000
Convertible note payable							
2018	12%	2 years	\$ 10.00 (b)	3,150	—	3,150	316,723
				<u>\$ 3,150</u>	<u>\$ —</u>	<u>\$ 3,150</u>	<u>316,723</u>
		Current		\$ 3,150	\$ —	\$ 3,150	316,723
		Grand 'Total		<u>\$ 15,294</u>	<u>\$ 1,720</u>	<u>\$ 13,574</u>	<u>3,946,723</u>

(a) The notes are convertible into Emmaus Life Sciences, Inc. shares. Beginning February 28, 2022, the holder is entitled to call for early redemption, only if the Company's common stock is not approved for listing on the NYSE American, the Nasdaq Capital Market or other Trading Market (as defined in the agreement). As the Company's common stock is not approved for listing, the notes were classified as current.

(b) This note is convertible into EMI Holdings Inc. shares.

The weighted-average stated interest rate of notes payable was 6% and 10%, respectively, for the years ended December 31, 2021 and 2020. The weighted-average effective interest rate of notes payable for the years ended December 31, 2021 and 2020 was 15% and 37%, respectively, after giving effect to discounts relating to warrants, conversion features and deferred financing cost in connection with these notes.

As of December 31, 2021, future contractual principal payments due on notes payable were as follows (in thousands):

Year Ending	December 31, 2021	
2022	\$	17,689
2023		4,650
Total	\$	22,339

In March 2021, the Company prepaid in full \$6.2 million principal amount of outstanding Amended and Restated 10% Senior Secured Convertible Debentures and recognized \$1.2 million of loss on debt extinguishment due to recognition of the remaining unamortized discount.

The conversion feature of the Amended and Restated 10% Senior Secured Convertible Debentures was separately accounted for at fair value as derivative liabilities under guidance in ASC 815 that is remeasured at fair value on a recurring basis using Level 3 inputs, with any changes in the fair value of the conversion feature liabilities recorded in earnings. Upon prepayment of the Debentures, the outstanding liability was recognized in change in fair value in earnings. The following table sets forth the fair value of the conversion feature liabilities as of December 31, 2021 and 2020 (in thousands):

Conversion feature liabilities—Amended and Restated 10% Senior Secured Convertible Debentures	December 31, 2021		December 31, 2020	
Balance, beginning of period	\$	7	\$	1
Fair value at modification date		—		118
Change in fair value		(7)		(112)
Balance, end of period	\$	—	\$	7

The fair value and any changes in fair value of conversion feature liabilities are determined using a binominal lattice model. The model produces an estimated fair value based on changes in the price of the underlying common stock.

The fair values as of December 31, 2020 was based upon following assumptions:

	December 31, 2020	
Stock price	\$	1.23
Conversion price	\$	2.00
Selected yield		10.48%
Expected volatility (peer group)		95.00%
Expected life (in years)		0.67
Expected dividend yield		—
Risk-free rate		Term structure

The Company is party to a revolving line of credit agreement with Dr. Niihara, the Company's Chairman and Chief Executive Officer. Under the agreement, at the Company's request from time to time, Dr. Niihara may, but is not obligated to, loan or re-loan to the Company up to \$1,000,000. Outstanding amounts under the agreement are due and payable upon demand and bear interest, payable monthly, at a variable annual rate equal to the Prime Rate in effect from time to time plus 3%. In addition to the payment of interest, the Company is obligated to pay Dr. Niihara a "tax gross-up" intended to make him whole for federal and state income taxes payable by him with respect to interest paid to him in the previous year. As of December 31, 2021, and 2020, the outstanding balances of \$400,000 and \$800,000 were reflected in revolving line of credit, related party on the consolidated balance sheet. With the tax-gross up, the effective interest rate on the outstanding balance as of December 31, 2021 and 2020 was 10.4%. The revolving line of credit agreement will expire on November 22, 2022. Refer to Note 12 and Note 14 for more related party information.

On May 8, 2020, the Company received a loan in the amount of \$797,840 under the Small Business Administration Paycheck Protection Program ("PPP"). The PPP, established as part of the Coronavirus Aid, Relief and Economic Security Act ("CARES Act"), provides for loans to qualifying businesses for amounts up to 2.5 times of the average monthly payroll expenses of the qualifying business. The loan, which is in the form of a Promissory Note dated April 29, 2020, matures on April 29, 2022 and bears interest at a rate of 1% per annum, payable monthly commencing on December 8, 2020 unless the PPP loan is forgiven prior to the date of the first monthly payment or the loan forgiveness process has commenced. The Note may be prepaid by the Company at any time prior to maturity with no prepayment penalties. The loan and accrued interest were forgivable after a specific period as long as the Company used the loan proceeds for eligible purposes, including payroll, benefits, rent and utilities, and maintains its payroll levels. The Company applied for loan forgiveness and during year ended December 31, 2021, the loan was forgiven and the

Company recognized a gain on forgiveness of debt of \$806,816 included in loss on debt extinguishment in the consolidated statements of operations. The PPP loan amount was included in notes payable on the consolidated balance sheet at December 31, 2020.

On February 9, 2021, the Company entered into a securities purchase agreement pursuant to which the Company agreed to sell and issue to the purchasers thereunder in a private placement pursuant to Rule 4(a)(2) of the Securities Act of 1933, as amended, and Regulation D thereunder a total of up to \$17 million in principal amount of convertible promissory notes of the Company for a purchase price equal to the principal amount thereof. The Company sold and issued approximately \$14.5 million of the convertible promissory notes. Of the net proceeds from the sale of the convertible promissory notes, \$6.2 million was used to prepay the outstanding Amended and Restated 10% Senior Secured Convertible Debentures as described above.

Commencing one year from the original issue date, the convertible promissory notes will be convertible at the option of the holder into shares of the Company's common stock at an initial conversion price of \$1.48 per share, which equaled the "Average VWAP" (as defined) of the Company's common stock on the effective date. The initial conversion price will be adjusted as of the end of each three-month period following the original issue date, commencing May 31, 2021, to equal the Average VWAP as of the end of such three-month period if such Average VWAP is less than the then-conversion price. There is no floor on the conversion price. The conversion price will be subject to further adjustment in the event of a stock split, reverse stock split or certain other events specified in the convertible promissory notes.

The convertible promissory notes bear interest at the rate of 2% per year, payable semi-annually on the last business day of August and January of each year and will mature on the 3rd anniversary of the original issue date. The convertible promissory notes will become prepayable in whole or in part at the election of the holders on or after February 28, 2022 if the Company's common stock shall not have been approved for listing on the NYSE American, the Nasdaq Capital Market or other "Trading Market" (as defined). The Company will be entitled to prepay up to 50% of the principal amount of the convertible promissory notes at any time after the first anniversary and on or before the second anniversary of the original issue date for a prepayment amount equal to the principal amount being prepaid, accrued and unpaid interest thereon and a prepayment premium equal to 50% of such principal amount. The convertible promissory notes are general, unsecured obligations of the Company.

The conversion feature of the convertible promissory notes was separately accounted for at fair value as a derivative liability under guidance in ASC 815 that is remeasured at fair value on a recurring basis using Level 3 inputs, with any changes in the fair value of the conversion feature liability recorded in earnings. The following table sets forth the fair value of the conversion feature liability as of December 31, 2021 (in thousands):

Convertible promissory notes	December 31, 2021
Balance, beginning of period	\$ —
Fair value at issuance date	5,594
Change in fair value included in the statement of operations	1,913
Balance, end of period	<u>\$ 7,507</u>

The fair value and any change in fair value of conversion feature liability are determined using a convertible bond lattice model. The model produces an estimated fair value based on changes in the price of the underlying common stock.

The fair value as of December 31, 2021 and at issuance date was based on upon following assumptions:

Convertible promissory notes	December 31, 2021		Issuance Date	
Stock price	\$	1.67	\$	1.41
Conversion price	\$	1.48	\$	1.48
Select yield		21.99%		20.29%
Expected volatility		50%		50%
Time until maturity (in years)		2.16		3.00
Dividend yield		—		—
Risk-free rate		0.77%		0.30%

NOTE 8—STOCKHOLDERS' DEFICIT

Purchase Agreement with GPB—On December 29, 2017, the Company entered into the Purchase Agreement with GPB Debt Holdings II, LLC ("GPB"), pursuant to which the Company issued to GPB a \$13 million principal amount senior

secured convertible promissory note (the “GPB Note”) for an aggregate purchase price of \$12.5 million, reflecting a 4.0% original issue discount.

In connection with the issuance of GPB Note, the Company also issued to GPB a warrant (the “GPB Warrant”) to purchase up to 240,764 of common stock at an exercise price of \$10.80 per share, with customary adjustments for stock splits, stock dividends and other recapitalization events and anti-dilution provisions set forth in the GPB Warrant. The GPB Warrant became exercisable six months after issuance and has a term of five years from the initial exercise date.

The Company determined that under ASC 815-40, GPB Warrant should be separately recognized at fair value as a liability upon issuance. The warrant liability is remeasured at fair value on a recurring basis using Level 3 inputs and any change in the fair value of the liability is recorded in earnings.

The following table sets forth the fair values of the warrants as of December 31, 2021 and 2020 (in thousands):

Warrant liability—GPB	December 31, 2021		December 31, 2020	
Balance, beginning of period	\$	83	\$	38
Change in fair value included in the statement of operations		(43)		45
Balance, end of period	\$	40	\$	83

The fair value of the warrant derivative liabilities was determined using the Black-Scholes option pricing models.

The value as of the dates set forth in the table below, were based on upon following assumptions:

	December 31, 2021		December 31, 2020	
Adjusted exercise price	\$	10.28	\$	10.28
Stock price	\$	1.67	\$	1.23
Risk-free interest rate		0.56%		0.15%
Expected volatility (peer group)		104.00%		120.00%
Expected life (in years)		1.50		2.50
Expected dividend yield		—		—
Number outstanding		252,802		252,802

Purchase Agreement with Holders of 10% Senior Secured Debentures—In October 2018, EMI sold and issued \$12.2 million principal amount of 10% Senior Secured Debentures and common stock purchase warrants to purchase an aggregate of up to 1,220,000 shares of EMI common stock to a limited number of accredited investors. EMI’s obligations under the Debentures were secured by a security interest in substantially all EMI assets and guaranteed by EMI’s U.S. subsidiaries. The net proceeds of the sale of the debentures and warrants were used to fund EMI’s original \$13.2 million loan to EJ Holdings. in October 2018 reflected on the Company’s consolidated balance sheets.

The Debentures were amended and restated in their entirety in conjunction with the Merger. The common stock purchase warrants issued in conjunction with the original Debentures also were amended and restated in their entirety in conjunction with the Merger.

The Amended and Restated 10% Senior Secured Convertible Debentures issued in conjunction with the Merger were convertible at the option of each holder into shares of EMI common stock immediately prior to the Merger at a conversion price of \$10.00 a share, subject to adjustment for stock splits, merger reorganizations and other customary events. The related amended and restated warrants were exercisable immediately prior to the Merger for an aggregate of 1,460,000 shares of EMI common stock at an initial exercise price of \$10.00 per share. The exercise price of the warrants was subject to reduction in connection with a “going public event” such as the Merger based upon the “VWAP” (i.e., volume-weighted average trading price) of the Company common stock at the time of the Merger. Upon completion of the Merger, the amended and restated warrants became exercisable for shares of the Company common stock and the exercise price of the warrants and the number of underlying warrant shares were adjusted based upon exchange ratio in the Merger. The exercise price of the amended and restated warrants was subsequently adjusted in accordance with their terms to \$5.87 per share based upon the VWAP of the Company common stock on the day following completion of the Merger.

Pursuant to the terms of a securities amendment agreement entered into in February 2020, the Amended and Restated 10% Senior Secured Convertible Debentures were once again amended and restated in their entirety to extend their maturity date to April 21, 2021 and reduce the conversion price of thereof to \$3.00 per share from \$9.52 per share. The related amended and restate common stock purchase warrants also were amended and restated again to reduce the exercise price thereof to \$3.00

per share from \$5.87 per share. The newly Amended and Restated 10% Senior Secured Convertible Debentures and related newly amended and restated warrants provide for so-called full-ratchet anti-dilution adjustments in the event we sell or issue shares of common stock or common stock equivalents at an effective price per share less than the conversion price of the debentures or the exercise price of the warrants, subject to certain exceptions. The conversion price of the Amended and Restated 10% Senior Secured Convertible Debentures and the exercise price of the related amended and restated warrants were reduced to \$2.00 a share as a result of the Company's subsequent sale of 100,000 shares of common stock at a price of \$2.00 a share and were subsequently reduced again to \$1.54 a share when the Company issued 324,675 shares of Company's common stock at \$1.54 per share as described below. See Note 7 for information regarding prepayment of the Debentures.

The Company evaluated the common stock purchase warrants issued in connection with the original issuance of the 10% Senior Secured Debentures in October 2018 under ASC 815-40 and concluded that the warrants should be separately recognized at fair value as a liability. The liability is remeasured at fair value on a recurring basis using Level 3 input and any changes in fair value is recorded in earnings. In 2019, the Debentures were amended and restated to be convertible into common stock of EMI immediately prior to completion of the Merger.

On September 22, 2020, the Company and EMI entered into a securities amendment agreement (the "September 2020 Amendment") with the holders of the Amended and Restated 10% Senior Secured Convertible Debentures described above. The September 2020 Amendment amended in certain respects the securities purchase agreement among EMI and the Debenture holders originally entered into on September 8, 2018, as amended by the February 2020 Amendment, and provides that the Debentures are to be amended in certain respects as set forth in the form of Allonge Amendment No. 1 to the debentures included in the September 2020 Agreement (the "Allonge"). Pursuant to the Allonge, the aggregate monthly redemption payments under the Debentures were reduced to \$500,000 from \$1,000,000 in principal amount and the maturity date of the Debentures was extended from April 21, 2021 to August 31, 2021. The monthly redemption payments resumed in September 2020.

In consideration of the Debenture holder's financial accommodations to the Company, the Company issued to the holders, pro rata based upon the relative principal amounts of their Debentures, five-year common stock purchase warrants to purchase a total of up to 1,840,000 shares of the Company common stock at an exercise price of \$2.00 a share. The warrants provide for so-called full-ratchet anti-dilution adjustments in the event the Company sells or issues shares of common stock or common stock equivalents at an effective price per share less than the exercise price of the warrants, subject to certain exceptions. The exercise price also remains subject to adjustment for stock splits and other customary events. In October 2018, the Company granted to T.R. Winston and its affiliates for services relating to the September 2020 Amendment common stock purchase warrants to purchase up to 75,000 shares of the Company common stock at an exercise price of \$2.10 a share and otherwise on terms identical to the warrants issued to the debenture holders described above.

The exercise price of the amended and restated warrants was reduced to \$2.00 per share in February 2020 and to \$1.54 per share in March 2021 pursuant to the anti-dilution adjustment provisions of the warrants. The warrants were valued using Black-Scholes-Merton model. The fair value as of agreement date and the anti-dilution adjustment dates was based upon following assumptions:

	March 2, 2021 (Anti-dilution adjustment date)		February 28, 2020 (Anti-dilution adjustment date)		February 21, 2020 (Amendment date)	
Exercise price	\$	1.54	\$	2.00	\$	3.00
Common stock fair value	\$	1.52	\$	1.60	\$	1.89
Volatility		101.00%-120.00%		93.00%		92.00%
Risk-free rate		0.21%-0.58%		0.86%		1.29%
Expected life (in years)		2.64-4.56		3.54		3.56

Purchase agreement with Holder of a Convertible Promissory Note - On June 15, 2020, the holder of a convertible promissory note in the principal amount of \$3,150,000 agreed to an extension of the maturity date to June 15, 2023 in exchange for an increase in the interest rate on the note from 11% to 12%. In conjunction with the amendment, the Company issued to the note holder five-year warrants to purchase a total of up to 1,250,000 shares of the Company common stock at an exercise price of \$2.05 a share. The modification of debt was considered debt extinguishment and a \$1.4 million loss on debt extinguishment was recognized in the consolidated statements of operation and comprehensive income (loss). Under ASC 815-40, the Company concluded that the related warrants should be recognized at fair value as a liability. The warrant liability is remeasured at fair value on a recurring basis using Level 3 input and any changes in the fair value of liability is recorded in earnings.

The following table presents the change in fair value of the warrants as of December 31, 2021 and 2020 (in thousands):

Warrant liability— Convertible Promissory Note	December 31, 2021	December 31, 2020
Balance, beginning of period	\$ 988	\$ —
Fair value at issuance date	—	1,425
Change in fair value included in the statement of operations	475	(437)
Balance, end of period	<u>\$ 1,463</u>	<u>\$ 988</u>

The fair value of the warrant derivative liabilities was determined using the Black-Scholes Merton model and was based upon following assumptions:

	December 31, 2021		December 31, 2020	
Exercise price	\$	2.05	\$	2.05
Stock price	\$	1.67	\$	1.68
Risk-free interest rate		1.04%		0.31%
Expected volatility (peer group)		117.00%		101.00%
Expected life (in years)		3.46		4.46
Expected dividend yield		—		—
Number outstanding		1,250,000		1,250,000

A summary of the Company's warrants activity for the years ended December 31, 2021 and 2020 is presented below:

	December 31, 2021	December 31, 2020
Warrants outstanding, beginning of period	8,439,480	4,931,099
Granted	—	3,625,000
Exercised	—	—
Cancelled, forfeited and expired	(203,463)	(116,619)
Warrants outstanding, end of period	<u>8,236,017</u>	<u>8,439,480</u>

A summary of outstanding warrants by year issued and exercise price as of December 31, 2021 is presented below.

Year issued	Exercise Price	Outstanding			Exercisable	
		Number of Warrants Issued	Weighted Average Remaining Contractual Life (Years)	Weighted Average Exercise Price	Total	Weighted Average Exercise Price
Prior to January 1, 2020						
	\$1.54-\$36.24	4,611,017	1.14	\$ 9.14	4,611,017	\$ 9.14
	Total	<u>4,611,017</u>			<u>4,611,017</u>	
At December 31, 2020						
	\$ 2.05	1,250,000	3.46	\$ 2.05	—	\$ —
	\$ 1.54	2,375,000	3.70	\$ 1.54	2,375,000	\$ 1.54
	2020 Total	<u>3,625,000</u>			<u>2,375,000</u>	
At December 31, 2021	Grand Total	<u>8,236,017</u>			<u>6,986,017</u>	

In April 2021, the Company amended a warrant to purchase 1,365,189 shares of common stock to extend the exercise period from May 9, 2021 to May 9, 2022.

Stock options – Upon completion of the Merger, the EMI Amended and Restated 2011 Stock Incentive Plan was assumed by the Company. The 2011 Stock Incentive Plan permits grants of incentive stock options to employees, including executive officers, and other share-based awards such as stock appreciation rights, restricted stock, stock units, stock bonus and unrestricted stock awards to employees, directors, and consultants for up to 9,000,000 shares of common stock. Options granted under the 2011 Stock Incentive Plan expire ten years after grant. Options granted to directors vest in quarterly installments and all other option grants vest over a minimum period of three years, in each case, subject to continuous service with the Company. Each stock option outstanding under the 2011 Stock Incentive Plan at the effective time of the Merger

was automatically converted into a stock option exercisable for a number of shares of the Company's common stock and at an exercise price calculated based on the exchange ratios in the Merger. The 2011 Stock Incentive Plan expired in May 2021, after which no further awards may be made under the plan.

The Company also had an Amended and Restated 2012 Omnibus Incentive Compensation Plan under which the Company may grant incentive stock options to selected employees including officers, non-employee consultants and non-employee directors. The Plan was terminated in September 2021.

On September 29, 2021, the Board of Directors of the Company adopted the Emmaus Life Sciences, Inc. 2021 Stock Incentive Plan upon the recommendation of the Compensation Committee of the Board. The 2021 Stock Incentive Plan was approved by stockholders on November 23, 2021. No more than 4,000,000 shares of common stock may be issued pursuant to awards under the 2021 Stock Incentive Plan. The number of shares available for Awards, as well as the terms of outstanding awards, is subject to adjustment as provided in the Stock Incentive Plan for stock splits, stock dividends, reverse stock splits, recapitalizations and other similar events. As of December 31, 2021, no awards were outstanding under the 2021 Stock Incentive Plan

Management has valued stock options at their date of grant utilizing the Black-Scholes-Merton Option pricing model. The fair value of the underlying shares was determined by the market value of stock of similar companies and recent arm's length transactions involving the sale of the Company's common stock. Prior the Merger, the Company lacked company-specific historical and implied volatility information for its common stock. Therefore, the expected volatility was calculated using the historical volatility of a comparative public traded companies. The following table presents the assumptions used on recent dates on which options were granted by the Company.

	June 29, 2020
Stock Price	\$ 1.67
Exercise Price	\$ 2.05
Term	5.5-6 years
Risk-Free Rate	0.28% - 0.38%
Dividend Yield	—
Volatility	78.91%-80.49%

The risk-free interest rate is based on the implied yield available on U.S. Treasury issues with a term approximating the expected life of the options depending on the date of the grant and expected life of the respective options.

During the year ended December 31, 2021, the Company did not grant any stock options. During the year ended December 31, 2020, the Company granted options to purchase up to 90,000 shares of common stock. The options have an exercise prices of \$2.05 per share. All of the options are exercisable for ten years from the date of grant and will vest and become exercisable with respect to the underlying shares as follows: as to one-third of the shares on the first anniversary of the grant date, and as to the remaining two-thirds of shares in twenty-four approximately equal monthly installments over a period of two years thereafter.

A summary of the Company's stock option activity for the years ended December 31, 2021 and 2020 is presented below:

	December 31, 2021		December 31, 2020	
	Number of Options	Weighted- Average Exercise Price	Number of Options	Weighted- Average Exercise Price
Options outstanding, beginning of period	7,110,025	\$ 4.63	7,245,350	\$ 4.68
Granted or deemed issued	—	\$ —	90,000	\$ 2.05
Exercised	—	\$ —	—	\$ —
Cancelled, forfeited and expired	(1,141,687)	\$ 3.82	(225,325)	\$ 5.08
Options outstanding, end of period	5,968,338	\$ 4.78	7,110,025	\$ 4.63
Options exercisable at end of year	5,937,837	\$ 4.80	6,986,268	\$ 4.47
Options available for future grant	4,000,000		2,302,475	

During the years ended December 31, 2021 and 2020, the Company recognized \$553,000 and \$739,000, respectively, of share-based compensation expense. As of December 31, 2021, there was approximately \$21,000 of total

unrecognized compensation cost related to unvested share-based compensation awards outstanding under the EMI Amended and Restated 2011 Stock Incentive Plan. That cost is expected to be recognized over the weighted-average remaining period of 1.2 years.

Collaborative Research and Development Agreement with Kainos Medicine, Inc—On February 26, 2021, the Company entered into a collaborative and research and development agreement with Kainos Medicine, Inc. (“Kainos”) to lead the preclinical development of Kainos’ patented IRAK4 inhibitor (“KM10544”) as an anti-cancer drug and further advance the research and development activity currently underway at Kainos. The companies also entered into a letter of intent regarding possible future joint development of small molecule therapeutics and other pharmaceutical assets.

Pursuant to the agreement, the Company paid and issued to Kainos \$500,000 in cash and 324,675 shares of common stock of the Company equivalent to \$500,000 in additional consideration, which were recorded as research and development expenses in the condensed consolidated statements of operations and comprehensive income (loss). The Company, in turn, has been granted rights of first negotiation and first refusal for an exclusive license regarding the development and commercialization of products based on the intellectual property resulting from the agreement.

On October 7, 2021, the Company entered into a License Agreement, with Kainos under which Kainos granted the Company an exclusive license in the territory encompassing the U.S., the U.K. and the EU to patent rights, know-how and other intellectual property relating to Kainos’s novel IRAK4 inhibitor, referred to as KM10544, for the treatment of cancers, including leukemia, lymphoma and solid tumor cancers. In consideration of the license, the Company paid Kainos a six-figure upfront fee in cash and agreed to make additional cash payments upon the achievement of specified milestones totaling in the mid-eight figures and pay a single-digit percentage royalty based on net sales of the licensed products and a similar percentage of any sublicensing consideration.

During the year ended December 31, 2021, the Company incurred \$1.5 million of research and development expenses related to the Kainos collaboration and license arrangements.

NOTE 9—INCOME TAXES

The provision for income taxes consists of the following for the years ended December 31, 2021 and 2020 (in thousands):

	2021	2020
Current U.S.	\$ 25	\$ 46
International	—	—
Deferred U.S.	—	(427)
International	—	—
	<u>\$ 25</u>	<u>\$ (381)</u>

Deferred tax assets consist of the following as of December 31, 2021 and 2020 (in thousands):

	2021	2020
Net operating loss carryforward	\$ 17,019	\$ 17,090
General business tax credit	11,393	10,490
Stock options	5,955	5,924
Charitable contribution	36	82
Accrued expenses	292	276
Unearned revenue	2,393	2,425
Allowance for bad AR	167	1
Unrealized gain on foreign exchange translation and others	133	472
Other	3,188	1,903
Total gross deferred tax assets	<u>40,576</u>	<u>38,663</u>
Less valuation allowance	(40,147)	(37,430)
Net deferred tax assets	<u>\$ 429</u>	<u>\$ 1,233</u>

Deferred tax liabilities consist of the following as of December 31, 2021 and 2020 (in thousands):

	2021	2020
Unrealized loss on foreign exchange translation and others	\$ —	\$ (347)
Unrealized gain on available-for-sale securities	(427)	(427)
Other	(2)	(459)
Total deferred tax liabilities	<u>\$ (429)</u>	<u>\$ (1,233)</u>

A valuation allowance for the net deferred tax assets is recorded when it is more likely than not that the Company will not realize these assets through future operations. The valuation allowance increased by approximately \$2.7 million for the years ended December 31, 2021, while it decreased by \$0.6 million for the years ended December 31, 2020.

As of December 31, 2021 and December 31, 2020, the Company had net operating loss carryforwards for federal income tax purposes of approximately \$62.6 million and \$63.1 million, respectively, available to offset future federal taxable income, if any. Net operating loss generated in 2017 and prior years expire in various years through 2037. Net operating losses for federal income tax purpose generated in 2018 and after will be available indefinitely. In addition, the Company had net operating loss carryforwards for state income tax purposes of approximately \$57.8 million and \$57.6 million respectively, which expire in various years through 2041. As of December 31, 2021 and December 31, 2020, the Company has general business tax credits of \$11.4 million and \$10.5 million, respectively, for federal income tax purposes. The tax credits are available to offset future tax liabilities, if any, through 2041. The Company's utilization of net operating loss carryforwards could be subject to an annual limitation as a result of certain past or future events, such as stock sales or other equity events constituting a "change in ownership" under the provisions of the Internal Revenue Code of 1986, as amended, and similar state provisions. The annual limitations could result in the expiration of net operating loss carryforwards and tax credits before they can be utilized.

The income tax provision differs from that computed using the statutory federal tax rate of 21% due to the following factors (in thousands):

	2021	2020
Tax benefit at statutory federal rate	\$ (3,359)	\$ 187
State taxes, net of federal tax benefit	(275)	191
Increase (decreases) in valuation allowance	2,722	(517)
Permanent items	1,337	859
General business tax credit	(902)	(602)
Other	502	(499)
	<u>\$ 25</u>	<u>\$ (381)</u>

As of December 31, 2021 and December 31, 2020, the Company had no unrecognized tax benefits or position which, in the opinion of management, would be reversed if challenged by a taxing authority. In the event the Company is assessed interest or penalties, such amounts would be classified as income tax expense. As of December 31, 2021, all federal tax returns since 2018 are subject to audit. The expiration of the state returns varies by state, but the 2017 and subsequent years' returns generally are subject to audit. No tax returns are currently being examined by taxing authorities.

NOTE 10—LEASES

Operating leases — During the years ended December 31, 2021 and 2020, the Company leased its office space under operating leases with unrelated entities.

The Company leased 21,293 square feet of office space for its headquarters in Torrance, California, at a base rental of \$81,717 per month, which lease will expire on September 30, 2026, and leased an additional 1,850 square feet office space in New York, New York, at a base rent of \$8,908, which lease will expire on January 31, 2023.

The Company leased 1,322 square feet of office space in Tokyo, Japan, which the lease expired on September 30, 2022 and 1,163 square feet of office space in Dubai, United Arab Emirates, which lease will expire on June 19, 2023.

The rent expense for the each of the years ended December 31, 2021 and 2020 amounted to approximately \$1.2 million.

Future minimum lease payments were as follows as of December 31, 2021 (in thousands):

	Amount
2022	\$ 1,174
2023	1,058
2024	1,063
2025	1,092
2026 and thereafter	836
Total lease payments	5,223
Less: Interest	(1,222)
Operating lease liabilities	\$ 4,001

As of December 31, 2021, and 2020, the Company had an operating lease right-of-use asset of \$3.5 million \$4.1 million, respectively and lease liability of \$4.0 million and \$4.6 million, respectively. The weighted average remaining term of the Company's leases as of December 31, 2021 was 4.6 years and the weighted-average discount rate was 11.8%.

NOTE 11—COMMITMENTS AND CONTINGENCIES

API Supply Agreement — On June 12, 2017, the Company entered into an API Supply Agreement (the "API Agreement") with Telcon pursuant to which Telcon paid the Company approximately \$31.8 million in consideration of the right to supply 25% of the Company's requirements for bulk containers of PGLG for a fifteen-year term. The amount was recorded as deferred trade discount. On July 12, 2017, the Company entered into a raw material supply agreement with Telcon which revised certain terms of the API supply agreement (the "revised API agreement"). The revised API agreement is effective for a term of five years and will renew automatically for 10 successive one-year renewal periods, except as either party may determine. In the revised API agreement, the Company has agreed to purchase a cumulative total of \$47.0 million of PGLG over the term of the agreement. The revised API agreement provided for an annual API purchase target of \$5 million and a target "profit" (*i.e.*, gross margin) to Telcon of \$2.5 million. To the extent these targets are not met, Telcon may be entitled to payment of the shortfall or to offset the shortfall against the Telcon convertible bond and proceeds there of that are pledged as a collateral to secure our obligations. In September 2018, the Company entered into an agreement with Ajinomoto and Telcon to facilitate Telcon's purchase of PGLG from Ajinomoto for resale to the Company under the revised API agreement. The PGLG raw material purchased from Telcon is recorded in inventory at net realizable value and the excess purchase price is recorded against deferred trade discount. Refer to Notes 6 and 12 for more information. Refer to Note 14 for subsequent events regarding Telcon.

NOTE 12—RELATED PARTY TRANSACTIONS

The following table sets forth information relating to our loans from related persons outstanding at any time during the year ended December 31, 2021 (in thousands except for conversion rate and share information).

Class	Lender	Interest Rate	Date of Loan	Term of Loan	Principal Amount Outstanding at December 31, 2021	Highest Principal Outstanding	Amount of Principal Repaid	Amount of Interest Paid
Current, Promissory note payable to related parties:								
	Willis Lee (2)	12%	10/29/2020	Due on Demand	\$ 100	\$ 100	\$ —	\$ —
	Soomi Niihara (1)	12%	1/20/2021	Due on Demand	—	700	700	13
	Soomi Niihara (1)	12%	9/15/2021	Due on Demand	—	300	300	3
	Soomi Niihara (1)	12%	12/7/2021	Due on Demand	700	700	—	—
				Subtotal	\$ 800	\$ 1,800	\$ 1,000	\$ 16
Revolving line of credit								
	Yutaka Niihara (1)	5.25%	12/27/2019	Due on Demand	\$ 400	\$ 800	\$ 400	\$ 35
				Subtotal	\$ 400	\$ 800	\$ 400	\$ 35
				Total	\$ 1,200	\$ 2,600	\$ 1,400	\$ 51

The following table sets forth information relating to our loans from related persons outstanding at any time during the year ended December 31, 2020 (in thousands except for conversion rate and share information).

Class	Lender	Interest Rate	Date of Loan	Term of Loan	Principal Amount Outstanding at December 31, 2020	Highest Principal Outstanding	Amount of Principal Repaid or Converted into Stock	Amount of Interest Paid
Current, Promissory note payable to related parties:								
	Lan T. Tran (2)	10%	4/29/2016	Due on Demand	\$ 20	\$ 20	\$ —	\$ —
	Lan T. Tran (2)	11%	2/10/2018	Due on Demand	—	159	159	35
	Lan T. Tran (2)	10%	2/9/2019	Due on Demand	14	14	—	—
	Hope Int'l Hospice (1)	12%	9/1/2020	Due on Demand	—	194	194	2
	Hope Int'l Homecare (1)	12%	9/1/2020	Due on Demand	—	189	189	1
	Soomi Niihara (1)	12%	9/1/2020	Due on Demand	—	98	98	4
	Soomi Niihara (1)	12%	10/28/2020	Due on Demand	—	395	395	12
	Willis Lee (2)	12%	9/1/2020	Due on Demand	—	685	685	1
	Willis Lee (2)	12%	10/29/2020	Due on Demand	100	100	100	1
				Subtotal	134	1,854	1,820	56
Revolving line of credit								
	Yutaka Niihara (1)	5.25%	12/27/2019	Due on Demand	800	800	200	37
				Subtotal	800	800	200	37
				Total	\$ 934	\$ 2,654	\$ 2,020	\$ 93

- (1) Dr. Niihara, the Chairman of the Board and Chief Executive Officer of the Company, is co-owner with his wife Soomi Niihara, a director and the Chief Executive Officer of Hope International Hospice, Inc.
- (2) Current and former officer

See Note 7 for a discussion of the Company's revolving line of credit agreement with Dr. Niihara and Note 8 for a discussion of the amendment to the previously issued warrant to Dr. Niihara.

See Notes 6 and 11 for a discussion of the Company's distribution and supply agreements with Telcon, which holds 4,147,491 shares of the Company common stock, or approximately 8.4% of the common stock outstanding as of December 31, 2020. The Company holds a convertible bond of Telcon in the principal amount of KRW 30 billion, or approximately \$26.1 million as of December 31, 2021 which matures on October 16, 2030 and bears interest at 2.1% a year, payable quarterly. See Note 5 for more information regarding the convertible bond.

NOTE 13—DEFINED CONTRIBUTION PLAN

The Company has a defined contribution plan (the “401(k) Plan”) covering substantially all the Company’s employees. The Emmaus 401(k) Plan is a tax-qualified retirement saving plan, pursuant to which covered employees are able to contribute the lesser of 90% of their eligible annual compensation (as defined) or the limit prescribed by the Internal Revenue Service (the “IRS”) to the 401(k) Plan on a before-tax basis. Since January 1, 2020, the Company has matched 50% of employee contributions to the Company’s 401(k) Plan based on each participant’s contribution during the plan year up to 4.0% of each participant’s annual compensation.

For the years ended December 31, 2021 and 2020, the Company made matching contributions to the Company’s 401(k) Plan of \$91,000 and \$71,000, respectively.

NOTE 14—SUBSEQUENT EVENTS

See Note 11 for information relating to our revised API agreement with Telcon which provides target annual revenue of more than US\$5,000,000 and annual “profit” (*i.e.*, sales margin) to Telcon of US\$2,500,000. The Company’s obligations under the revised API supply agreement are secured by a pledge to Telcon of the Telcon convertible bond purchased by the Company in September 2020 and the proceeds thereof. In February 2022, the Company consented to Telcon’s offset as of February 10, 2022 of KRW3.5 billion, or approximately US\$2.9 million, against the principal amount of the Telcon Convertible Bond and release of KRW400 million, or approximately US\$310,000 in cash proceeds to Telcon in satisfaction the target shortfalls for the years ended 2020 and 2021. To the extent the annual revenue and “profit” targets provided for in the API supply agreement are not met in 2022 or future years, Telcon may be entitled to payment of the shortfall or offsets against the Telcon convertible bond and other collateral securing the Company’s obligations.

Subsequent to the year ended December 31, 2021, the Company received \$1.9 million of proceeds from related-party loans to augment its working capital.

NUMBER
EMM0018



SHARES
COMMON STOCK

INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE

SEE REVERSE FOR CERTAIN DEFINITIONS

CUSIP 29137T 10 1

THIS CERTIFIES THAT:

IS THE OWNER OF

FULLY PAID AND NON-ASSESSABLE SHARES OF COMMON STOCK OF \$0.001 PAR VALUE EACH OF
EMMAUS LIFE SCIENCES, INC.

transferable on the books of the Corporation in person or by attorney upon surrender of this certificate duly endorsed or assigned. This certificate and the shares represented hereby are subject to the laws of the State of Delaware, and to the Certificate of Incorporation and Bylaws of the Corporation, as now or hereafter amended. This certificate is not valid until countersigned by the Transfer Agent.

WITNESS the facsimile signatures of its duly authorized officers.

DATED:

[Signature]
SECRETARY

[Signature]
CHAIRMAN

AM WITHDRAWN
377 ANNEX 02 - 07/16/16 10:18:05 AM
SEE REVERSE FOR DEFINITIONS
EMMAUS LIFE SCIENCES, INC.

THE CORPORATION WILL FURNISH TO ANY STOCKHOLDER, UPON REQUEST AND WITHOUT CHARGE, A FULL STATEMENT OF THE DESIGNATIONS, RELATIVE RIGHTS, PREFERENCES AND LIMITATIONS OF THE SHARES OF EACH CLASS AND SERIES AUTHORIZED TO BE ISSUED, SO FAR AS THE SAME HAVE BEEN DETERMINED, AND OF THE AUTHORITY, IF ANY, OF THE BOARD TO DIVIDE THE SHARES INTO CLASSES OR SERIES AND TO DETERMINE AND CHANGE THE RELATIVE RIGHTS, PREFERENCES AND LIMITATIONS OF ANY CLASS OR SERIES. SUCH REQUEST MAY BE MADE TO THE SECRETARY OF THE CORPORATION OR TO THE TRANSFER AGENT NAMED ON THIS CERTIFICATE.

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
TEN ENT - as tenants by the entireties
JT TEN - as joint tenants with right of survivorship and not as tenants in common

UNIF GIFT MIN ACT -Custodian.....
(Cust) (Minor)
under Uniform Gifts to Minors
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 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 _____

NOTICE: THE SIGNATURE(S) TO THIS ASSIGNMENT MUST CORRESPOND WITH THE NAME(S) AS WRITTEN UPON THE FACE OF THE CERTIFICATE, IN EVERY PARTICULAR WITHOUT ALTERATION OR ENLARGEMENT OR ANY CHANGE WHATSOEVER.

Signature(s) Guaranteed

By _____
The Signature(s) must be guaranteed by an eligible guarantor institution (Banks, Stockbrokers, Savings and Loan Associations and Credit Unions with membership in an approved Signature Guarantee Medallion Program), pursuant to SEC Rule 17Ad-15.

AMENDMENT NO. 1 TO LOAN AGREEMENT

This Amendment No. 1 to Loan Agreement (this “Amendment”) is made and entered into on January 5, 2022, by and between Emmaus Life Sciences, Inc. (“Lender”) and EJ Holdings, Inc. (“Borrower”) and amends that certain Loan Agreement dated October 28, 2020 (the “Original Agreement”) as follows:

1. Defined Terms. Capitalized terms used but not otherwise defined herein shall have the meanings ascribed to them in the Original Agreement. References in the Original Agreement to “this Agreement” mean the Original Agreement as amended by this Amendment and as further amended from time to time as provided therein.
2. Voluntary Additional Loans. At Borrower’s request, since March 31, 2021, the last date of the Loan provided for in the Original Agreement, Lender has loaned to Borrower on the dates set forth on Appendix A hereto the loan amounts set forth thereon and may, but shall not be obligated to, hereafter loan to Borrower additional amounts from time to time (all such additional loans whenever made are collectively referred to as “Additional Loans”). Absent manifest error, the dates and loan amounts of any Additional Loans made after the date of this Amendment shall be as reflected in the books and records of Lender. Appendix A hereto may be amended from time to time to reflect such Additional Loans. Lender and Borrower agree that such Additional Loans shall bear interest at the same rate, shall be repayable and shall otherwise be on the same terms as the Loan as set forth in the Original Agreement.
3. No Other Effect. Except as expressly modified by this Amendment, the Original Agreement shall continue in effect in accordance with its terms.
4. Miscellaneous. This Amendment may be exercised in counterparts, which together shall constitute a single instrument. A facsimile, PDF or other electronic signature to this Amendment shall have the same force and effect as an original signature.

The parties have executed this Amendment.

Emmaus Life Sciences, Inc.

By: /s/ Yutaka Niihara
Yutaka Niihara, M.D., M.P.H.
Chief Executive Officer

EJ Holdings, Inc.

By: /s/ Katsu Harashima
Katsu Harashima
Chief Executive Officer

Additional Loans

Date	Amount (JPY)
April 30, 2021	80,000,000
May 31, 2021	80,000,000
June 30, 2021	80,000,000
July 31, 2021	60,000,000
August 31, 2021	60,000,000
September 30, 2021	60,000,000

License Agreement

This License Agreement (this "**Agreement**"), effective as of October 6, 2021 (the "**Effective Date**"), is made by and between Kainos Medicine, Inc., a corporation organized and existing under the laws of the Republic of Korea, with offices located at 3F, 29, Dunchon-daero 514 beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea ("**Licensor**"), and Emmaus Life Sciences, Inc., a corporation organized and existing under the laws of the State of Delaware, with offices located at 21250 Hawthorne Boulevard, Suite 800, Torrance, California 90503 ("**Licensee**") (collectively, the "**Parties**," or each, individually, a "**Party**").

WHEREAS, the Parties are parties to that certain Collaborative Research and Development Agreement, effective as of February 26, 2021 (the "**Collaborative Agreement**"), for the purpose of joint development of anti-cancer drugs using Licensor's know how and intellectual property rights in a novel IRAK4 inhibitor, referred to as KMI 0544 (together with salts, prodrugs, solvates, and stereoisomers thereof, "**KM10544**"), as a therapeutic agent for cancers; and

WHEREAS, KM10544 is one of the N-(1H-Imidazol-2-yl) benzamide compounds (the "**Claimed Compounds**") claimed in patent application number PCT/KR2020/013397, titled N (1H-IMIDAZOL-2-YL) BENZAMIDE COMPOUND AND PHARMACEUTICAL COMPOSITION COMPRISING THE SAME AS ACTIVE INGREDIENT (the "**Patent Application**"); and

WHEREAS, the Parties wish to enter into this Agreement as contemplated by Section 6 of the Collaborative Agreement;

NOW, THEREFORE, in consideration of the mutual covenants, terms, and conditions set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Definitions. For purposes of this Agreement, the following terms have the following meanings:

"**Accountant**" has the meaning set forth in Section 4.3.

"**Action**" has the meaning set forth in Section 11.1.

"**Affiliate**" of a Person means any other Person that, at any time during the Term, directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with, such Person. The term "control" for purposes of this Agreement means the power to direct or cause the direction of the management and policies of a Person, whether through the ownership of voting securities, by contract, or otherwise, and "controlled by" and "under common control with" have correlative meanings.

"**Agreement**" has the meaning set forth in the preamble.

"Auditor" has the meaning set forth in Section 4.2(a).

"Bankruptcy Code" has the meaning set forth in Section 13.1.

"Collaborative Agreement" has the meaning set forth in the recitals.

"Combination Product" means a product consisting of a Licensed Product that is packaged, bundled, or otherwise combined for sale with one or more other products or technology that is not a Licensed Product. All references to Licensed Products in this Agreement will be deemed to include Combination Products.

"Confidential Information" means all non-public, confidential, or proprietary information of the Disclosing Party, whether in oral, written, electronic, or other form or media, whether or not such information is marked, designated, or otherwise identified as "confidential" and any information that, due to the nature of its subject matter or circumstances surrounding its disclosure, would reasonably be understood to be confidential or proprietary and includes [the terms and existence of this Agreement. Confidential Information does not include information that the Receiving Party can demonstrate by documentation: (w) was already known to the Receiving Party without restriction on use or disclosure prior to receipt of such information directly or indirectly from or on behalf of the Disclosing Party; (x) was or is independently developed by the Receiving Party without reference to or use of any Confidential Information; (y) was or becomes generally known by the public other than by breach of this Agreement by, or other wrongful act of, the Receiving Party; or (z) was received by the Receiving Party from a third party who was not, at the time of receipt, under any obligation to the Disclosing Party or any other Person to maintain the confidentiality of such information.

"Disclosing Party" has the meaning set forth in Section 8.1.

"Effective Date" has the meaning set forth in the preamble.

"Field of Use" means treatment of cancers, including but not limited to leukemia, lymphoma, and solid tumor cancers.

"Governmental Authority" means any federal, state, national, supranational, local, or other government, whether domestic or foreign, including any subdivision, department, agency, instrumentality, authority (including any regulatory authority), commission, board, or bureau thereof, or any court, tribunal, or arbitrator.

"Improvement" means any modification of or improvement or enhancement to the technology that is the subject of the Licensed Patents.

"Indemnitee" has the meaning set forth in Section 11.1.

"**KM10544**" has the meaning set forth in the recitals.

"**Know-How**" means all know-how, technology, inventions, discoveries, ideas, processes, methods, designs, plans, instructions, specifications, formulas, testing, manufacturing and other protocols, settings, and procedures, vendor and supply chain contacts and information, and other confidential or proprietary technical, scientific, engineering, business, or financial information owned or controlled by Licensor at any time relating to KM10544 as described in more detail in Schedule 1 hereto as it may be amended from time to time.

"**Law**" means any statute, law, ordinance, regulation, rule, code, order, constitution, treaty, common law, judgment, decree, other requirement or rule of law of any federal, state, local, or foreign government or political subdivision thereof, or any arbitrator, court, or tribunal of competent jurisdiction.

"**Licensed Patent**" and "**Licensed Patents**" mean (a) the Patent Application, together with any and all patents that issue therefrom and all continuations, continuations-in-part, divisionals, extensions, substitutions, reissues, re-examinations, and renewals of any of the foregoing and (b) any patents in the Territory issuing from any applications that claim domestic benefit or foreign priority from any of the patents or patent application identified in clause (a) or from which any of the patents or patent applications identified in subsection (a) claim domestic benefit or foreign priority.

"**Licensed Product**" and "**Licensed Products**" mean (a) any and all products that include KM10544, (i) the manufacture, use, offer for sale, sale, or importation of which by Licensee would, in the absence of a license granted under, or ownership of, the Licensed Patents, infringe a Valid Claim or (ii) that incorporates or embodies any Know-How, and (b) any other products the Parties may agree upon in writing from time to time.

"**Licensed Proprietary Rights**" means (a) the Licensed Patents, (b) Licensor's and its Affiliates' proprietary rights in and to the Know-How (whether under applicable trade secret law or otherwise), and (c) all relevant "Results, Foreground IP and KAINOS Background IP for the purpose of development and commercialization of KMI 0544 in the Field" as such terms are used in the Collaborative Agreement, which terms are incorporated herein by reference.

"**Licensee**" has the meaning set forth in the preamble.

"**Licensor**" has the meaning set forth in the preamble.

"**Losses**" means all losses, damages, liabilities, costs, and expenses, including reasonable attorneys' fees and other litigation costs.

"Net Sales" means the gross amount received by Licensee or any of its Affiliates or Sublicensees from a third party for the sale to such third party of Licensed Products less the sum of the following deductions and offsets allowed, accrued, paid, or taken: (a) discounts and rebates allowed in amounts customary in the trade; (b) sales, tariff duties, and excise, use, and value-added taxes; (c) costs of packing, insurance, delivery charges, outbound transportation prepaid or allowed; (d) amounts allowed or credited on returns; and (e) commissions to agents. Net Sales on Combination Products will be calculated based on the portion of Net Sales attributable to the Licensed Product in such Combination Products, as set forth in Section 3.4.

"Parties" and "Party" have the meanings set forth in the preamble. **"Patent Application"** has the meaning set forth in the recitals. **"Payment Statement"** has the meaning set forth in Section 3.8(b).

"Person" means an individual, corporation, partnership, joint venture, limited liability company, governmental authority, unincorporated organization, trust, association, or other entity.

"Quarterly Period" means each period of three consecutive months ending on March 31, June 30, September 30, and December 31 of each year during the Term.

"Receiving Party" has the meaning set forth in Section 8.1.

"Representatives" means a Party's and its Affiliates' employees, officers, directors, consultants, and legal advisors.

"Royalty" or "Royalties" has the meaning set forth in Section 3.3.

"Sell-Off Period" has the meaning set forth in Section 12.5.

"Sublicense Consideration" means consideration of any kind received by Licensee from a Sublicensee in connection with the grant of an option, license, release, waiver, or other rights or immunities under any Licensed Proprietary Rights (e.g., including upfront fees and milestone payments); *provided*, however, Sublicense Consideration does not include payments received by Licensee for (a) equity of Licensee or debt securities; (b) research or development expenses incurred by Licensee; (c) running royalties on sales of Licensed Products or payments for sales of units of Licensed Product; and/or (d) that portion of any development, regulatory or commercial milestone payment received from such Sublicensee that is equal to or less than the identical milestone paid to Licensor. To the extent that rights other than the Licensed Proprietary Rights are (sub)licensed together with the Licensed Proprietary Rights, the Sublicense Consideration allocated to the Licensed

Proprietary Rights shall be fairly determined by Licensee in good faith taking into account the relative value of the Licensed Proprietary Rights and those other rights.

"Sublicensee" means any Person that is granted a sublicense, in whole or in part, by Licensee under this Agreement.

"Term" has the meaning set forth in Section 12.1.

"Territory" means the United States of America and its territories and possessions worldwide, the United Kingdom and its territories and possessions worldwide, and the countries comprising the European Union as of the Effective Date.

"Valid Claim" means, on a country-by-country basis, a claim that covers KM10544 in an unexpired, issued Licensed Patent that has not been admitted or otherwise caused by Licensor to be invalid or unenforceable through reissue, disclaimer, or otherwise, or held invalid or unenforceable by judgment of a governmental authority of competent jurisdiction from which no appeal is allowed or timely taken.

2. Grant.

2.1 Scope of Grant. Licensor hereby grants to Licensee during the Term an exclusive (even as to Licensor), non-transferable (except in accordance with Section 13.9) license, with the right to sublicense in accordance with Section 2.3, under the Licensed Proprietary Rights to make, have made, use, offer to sell, sell, have sold, and import Licensed Products and to use the Know-How in connection therewith, in each case in the Field of Use in the Territory. No license or rights are granted to Licensee by implication, estoppel, or otherwise, other than as expressly granted by Licensor under this Section 2.

2.2 Restrictions on Licensor. Licensor shall not, directly or indirectly through any other Person, nor shall it purport to grant to any other Person the right to, make, use, offer to sell, sell, have sold, or import Licensed Products during the Term in the Field of Use in the Territory.

2.3 Sublicensing. Licensor hereby grants to Licensee the right to sublicense all and any of its rights to and under the Licensed Proprietary Rights. The granting of sublicenses will be at Licensee's sole and exclusive discretion and Licensee will have the sole and exclusive power to determine the identity of any Sublicensee, the applicable licensee fees or royalty rates, if any, and other terms and conditions of the sublicense. Licensee shall pay to Licensor the Royalty payable pursuant to Section 3.3 on Net Sales

by such Sublicensee of Licensed Products and the portion of Sublicense Consideration payable pursuant to Section 3.3 received from such Sublicensee.

- 2.4 Know-How Transfer. Upon Licensee's request at any time and from time to time during the Term, Licensor shall disclose the Know-How to Licensee in such form and media as Licensee may reasonably request. For the avoidance of doubt, all Know How disclosed to Licensee hereunder is Licensor's Confidential Information and subject to the confidentiality and non-disclosure obligations under Section 8, and Licensee's use of any documentation, materials, or other information concerning the Know-How provided under this Section 2 is subject to the terms and conditions of this Agreement, including the scope of the license expressly granted under Section 2.1. Upon Licensee's reasonable request during the Term, Licensor shall make available one or more of its technical personnel to provide Licensee with reasonable technical assistance concerning the Know-How applicable to the Licensed Products in the Field of Use. Licensor shall provide such technical assistance at no additional cost to Licensee, except that Licensee shall reimburse Licensor for reasonable travel and other reasonable, out-of-pocket expenses incurred by Licensor's technical personnel in providing such technical assistance.
- 2.5 Improvements. As between the Parties, each Party will solely own all right, title, and interest in and to any Improvement conceived or developed by its employees or independent contractors. Each Party's Improvements will be deemed to be such Party's Confidential Information. Licensor shall promptly notify Licensee upon the conception or other development of any Improvement. At Licensee's election, any Improvement conceived or developed by or on behalf of Licensor will be included in the Know-How and, to the extent patentable, the Licensed Patents for all purposes under this Agreement, in each case at no additional cost to Licensee. All rights in and to any Improvements developed by or on behalf of Licensee will be retained by Licensee, and no rights therein or thereto shall be granted to Licensor hereunder unless the Parties otherwise specifically agree in writing.
- 2.6 Other Activities. Licensee shall provide Licensor with quarterly progress reports on Licensee's activities hereunder and the Parties shall meet, virtually or in person, at least annually and at such other times as either Party may reasonably request to discuss the Parties' activities regarding the Licensed Proprietary Rights.

3. Payments.

3.1 Upfront Payment. Licensee shall pay to Licensor a non-refundable, non-creditable payment of Five Hundred Thousand U.S. Dollars (\$500,000.00) within eighty (80) days of execution of the Agreement. Licensee has previously paid to Licensor One Million U.S. Dollars (\$1,000,000) in cash and shares of common stock of Licensee.

3.2 Milestone Payments. Licensee shall pay to Licensor non-refundable, non-creditable milestone payments as follows: (i) One Million Five Hundred Thousand U.S. Dollars (\$1,500,000.00) within thirty (30) days following the enrollment of the first subject in the first Phase 1 trial of a Licensed Product in the Field of Use; (ii) Three Million U.S. Dollars (\$3,000,000.00) within thirty (30) days following the enrollment of the first subject in the first Phase 2 trial of a Licensed Product in the Field of Use; (iii) Four Million U.S. Dollars (\$4,000,000.00) within thirty (30) days following the enrollment of the first subject in the first Phase 3 trial of a Licensed Product in the Field of Use; and (iv) Five Million Five Hundred Thousand U.S. Dollars (\$5,500,000.00) within thirty (30) days following the approval of the first New Drug Application or Marketing Authorization for a Licensed Product in the Field of Use in the Territory. For clarity, each of the aforementioned milestones will be due only once. For Combination Products, the aforementioned milestone payments will be reduced by multiplying each of the aforesaid milestone payments for any such Combination Product by the fraction "1/A", where "A" is total number of material products, components or ingredients (including the Licensed Product) in the Combination Product.

3.3 Royalty. Subject to Section 3.8, Licensee shall pay to Licensor during the Term and any Sell-off Period a royalty of five percent (5.0%) of Net Sales ("**Royalty**" or "**Royalties**") and five percent (5.0%) of any Sublicense Consideration.

3.4 Combination Products. If Licensee sells any Licensed Product in the form of a Combination Product, the Net Sales of such Combination Product for the purpose of determining the Royalty due to Licensor pursuant to Section 3.3 will be calculated on a country-by-country basis as follows:

(a) where both the Licensed Product and the product or component or components that are not Licensed Products ("**Other Components**") are sold separately, by multiplying the actual Net Sales of such Combination Product by the fraction $A/(A+B)$, where A is the invoice price of the Licensed Product if sold separately and B is the total invoice price of the Other Components if sold separately;

(b) where the Licensed Product is sold separately in such country, but the Other Components are not sold separately in such country, by multiplying the actual Net Sales of such Combination Product by the fraction A/C , where A is the invoice price of the Licensed Product if sold separately and C is the invoice price of the Combination Product; or

(c) where the Licensed Product is not sold separately in such country, by multiplying the actual Net Sales of such Combination Product by the fraction D/E , where D is the inventory cost of the Licensed Product and E is the inventory cost of the Other Components, as such inventory costs are determined in accordance with Licensee's regular accounting methods, consistently applied.

3.5 Royalty Stacking. If, during the Term, Licensee in its sole discretion takes one or more licenses under intellectual property rights owned by one or more third parties to make, use, offer to sell, sell, have sold, or import any Licensed Product in a jurisdiction in the Territory, Licensee may deduct from any Royalty due on the Net Sales of such Licensed Products in that jurisdiction the license fees, royalties, or other amounts paid by Licensee to such third parties for such Licensed Product.

3.6 No Multiple Royalties. No multiple royalties will be due because any Licensed Product is covered by more than one Licensed Patent. In such case, Licensee shall pay only one Royalty at the applicable rate pursuant to Section 3.3 above, as adjusted pursuant to Section 3.4 or Section 3.5, as applicable.

3.7 Taxes. If Licensee is required by Law to withhold taxes in connection with any sums payable to Licensor under this Agreement, Licensee may deduct that amount from the payment it otherwise would have made to Licensor under this Agreement and shall include in the Payment Statement required pursuant to Section 3.8(b) the amount due before such withholding, the amount of the withholding under this Section 3.7, and the actual amount paid.

3.8 Payment Terms and Royalty Statements.

(a) Licensee shall pay all Royalties and that portion of Sublicense Consideration due Licensor under this Agreement for each Quarterly Period within sixty (60) days of the end of such Quarterly Period. Licensee shall make all payments in USD by wire transfer of immediately available funds to a bank account to be designated in writing by Licensor. For the purpose of converting the local currency in which any Royalties or portion of Sublicense Consideration arise into USD, the rate of exchange to be applied will be the rate of exchange in effect for the last day of the Quarterly Period to which the payment relates as reported in The Wall Street Journal.

(b) On or before the due date for all payments to Licensor pursuant to Section 3.3, Licensee shall provide Licensor with a statement (a "**Payment Statement**") showing for the relevant Quarterly Period on a Licensed Product-by Licensed Product and country-by-country basis:

(i) the gross amount received by Licensee or any of its Sublicensees for the sale of Licensed Products; and

(ii) the calculation of Net Sales on such sales, including the type and amount of all deductions and offsets allocated with respect to such Licensed Products;

(iii) the calculation of Licensor's portion of any Sublicense Consideration payable to Licensor; and

(iv) the exchange rate used for calculating such payments.

4. Records and Audit.

4.1 Records. Licensee shall keep records of its and its Sublicensees sales of Licensed Products reasonably necessary for the calculation of payments to be made to Licensor hereunder. However, Licensee has no (a) duty of trust or other fiduciary relationship with Licensor regarding the maintenance of the records or the calculation and reporting of royalties; or (b) obligations to maintain any records except in accordance with its own document retention policy.

4.2 Audit.

(a) At the reasonable request, and sole expense, of Licensor within one year after receiving any Payment Statement, Licensee shall permit an independent certified public accountant designated by Licensor and reasonably acceptable to Licensee (the "**Auditor**"), to access Licensee's records maintained pursuant to Section 4.1 upon reasonable prior written notice to Licensee and during Licensee's normal business hours solely for the purpose of verifying the payment made in connection with such Payment Statement. The Auditor must conduct such audit in a manner designed to minimize disruption of Licensee's normal business operations. All information and materials made available to or otherwise obtained or prepared by or for the Auditor in connection with such audit will be deemed Licensee's Confidential Information and will be subject to the Auditor's entry, prior to conducting the audit, into a written agreement with Licensee containing confidentiality and restricted use obligations at least as restrictive as those set out in Section 8. Licensor may not exercise this right more than once in any calendar year and the Auditor may only disclose to Licensor information limited to the accuracy of the Payment Statement and any deficiency in the payment made, or any overpayment. Licensor shall not compensate the Auditor (in whole or in part) contingent on the outcome of the audit.

(b) Licensor shall provide to Licensee a copy of the Auditor's audit report within thirty (30) days of Licensor's receipt of the report. If the report shows that payments made by Licensee are deficient, Licensee shall pay Licensor the deficient amount within thirty (30) days after Licensee's receipt of the audit report. If the report shows that payments made by Licensee are in excess of the required payment, Licensor shall, at Licensee's election, credit the excess amount against future Royalties or pay Licensee the excess amount at the time it provides the copy of the Auditor's audit report to Licensee.

(c) The failure of Licensor to request verification of any Payment Statement during the one-year period after receipt of such Payment Statement shall be deemed acceptance by Licensor of the accuracy of the Payment Statement and the payments made by Licensee in accordance with the Payment Statement.

4.3 Audit Disputes. In the event of a dispute over the results of any audit conducted pursuant to Section 4.2, Licensor and Licensee shall work in good faith to resolve such dispute. If the Parties are unable to reach a mutually acceptable resolution of any such dispute within thirty (30) days, the dispute shall be submitted for binding arbitration to a certified public accounting firm (the "**Accountant**") selected by each Party's certified public accountants or such other Person as the Parties shall mutually agree. The decision of the Accountant will be final and the costs of such arbitration will be borne between the Parties in such manner as the Accountant shall determine.

5. Patent Prosecution and Maintenance.

5.1 Patent Prosecution and Maintenance. Subject to Section 5.2, for each patent application and patent included within the Licensed Patents, Licensor shall:

- (a) prepare, file, prosecute, and maintain such Licensed Patent at its sole cost and expense using reasonable care and skill and using counsel reasonably acceptable to Licensee;
- (b) keep Licensee currently informed of the filing and progress of all material aspects of the prosecution of such patent application and the issuance of patents from any such patent application;
- (c) provide Licensee with a copy of such patent application, amendments thereto, and other related correspondence to and from patent offices, and, to the extent reasonably practicable, permit Licensee an opportunity to offer its comments thereon before making a submission to a patent office and Licensor shall consider in good faith Licensee's comments;
- (d) consult with Licensee concerning any decisions that could affect the scope or enforcement of any issued claims or the potential abandonment of such patent application or patent; and
- (e) notify Licensee in writing of any changes in the scope or status of such patent or patent application.

5.2 Abandonment. If Licensor plans to abandon the Patent Application or any other patent application or patent included in the Licensed Patents in the Territory, Licensor shall notify Licensee in writing at least ninety (90) days in advance of the due date of any payment or other action that is required to prosecute and maintain such Licensed Patent. Following such notice, Licensee will have the right, in its sole discretion, to assume control and direction of the prosecution and maintenance of such Licensed Patent at its sole cost and expense in such country, and Licensor shall, at Licensee's request, assign to Licensee such patent application or patent. Effective as of the effective

date of any such assignment under this Section 5.2, such patent application or patent shall no longer be a Licensed Patent.

6. Enforcement of Licensed Patents.

6.1 Notice of Infringement or Third-Party Claims. If either Party becomes aware of any suspected infringement of any Licensed Patent by a third party in the Field of Use in the Territory, or (b) any claim that any Licensed Patent is invalid or unenforceable, such Party shall promptly notify the other Party and provide it with all details of such infringement or claim, as applicable, that are known by such Party.

6.2 Right to Bring Action or Defend. Licensor shall bring an infringement action to enforce any Licensed Patent, defend any declaratory judgment action concerning any Licensed Patent, and take any other lawful action reasonably necessary to protect, enforce, or defend any Licensed Patent, and control the conduct thereof. Notwithstanding the foregoing, if Licensor does not bring action with respect to any commercially significant third-party infringement within thirty (30) days of a request by Licensee, does not timely take any other lawful action reasonably necessary to protect, enforce, or defend any Licensed Patent, or earlier notifies Licensee in writing of its intent not to do either of the foregoing, then Licensee shall have the right, but not the obligation, to bring or take such action and to control the conduct thereof.

6.3 Cooperation, Recovery, and Settlement. In the event a Party undertakes the enforcement or defense of any Licensed Patent in accordance with Section 6.2:

(a) the other Party shall provide all reasonable cooperation and assistance, at the enforcing Party's expense, including providing access to relevant documents and other evidence, making its employees available at reasonable business hours, and being joined as a party to such action if such other Party is an indispensable party to such action;

(b) any recovery, damages, or settlement derived from such suit, action, or other proceeding will be applied first in satisfaction of any costs and expenses, including reasonable attorneys' fees, of the Parties, with any remaining amounts retained 100% by the Party undertaking the enforcement or defense, but if the Parties share in the costs and expenses of the enforcement or defense, then the remaining amounts shall be shared 50/50; and

(c) such Party may settle any such suit, action, or other proceeding, whether by consent order, settlement, or other voluntary final disposition, without the prior written approval of the other Party, provided that Licensor shall not settle any such suit, action, or other proceeding in a manner that adversely affects the rights of Licensee concerning the Licensed Patents without Licensee's prior written consent, which consent may not be unreasonably withheld or delayed.

7. Compliance with Laws.

7.1 Patent Marking. Licensee shall comply with the patent marking provisions of 35 U.S.C. § 287(a) by marking all Licensed Products with the word "patent" or the abbreviation "pat." and either the relevant Licensed Patents or a web address that is freely accessible to the public and that lists the relevant Licensed Patents. Licensee also shall comply with the patent marking Laws of the relevant countries in the Territory.

7.2 Recordation of License. If recordation of this Agreement or any part of it with a national or supranational Governmental Authority is necessary for Licensee to fully enjoy the rights, privileges, and benefits of this Agreement, Licensor shall, at its own expense and within thirty (30) days of the Effective Date, record this Agreement or all such parts of this Agreement and information concerning the license granted hereunder with each such appropriate national or supranational Governmental Authority.

8. Confidentiality.

8.1 Confidentiality Obligations. Each Party (the "**Receiving Party**") acknowledges that in connection with this Agreement it will gain access to Confidential Information of the other Party (the "**Disclosing Party**"). As a condition to being furnished with Confidential Information, the Receiving Party shall, during the Term and for five years thereafter:

(a) not use the Disclosing Party's Confidential Information other than as strictly necessary to exercise its rights and perform its obligations under this Agreement; and

(b) maintain the Disclosing Party's Confidential Information in strict confidence and, subject to Section 8.2, not disclose the Disclosing Party's Confidential Information without the Disclosing Party's prior written consent, provided, however, the Receiving Party may disclose the Confidential Information to its Representatives who:

(i) have a need to know the Confidential Information for purposes of the Receiving Party's performance, or exercise of its rights with respect to such Confidential Information, under this Agreement;

(ii) have been apprised of this restriction; and

(iii) are themselves bound by written nondisclosure agreements at least as restrictive as those set out in this Section 8, provided further that the Receiving Party will be responsible for ensuring its Representatives'

compliance with, and will be liable for any breach by its Representatives of, this Section 8.

The Receiving Party shall use reasonable care, at least as protective as the efforts it uses with respect to its own confidential information, to safeguard the Disclosing Party's Confidential Information from use or disclosure other than as permitted hereby.

8.2 Exceptions. If the Receiving Party becomes legally compelled to disclose any Confidential Information, the Receiving Party shall:

- (a) provide prompt written notice to the Disclosing Party so the Disclosing Party may seek a protective order or other appropriate remedy or waive its rights under Section 8; and
- (b) disclose only the portion of Confidential Information it is legally required to furnish.

If a protective order or other remedy is not obtained, or the Disclosing Party waives compliance under Section 8, the Receiving Party shall, at the Disclosing Party's expense, use reasonable efforts to obtain assurance that confidential treatment will be afforded the Confidential Information.

8.3 Injunctive Relief. Both Parties acknowledge and agree that it would be difficult to measure damages for breach by either Party of the covenants set forth in this Section 8, and that injury from any such breach would be incalculable, and that money damages would therefore be an inadequate remedy for any such breach. Accordingly, either Party shall be entitled, in addition to all other remedies available hereunder or under law or equity, to injunctive or such other equitable relief as a court may deem appropriate to restrain or remedy any breach of such covenants.

9. Representations and Warranties.

9.1 Mutual Representations and Warranties. Each Party represents and warrants to the other Party that:

- (a) it is duly organized, validly existing, and in good standing as a corporation as represented herein under the laws and regulations of its jurisdiction of incorporation;
- (b) it has, and throughout the Term will retain, the full right, power, and authority to enter into this Agreement and to perform its obligations hereunder;

(c) the execution of this Agreement by its representative whose signature is set forth at the end hereof has been duly authorized by all necessary corporate action of the Party; and

(d) when executed and delivered by such Party, this Agreement will constitute the legal, valid, and binding obligation of that Party, enforceable against that Party in accordance with its terms.

9.2 Licensor's Representations and Warranties. Licensor represents and warrants that:

(a) The Patent Application is all the patent applications (and patents) owned or controlled by Licensor or its Affiliates that are necessary or useful for Licensee to make, use, offer to sell, sell, have sold and import the Licensed Products in the Field of Use;

(b) it is the sole and exclusive owner of the entire right, title, and interest in and to the Licensed Patents;

(c) it has, and throughout the Term will retain, the right to grant the license granted to Licensee hereunder, and it has not granted, and is not under any obligation to grant, to any third party any license, lien, option, encumbrance, or other contingent or non-contingent right, title, or interest in or to the Licensed Patents that conflicts with the rights and licenses granted to Licensee hereunder;

(d) it has complied with all applicable Laws in connection with the prosecution of the Licensed Patents, including any disclosure requirements of the United States Patent and Trademark Office and any foreign patent office, and has timely paid all filing and renewal fees payable with respect thereto;

(e) there is no settled, pending, or to its knowledge threatened litigation, claim, or proceeding alleging that any Licensed Patent is invalid or unenforceable (including any interference, nullity, opposition, inter partes, or post-grant review or similar invalidity or patentability proceedings before the United States Patent and Trademark Office or any foreign patent office), and it has no knowledge after reasonable investigation of any factual, legal, or other reasonable basis for any such litigation, claim, or proceeding; and

(f) to its knowledge, the making, using, offering to sell, selling, having sold and importing of Licensed Products in the Field of Use in the Territory do not and will not infringe or otherwise violate any intellectual property right of any Person, and Licensor has not received any oral or written communication that a Licensed Product infringes or otherwise violates the intellectual property right of any Person.

10. Exclusion of Consequential and Certain Other Damages. TO THE FULLEST EXTENT PERMITTED BY LAW, LICENSEE WILL NOT BE LIABLE TO LICENSOR OR ANY OTHER PERSON FOR ANY INJURY TO OR LOSS OF GOODWILL, REPUTATION, BUSINESS PRODUCTION, REVENUES, PROFITS, ANTICIPATED PROFITS, CONTRACTS, OR OPPORTUNITIES (REGARDLESS OF HOW THESE ARE CLASSIFIED AS DAMAGES), OR FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, EXEMPLARY, SPECIAL, PUNITIVE, OR ENHANCED DAMAGES, WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, PRODUCT LIABILITY, OR OTHERWISE (INCLUDING THE ENTRY INTO, PERFORMANCE, OR BREACH OF THIS AGREEMENT), REGARDLESS OF WHETHER SUCH LOSS OR DAMAGE WAS FORESEEABLE AND THE PARTY AGAINST WHOM LIABILITY IS CLAIMED HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH LOSS OR DAMAGE, AND NOTWITHSTANDING THE FAILURE OF ANY AGREED REMEDY OF ITS ESSENTIAL PURPOSE.

11. Indemnification.

11.1 Indemnification by Licensor. Licensor shall indemnify, defend, and hold harmless Licensee and its Affiliates and Sublicensees, and each of their respective officers, directors, employees, agents, successors, and assigns (each, an "**Indemnitee**") against all Losses arising out of or resulting from any third-party claim, suit, action, or proceeding (each an "**Action**") related to, arising out of, or resulting from Licensor's breach of any representation, warranty, covenant, or obligation under this Agreement.

11.2 Indemnification Procedure. An Indemnitee shall promptly notify Licensor in writing of any Action and cooperate with Licensor at Licensor's sole cost and expense. Licensor shall immediately take control of the defense and investigation of the Action and shall employ counsel reasonably acceptable to Indemnitee to handle and defend the same, at Licensor's sole cost and expense. Licensor shall not settle any Action in a manner that adversely affects the rights of any Indemnitee without the Indemnitee's prior written consent, which consent may not be unreasonably withheld or delayed. The Indemnitee's failure to perform any obligations under this Section 11.2 shall not relieve Licensor of its obligation under this Section 11.2 except to the extent Licensor can demonstrate that it has been materially prejudiced as a result of the failure. The Indemnitee may participate in and observe the proceedings at its own cost and expense with counsel of its own choosing.

12. Term and Termination.

12.1 Term. This Agreement is effective as of the Effective Date and, unless terminated earlier in accordance with Section 12.2, will continue in full force and effect on a Licensed Product-by-Licensed Product and country-by-country basis until the expiration of the last to expire Valid Claim of a Licensed Patent in such country (the "**Term**").

12.2 Termination.

(a) Licensee may terminate this Agreement at any time without cause, and without incurring any additional obligation, liability, or penalty, by providing at least thirty (30) days' prior written notice to Licensor.

(b) If Licensee abandons the development and commercialization of KM10544 in the Field of Use in the Territory, Licensor may terminate this Agreement at any time upon ninety (90) days' prior written notice to Licensee and Licensee shall transfer to Licensor ownership of all "Foreground IP" (as such term is used in the Collaborative Agreement) acquired prior to effective date of termination of the License Agreement.

(c) Either Party may terminate this Agreement on written notice to the other Party if the other Party materially breaches this Agreement and fails to cure such breach within a reasonable period, but not more than thirty (30) days, after receiving written notice thereof.

(d) Either Party may terminate this Agreement, effective immediately, if the other Party: (i) is dissolved or liquidated or takes any corporate action for such purpose; (ii) becomes insolvent or is generally unable to pay, or fails to pay, its debts as they become due; (iii) files or has filed against it a petition for voluntary or involuntary bankruptcy or otherwise becomes subject, voluntarily or involuntarily, to any proceeding under any domestic or foreign bankruptcy or insolvency Law; (iv) makes or seeks to make a general assignment for the benefit of its creditors; or (v) applies for or has a receiver, trustee, custodian, or similar agent appointed by order of any court of competent jurisdiction to take charge of or sell any material portion of its property or business.

12.3 Effect of Termination. On any expiration or termination of the entirety of this Agreement, the Receiving Party shall return to the Disclosing Party all documents and tangible materials (and any copies) containing, reflecting, incorporating, or based on the Disclosing Party's Confidential Information. Notwithstanding anything to the contrary contained herein, each Party will be permitted to retain one (1) copy of the Confidential Information for the purpose of monitoring compliance with the terms of this Agreement; provided that all such information shall continue to be kept confidential pursuant to the terms of this Agreement. The above obligations shall not apply to copies of electronically exchanged Confidential Information made as a matter of routine information technology backup and to Confidential Information or copies thereof which must be stored by the Receiving Party according to mandatory regulatory authority, provided that such Confidential Information shall remain subject to the confidentiality obligations set forth herein

12.4 Expiration. At the expiration of the last Valid Claim to expire under the Licensed Patents in any country in the Territory with respect to any Licensed Product,

provided Licensee is not at that time in breach of this Agreement, Licensee will have a perpetual, irrevocable, fully paid-up, royalty-free right and license to subsequently make, use, offer to sell, sell, have sold and import in the Field of Use in that country any and all products that were previously Licensed Products and shall have no further obligations to Licensor in the Field of Use in that country with respect to such Licensed Patents or such Licensed Products.

12.5 Sell-Off Period. For a period of 180 days after the effective date of the termination of this Agreement under Section 12.2 (the "**Sell-Off Period**"), Licensee and Sublicensees will have the right to sell or otherwise dispose of all existing Licensed Products in their possession, custody, or control and to complete the manufacture of and sell or otherwise dispose of all Licensed Products in the course of manufacture as of the effective date of termination, in each case, in accordance with the applicable terms and conditions of this Agreement, including the Royalty and Sublicense Consideration obligations of Section 3.3.

12.6 Survival. The rights and obligations of the Parties set forth in this Section 12.6 and Section 1 (Definitions), Sections 3.3-3.8 (Payment), Section 8 (Confidentiality), Section 9 (Representations and Warranties), Section 10 (Exclusion of Consequential and Certain Other Damages), Section 11 (Indemnification), Section 12.3 (Effect of Termination), Section 12.4 (Expiration), Section 12.5 (Sell-off Period) and Section 13 (Miscellaneous), and any right, obligation, or required performance of the Parties in this Agreement which, by its express terms or nature and context is intended to survive termination or expiration of this Agreement, will survive any such termination or expiration.

13. Miscellaneous.

13.1 Bankruptcy. All rights and licenses granted by Licensor under this Agreement are and will be deemed to be rights and licenses to "intellectual property" as such term is used in, and interpreted under, Section 365(n) of the United States Bankruptcy Code (11 U.S.C. § 365(n)) and any foreign equivalent thereto in any country having jurisdiction over a Party or its assets (the "**Bankruptcy Code**"). Licensee has all rights, elections, and protections under the Bankruptcy Code and all other bankruptcy, insolvency, and similar laws with respect to the Agreement, and the subject matter hereof. Without limiting the generality of the foregoing, Licensor acknowledges and agrees that, if Licensor or its estate shall become subject to any bankruptcy or similar proceeding:

(a) subject to Licensee's rights of election under the Bankruptcy Code, all rights, licenses, and privileges granted to Licensee under this Agreement will continue subject to the respective terms and conditions hereof, and will not be affected, even by Licensor's rejection of this Agreement; and

(b) Licensee shall be entitled to a complete duplicate of, or complete access to, as appropriate, all such intellectual property and embodiments of intellectual property, which, if not already in Licensee's possession, shall be promptly delivered to Licensee or its designee, unless Licensor elects to and does in fact continue to perform all its obligations under this Agreement.

13.2 Further Assurances. Each Party shall, and shall cause their respective Affiliates to, upon the request, and at the sole cost and expense, of the other Party, promptly execute such documents and take such further actions as may be necessary to give full effect to the terms of this Agreement.

13.3 Independent Contractors. The relationship between the Parties is that of independent contractors. Nothing contained in this Agreement creates any agency, partnership, joint venture, or other form of joint enterprise, employment, or fiduciary relationship between the parties, and neither Party has authority to contract for or to bind the other Party in any manner whatsoever.

13.4 No Public Statements. Neither Party may issue or release any announcement, statement, press release, or other publicity or marketing materials relating to this Agreement or, unless expressly permitted under this Agreement, otherwise use the other Party's trademarks, service marks, trade names, logos, domain names, or other indicia of source, association, or sponsorship, in each case, without the prior written consent of the other Party, which shall not be unreasonably withheld or delayed.

13.5 Notices. All notices, requests, consents, claims, demands, waivers, and other communications (other than routine communications having no legal effect) must be in writing and sent to the respective Party at the addresses indicated below (or such other address for a Party as may be specified in a notice given in accordance with this Section):

If to Licensor: 3F, 29, Dunchon-daero 514 beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Facsimile: 82-2-6268-9604 Email: jlee@kainosmedicine.com Attention: President

If to Licensee: 21250 Hawthorne Boulevard, Suite 800, Torrance, California 90503
Facsimile: 310-214-0075
Email: wlee@emmauslifesciences.com Attention: Chief Operating Officer

Notices sent in accordance with this Section 13. Will be deemed effective: (a) when received or delivered by hand (with written confirmation of receipt); (b) when received, if sent by a nationally recognized overnight courier (receipt requested); or (c) on the date sent by facsimile or email (in each case, following confirmation of receipt).

13.6 Interpretation. For purposes of this Agreement, (a) the words "include," "includes," and "including" will be deemed to be followed by the words "without limitation"; (b) the word "or" is not exclusive; and (c) the words "herein," "hereof," "hereby," "hereto," and "hereunder" refer to this Agreement as a whole.

Unless the context otherwise requires, references herein to: (x) Sections and Schedules refer to the Sections of and Schedules attached to this Agreement; (y) an agreement, instrument, or other document means such agreement, instrument, or other document as amended, supplemented, and modified from time to time to the extent permitted by the provisions thereof; and (z) a statute means such statute as amended from time to time and includes any successor legislation thereto and any regulations promulgated thereunder. This Agreement will be construed without regard to any presumption or rule requiring construction or interpretation against the Party drafting an instrument or causing any instrument to be drafted.

13.7 Headings. The headings in this Agreement are for reference only and shall not affect the interpretation of this Agreement.

13.8 Entire Agreement. This Agreement, together with all Schedules and any other documents incorporated herein by reference, constitutes the sole and entire agreement of the Parties with respect to the subject matter contained herein, and supersedes all prior and contemporaneous understandings and agreements, both written and oral, with respect to such subject matter. In the event of any conflict between the terms and provisions of this Agreement and those of any Schedule or other document, the following order of precedence will govern: (a) first, this Agreement, excluding its Schedules; and (b) second, any Schedules to this Agreement as of the Effective Date; and (c) third, any other documents incorporated herein by reference.

13.9 Assignment. Except as otherwise expressly provided in this Agreement, neither Party may assign or otherwise transfer all or any of its rights, or delegate or otherwise transfer all or any of its obligations, hereunder without the prior written consent of the other Party (which consent may not be unreasonably withheld, conditioned, or delayed); provided, however, that either Party may make such an assignment, delegation, or other transfer, in whole or in part, without the other Party's consent:

(a) to an Affiliate; or

(b) in connection with the transfer or sale to a third party of all or substantially all of the business or assets of such Party to which this Agreement relates.

No delegation or other transfer will relieve a Party of any of its obligations or performance under this Agreement. Any purported assignment, delegation, or transfer in violation of this Section 13.9 shall be void.

13.10 No Third-Party Beneficiaries. This Agreement is for the sole benefit of the Parties hereto and their respective successors and permitted assigns and, except as provided in Section 11, nothing herein, express or implied, is intended to or will confer upon any other Person any legal or equitable right, benefit, or remedy of any nature whatsoever, under, or by reason of this Agreement.

13.11 Amendment; Modification; Waiver. This Agreement may only be amended, modified, or supplemented by an agreement in writing signed by each Party. No waiver by any Party of any of the provisions hereof will be effective unless explicitly set forth in writing and signed by the waiving Party. Except as otherwise set forth in this Agreement, no failure to exercise, or delay in exercising, any rights, remedy, power, or privilege arising from this Agreement will operate or be construed as a waiver thereof; nor will any single or partial exercise of any right, remedy, power, or privilege hereunder preclude any other or further exercise thereof or the exercise of any other right, remedy, power, or privilege.

13.12 Severability. If any term or provision of this Agreement is invalid, illegal, or unenforceable in any jurisdiction, such invalidity, illegality, or unenforceability will not affect any other term or provision of this Agreement or invalidate or render unenforceable such term or provision in any other jurisdiction. Upon a determination that any term or other provision is invalid, illegal, or unenforceable, the Parties hereto shall negotiate in good faith to modify this Agreement so as to affect the original intent of the Parties as closely as possible in a mutually acceptable manner in order that the transactions contemplated hereby be consummated as originally contemplated to the greatest extent possible.

13.13 Governing Law. This Agreement is governed by and construed in accordance with the law of the United States of America, including applicable internal laws of the State of California, in each case without regard to conflicts of law principles.

13.14 Dispute Resolution; Submission to Jurisdiction. Any dispute, action or proceeding seeking to enforce any provision of, or based on any right arising out of, this Agreement shall be exclusively settled by arbitration administered by the Singapore International Arbitration Centre (the "SIAC") in accordance with the Arbitration Rules of the Singapore International Arbitration Centre (the "SIAC Rules") for the time being in force, by a single arbitrator appointed in accordance with the said rules, and each Party irrevocably submits to the exclusive jurisdiction of the SIAC in any such suit, action, or proceeding. Service of process, summons, notice, or other document by delivery to such Party's address for notice set forth herein will be effective service of process for any suit, action, or proceeding brought in before the SIAC. The seat of arbitration shall be Singapore. The arbitration proceedings will be conducted in English, and the award will

be rendered in writing in English. Unless otherwise ordered by the arbitrator, each party shall bear its own costs and fees, including attorneys' fees and expenses, the provisions of Section 13.15 notwithstanding. The Parties agree to treat any award made by the arbitral tribunal as final and binding upon them and immediately enforceable against them and undertake not to exercise or seek to exercise any right of appeal or other challenge against such final award before any court or jurisdiction. Notwithstanding the foregoing, nothing in this Agreement shall prohibit the parties from seeking any preliminary, emergency, or interim injunctive relief in any court of competent jurisdiction or from the SIAC or arbitrators. Judgment upon any award rendered by the arbitrator may be entered by any court having jurisdiction over the Party against whom enforcement is sought.

13.15 Attorneys' Fees. In the event that any action, suit, or other legal or administrative proceeding is instituted or commenced by either Party hereto against the other Party arising out of or related to this Agreement, the prevailing Party shall be entitled to recover its reasonable attorneys' fees and court costs from the non-prevailing Party.

13.16 Counterparts. This Agreement may be executed in counterparts, each of which will be deemed an original, but all of which together will be deemed to be one and the same agreement. A signed copy of this Agreement delivered by facsimile, e-mail, or other means of electronic transmission (to which a signed copy in PDF is attached) will be deemed to have the same legal effect as delivery of an original signed copy of this Agreement.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed as of the date first written above by their respective officers thereunto duly authorized.

Kainos Medicine, Inc.

By: /s/ Kisub Lee

Name: Kisub Lee

Title: CEO and Chairman

Emmaus Life Sciences, Inc.

By: /s/ Yutaka Niihara

Name: Yutaka Niihara, M.D., M.P.H.

Title: Chairman and Chief Executive Officer

SCHEDULE 1

KNOW-HOW AS OF THE EFFECTIVE DATE

1. Study design and data used to demonstrate K.MI 0544's efficacy for all relevant cancer and inflammation indications, including the proof-of-concept studies using 1) KM10544; and 2) combination of KM10544 and ibrutinib.
2. All toxicology studies and data related to KM 10544.
3. Chemical structure information.
4. Manufacturing, storing, and shipping related Know-How, including:
 - o Stability data,
 - o Storage condition data,
 - o Shipping/transporting information and data; and
 - o Outsourcing of manufacturing.

the entire balance of this Note and any interest accrued thereon shall be immediately due and payable to the holder of this Note.

6. Modification: No modification or waiver of any of the terms of this Note shall be allowed unless by written agreement signed by the parties. No waiver of any breach or default hereunder shall be deemed a waiver of any subsequent breach or default of the same or similar nature.

7. Complete Note: This Note is the complete and exclusive statement of agreement of the parties with respect to matters in this Note. This Note replaces and supersedes all prior written or oral agreements or statements by and among the parties with respect to the matters covered by it. No representation, statement, condition or warranty not contained in this Note is binding on the parties.

8. Transfer of the Note: This Note may be transferred, in whole or in part, at any time or from time to time, by the Lender. If this Note is to be transferred, the Lender shall surrender this Note to the Borrower, whereupon the Borrower will forthwith issue and deliver upon the order of the Lender a new Note registered as the Lender may request, representing the outstanding Principal Amount being transferred by the Lender and, if less than the entire outstanding Principal Amount is being transferred, a new Note to the Lender representing the outstanding Principal Amount not being transferred.

9. Lost, Stolen or Mutilated Note: Upon receipt by the Borrower of evidence reasonably satisfactory to the Borrower of the loss, theft, destruction or mutilation of this Note, and, in the case of loss, theft or destruction, of any indemnification undertaking by the Lender to the Borrower in customary form and, in the case of mutilation, upon surrender and cancellation of this Note, the Borrower shall execute and deliver to the Lender a new Note representing the outstanding Principal Amount and accrued and unpaid interest thereon.

10. Severability of Provisions: If any portion of this Note is deemed unenforceable, all other provisions of this Note shall remain in full force and effect.

11. Choice of Law: All terms and conditions of this Note shall be interpreted under the laws of California, U.S.A., without regard to conflict of law principles.

Signed Under Penalty of Perjury, this 7th day of December, 2021

Emmaus Life Sciences, Inc.

By: _____
Willis C. Lee, Chief Operating Officer

By: _____

Investor

ATTACHMENT 1

Lender's Name: Soomi Niihara

Lender's Address:

CONSENT OF BAKER TILLY US, LLP, INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statement No. 333-2225100 and 333-223203 on Form S-3 and Form S-3/A and in the Registration Statements Nos. 333-150398, 333-215434, 333-225050, 333-228835, 333-233718 and 333-261944 on Form S-8, of Emmaus Life Sciences, Inc. of our report dated March 31, 2022, relating to the consolidated financial statements of Emmaus Life Sciences, Inc. appearing in this report on Form 10-K of Emmaus Life Sciences, Inc. as of December 31, 2021 and 2020 and for the years then ended.

/s/

BAKER TILLY US, LLP

San Diego, CA
March 31, 2022

**Certification of Chief Executive Officer pursuant to Item 601(b)(31) of Regulation S-K,
as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002**

I, Yutaka Niihara, certify that:

1. I have reviewed this annual report of Emmaus Life Sciences, 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 and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ YUTAKA NIIHARA

Yutaka Niihara

Chief Executive Officer

(Principal Executive Officer)

Date: March 31, 2022

**Certification of Chief Financial Officer pursuant to Item 601(b)(31) of Regulation S-K,
as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002**

I, Yasushi Nagasaki, certify that:

1. I have reviewed this annual report of Emmaus Life Sciences, 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 and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ YASUSHI NAGASAKI

Yasushi Nagasaki

Interim Chief Financial Officer

(Principal Financial and Accounting Officer)

Date: March 31, 2022

**Certification of Chief Executive Officer and Chief Financial Officer Pursuant to 18 U.S.C.
Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002**

In connection with the annual report of Emmaus Life Sciences, Inc. (the "Company") on Form 10-K/A for the year ending December 31, 2021, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned, in the capacities and on the date indicated below, hereby certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to his knowledge:

- (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.

/s/ YUTAKA NIIHARA

Yutaka Niihara

Chief Executive Officer

(Principal Executive Officer)

March 31, 2022

/s/ YASUSHI NAGASAKI

Yasushi Nagasaki

Interim Chief Financial Officer

(Principal Financial and Accounting Officer)

March 31, 2022