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

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 or 15(d) of
The Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): October 21, 2022

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

Delaware	**001-38022**	**46-3011414**
(State or other jurisdiction of incorporation)	**(Commission File Number)**	**(IRS Employer ID Number)**

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

Registrant's telephone number, including area code: (908) 484-8805

Not Applicable
(Former name or former address, if changed since last report.)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

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

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common Stock	MTNB	NYSE American

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (17 CFR §230.405) or Rule 12b-2 of the Securities Exchange Act of 1934 (17 CFR §240.12b-2).

Emerging growth company ☐

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

Item 7.01 Regulation FD Disclosure.

Matinas BioPharma Holdings, Inc. (the "Company") issued a press release announcing interim data from the fourth and final cohort of the Phase 2 EnACT trial of the Company's MAT2203 product candidate. A copy of the press release is furnished as Exhibit 99. 1 hereto and incorporated herein by reference.

The Company updated its corporate presentation (the "Corporate Presentation") which it intends to use at various conferences and investor meetings. The Corporate Presentation is attached hereto as Exhibit 99.2 and incorporated herein by reference.

The information in this Item 7.01 and Exhibits 99.1 and 99.2 attached hereto shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise subject to the liabilities of that Section, nor shall such information be deemed incorporated by reference in any filing under the Securities Act of 1933, as amended, or the Exchange Act, except as shall be expressly set forth by specific reference in such a filing.

Item 8.01. Other Events.

On October 21, 2022, the Company announced positive interim data from the fourth and final cohort of the Phase 2 EnACT trial evaluating the safety and efficacy of an all-oral regimen of its MAT2203 (administered with adjunctive flucytosine) product candidate ("Cohort 4"). Interim EnACT Cohort 4 data from 40 MAT2203 treatment arm

participants and 40 standard of care ("SOC") controls will be presented on October 21, 2022 by Drs. Mucunguzi Atukunda, MBChB, MPH of the Infectious Diseases Institute of Makarere University in Uganda and David Boulware, MD, MPH of the University of Minnesota Medical School. Cohort 4 (an all-oral treatment regimen with MAT2203) met its prespecified primary endpoint, exceeding the target rate of cerebrospinal fluid ("CSF") yeast clearance threshold of >0.20 colony forming units ("CFU") per mL of CSF per day. Overall survival in Cohort 4, a key secondary endpoint of the study, is 95% at two weeks and currently 90% overall, with ongoing final follow-up through 18 weeks. The Company plans to initiate a Phase 3 registration trial of MAT2203 as step-down therapy in cryptococcal meningitis in the first quarter of 2023.

Interim Results from Cohort 4

- The CSF yeast clearance rate exceeded the prespecified primary endpoint threshold target of >0.20, with a mean early fungicidal activity achieved of 0.30 $\log_{10}$ CFU/mL/day with 95% confidence intervals from 0.22 – 0.38.
- Several participants with high baseline fungal burdens had noteworthy antifungal activity within the MAT2203 treatment arm, including one patient with quantitative cryptococcal culture as high as 915,000 CFU/mL at the time of screening with effective clearance during the induction period, a key demonstration of potent antifungal activity, even in the most challenging of cases.

Survival

- In 40 patients receiving MAT2203 treatment, interim survival is currently 90%, while the survival rate at Week 2 was 95%; note that Week 2 survival is the prespecified primary endpoint for the MAT2203 Phase 3 registration trial in cryptococcal meningitis.

Safety

- MAT2203 patients had fewer Grade ≥3 Clinical Adverse Events (42%) vs. SOC treatment (59%).
- The incidence of adverse events relating to kidney function and anemia were significantly lower for MAT2203 compared with the SOC treatment, with no evidence of kidney toxicity seen with six weeks of oral MAT2203 treatment.
- The favorable safety and tolerability data seen in Cohort 4 support the use of oral MAT2203 for longer-term use, something not previously feasible due to associated toxicities with currently available IV formulations of amphotericin B.

The Company may leverage data from the EnACT trial to further the development of MAT2203 and secure multiple orphan indications for the treatment of other life-threatening invasive fungal infections, such as mucormycosis and aspergillosis.

The Company expects that a pivotal Phase 3 registration trial of MAT2203 in cryptococcal meningitis will be initiated early in the first quarter of 2023 and will assess MAT2203 as step-down therapy after two loading doses of IV amphotericin B. This open-label randomized trial, which will be partially financially supported by the National Institutes of Health National Institute of Neurological Disorders and Stroke, involves a three arm non-inferiority design in persons living with HIV who have cryptococcal meningitis: (A) step-down therapy with MAT2203 with treatment continuing for 2 weeks; (B) step-down therapy with MAT2203 with treatment out to 6 weeks; and (C) a SOC control arm of IV amphotericin induction transitioning to fluconazole. The non-inferiority margin for both the primary and key secondary endpoints will be 10% and total enrollment is planned to be approximately 270 patients, with an adaptive, de-risking design allowing for the potential for additional patients once enrollment has reached 75%. The primary endpoint will be 2-week all-cause mortality, with a pooled analysis across the two MAT2203 treatment arms compared with SOC control to support a potential indication for the treatment of cryptococcal meningitis. A secondary endpoint is 10-week relapse free survival of optimized treatment (2-weeks or 6-weeks) against SOC will be evaluated for non-inferiority. Selection of the optimal treatment regimen will be based on predefined and protocolized clinical criteria and will form the basis for a final New Drug Application submission with the U.S. Food and Drug Administration.

Forward- Looking Statements

This Current Report on Form 8-K contains certain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934 and Private Securities Litigation Reform Act, as amended, including those relating to topline results of the ENHANCE-IT study, the Company's strategic focus and the future development of its product candidates, including MAT2203, the anticipated timing of regulatory submissions, the anticipated timing of clinical studies, the anticipated timing of regulatory interactions, the Company's ability to identify and pursue development and partnership opportunities for its products or platform delivery technology on favorable terms, if at all, and the ability to obtain required regulatory approval and other statements that are predictive in nature, that depend upon or refer to future events or conditions. All statements other than statements of historical fact are statements that could be forward-looking statements.

These statements may be identified by the use of forward-looking expressions, including, but not limited to, "expects," "anticipates," "intends," "plans," "could," "believes," "estimates" and similar expressions. These statements involve known and unknown risks, uncertainties and other factors which may cause actual results to be materially different from any future results expressed or implied by the forward-looking statements. Forward-looking statements are subject to a number of risks and uncertainties, including, but not limited to, the Company's ability to obtain additional capital to meet its liquidity needs on acceptable terms, or at all, including the additional capital which will be necessary to complete the clinical trials of our product candidates; the ability to successfully complete research and further development and commercialization of our product candidates; the uncertainties inherent in clinical testing; the timing, cost and uncertainty of obtaining regulatory approvals; our ability to protect the Company's intellectual property; the loss of any executive officers or key personnel or consultants; competition; changes in the regulatory landscape or the imposition of regulations that affect the Company's products; and the other factors listed under "Risk Factors" in our filings with the SEC, including Forms 10-K, 10-Q and 8-K. Investors are cautioned not to place undue reliance on such forward-looking statements, which speak only as of the date hereof. Except as may be required by law, the Company does not undertake any obligation to release publicly any revisions to such forward-looking statements to reflect events or circumstances after the date hereof or to reflect the occurrence of unanticipated events. The Company's product candidates are all in a development stage and are not available for sale or use.

Item 9.01 Financial Statements and Exhibits.

Exhibit No.	Description
99.1	Press Release, dated October 21, 2022
99.2	Corporate Presentation, October 2022
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

MATINAS BIOPHARMA HOLDINGS, INC.

Dated: October 21, 2022 By: */s/ Jerome D. Jabbour*

Name: Jerome D. Jabbour
Title: Chief Executive Officer

Exhibit 99.1

Matinas BioPharma Announces Positive Interim Data from the Phase 2 EnACT Trial of MAT2203 for the Treatment of Cryptococcal Meningitis, Exceeding Primary Endpoint Threshold; Patient Survival in All-Oral Cohort 4 Regimen Currently 90%

Two-week survival in Cohort 4 (all-oral regimen) was 95% in 40 patients receiving MAT2203

Mean Early Fungicidal Activity (EFA) of the rate of yeast clearance in cerebrospinal fluid exceeded the prespecified primary endpoint threshold of >0.20 CFU/mL, CSF/day

Favorable safety and tolerability data support longer-term use of MAT2203 with no evidence of kidney toxicity seen with 6 weeks of oral MAT2203 treatment

Overall survival data from Cohorts 2 and 4 of EnACT trial (Cohorts 1 and 3 were safety lead-ins) provide clinically meaningful evidence of the safety and efficacy of MAT2203 for both a step-down indication and an all-oral treatment regimen for cryptococcal meningitis

Phase 3 registration trial of MAT2203 for treatment of cryptococcal meningitis to commence Q1 2023

BEDMINSTER, N.J., October 21, 2022 – Matinas BioPharma Holdings, Inc. (NYSE AMER: MTNB), a clinical-stage biopharmaceutical company focused on improving the intracellular delivery of nucleic acids and small molecules with its lipid nanocrystal (LNC) platform delivery technology, today announced positive interim data from Cohort 4, the fourth and final cohort of the Phase 2 EnACT trial evaluating MAT2203, an oral LNC formulation of amphotericin B, for the treatment of cryptococcal meningitis.

Interim EnACT Cohort 4 data from 40 MAT2203 treatment arm participants and 40 standard of care (SOC) controls will be presented today by Drs. Mucunguzi Atukunda, MBChB, MPH of the Infectious Diseases Institute of Makarere University in Uganda and David Boulware, MD, MPH of the University of Minnesota Medical School during the IDWeek 2022 conference, currently taking place in Washington DC. Importantly, Cohort 4 (an all-oral treatment regimen with MAT2203) met its prespecified primary endpoint, exceeding the target rate of CSF yeast clearance threshold of >0.20 colony forming units (CFUs) per mL of cerebrospinal fluid per day. Overall survival in Cohort 4, a key secondary endpoint of the study, is 95 % at two weeks and currently 90% overall, with ongoing final follow-up through 18 weeks. Matinas plans to initiate the Phase 3 registration trial of MAT2203 as step-down therapy in cryptococcal meningitis in the first quarter of 2023.

“A positive Phase 2 study for any drug is a major milestone for a biotech company. We would first like to thank all of the EnACT patients, our dedicated investigators and the entire clinical study staff in Uganda for their commitment to this important clinical trial,” commented Jerome D. Jabbour, Chief Executive Officer of Matinas. “MAT2203 performed extremely well in EnACT, with an unprecedented 90% survival of patients in Cohorts 2 and 4. The survival rates seen throughout this trial provide tremendous enthusiasm and confidence as we head into our Phase 3 program, which stands to benefit from a flexible, FDA-reviewed design which we believe significantly de-risks this later stage clinical program. In looking beyond the immediate success with MAT2203, these data also represent significant clinical validation of our LNC drug delivery platform, with its unique ability to package and deliver a variety of complex molecules in an oral, safe and targeted manner. We’re very excited by the potential for our proprietary LNC technology to play a meaningful role in overcoming significant drug delivery challenges across therapeutic categories.”

EnACT Cohort 4

Cohort 4 of EnACT evaluated the safety and efficacy of an all-oral regimen of MAT2203 (administered with adjunctive flucytosine) for the initial 14-day induction period, with MAT2203 treatment continued for an additional four weeks into the consolidation phase, administered in combination with 800 mg/day of fluconazole. The primary endpoint of EnACT was early fungicidal activity, a direct measurement of the quantitative rate of antifungal activity at the site of infection in the cerebrospinal fluid (CSF) surrounding the brain, a well-recognized key surrogate marker for survival. The pre-specified target threshold of 0.20 in EnACT is clinically meaningful and represents a robust degree of fungal clearance that is associated with enhanced survival. Treatment early fungicidal activity beyond the >0.20 threshold have not resulted in any observed incremental benefit.[1] Cohort 4 also included secondary endpoints of overall survival, prevention of relapse, CSF sterilization, and safety.

“The Phase 2 clinical trial data to be presented today at IDWeek, testing oral MAT2203 with flucytosine for the treatment of cryptococcal meningitis, are quite exciting, with an approximately 90% survival through 18 weeks. These interim results potentially open other opportunities to explore this oral amphotericin therapy for other difficult to treat or resistant invasive fungal infections.” said David R. Boulware, M.D., MPH, Professor of Medicine, University of Minnesota Medical School, and co-principal investigator of the EnACT Trial. “One of the most important findings was reduced toxicity. With 6 weeks of oral LNC-enabled oral amphotericin B, statistically fewer lab abnormalities occurred than with 1 week of intravenous amphotericin B.”

Interim Results from Cohort 4

The key interim results from Cohort 4 of EnACT include exceeding the prespecified early fungicidal activity threshold of >0.20 CFU/mL CSF/day, survival, and the safety of longer-term use of an oral formulation of amphotericin B (MAT2203) for up to 6 weeks.

[1] **Clin Infect Dis.** 2020; 71(5):e45-49

- In Cohort 4, the CSF yeast clearance rate exceeded the prespecified primary endpoint threshold target of >0.20, with a mean early fungicidal activity achieved of 0.30 log_{10} CFU/mL/day with 95% confidence intervals from 0.22 – 0.38.

- Several participants with high baseline fungal burdens had noteworthy antifungal activity within the MAT2203 treatment arm, including one patient with quantitative cryptococcal culture as high as 915,000 CFU/mL at the time of screening with effective clearance during the induction period, a key demonstration of potent antifungal activity, even in the most challenging of cases.

Survival

- In Cohort 4, in 40 patients receiving MAT2203 treatment, interim survival is currently 90%, while the survival rate at Week 2 was 95%; note that Week 2 survival is the prespecified primary endpoint for the MAT2203 Phase 3 registration trial in cryptococcal meningitis.

Safety

- MAT2203 patients had fewer Grade ≥3 Clinical adverse events (AEs) (42%) vs. SOC treatment (59%).

- Importantly, the incidence of adverse events relating to kidney function and anemia were significantly lower for MAT2203 compared with the SOC treatment, with no evidence of kidney toxicity seen with 6 weeks of oral MAT2203 treatment.

- The favorable safety and tolerability data seen in Cohort 4 support the use of oral MAT2203 for longer-term use, something not previously feasible due to associated toxicities with currently available IV formulations of amphotericin B.

“Based on these data, we have succeeded in establishing a well-tolerated, all-oral dose regimen for the treatment of cryptococcal meningitis that improves survival in an otherwise devastatingly fatal disease,” commented Dr. Theresa Matkovits, Chief Development Officer of Matinas. “As we move into our Phase 3 registration trial, EnACT Cohort 4 data also provide very favorable 2-week survival data, an added level of confidence as they replicate what we saw in Cohort 2. In addition, we hope to leverage these data from EnACT to further the development of MAT2203 and secure multiple orphan indications for the treatment of other life-threatening invasive fungal infections, such as mucormycosis and aspergillosis, which also require longer-term antifungal treatment.”

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Upcoming Phase 3 Trial of MAT2203 in Cryptococcal Meningitis

The pivotal Phase 3 registration trial of MAT2203 in cryptococcal meningitis will be initiated early in the first quarter of 2023 and will assess MAT2203 as step-down therapy after only 2 loading doses of IV amphotericin B (similar to EnACT Cohort 2), building upon the impressive results already documented in EnACT Phase 2 trial. This open-label randomized trial, which will be partially financially supported by the National Institutes of Health (NIH) National Institute of Neurological Disorders and Stroke (NINDS), involves a three arm non-inferiority design in persons living with HIV who have cryptococcal meningitis: (A) step-down therapy with MAT2203 with treatment continuing for 2 weeks; (B) step-down therapy with MAT2203 with treatment out to 6 weeks; and (C) SOC control arm of IV amphotericin induction transitioning to fluconazole. The non-inferiority margin for both the primary and key secondary endpoints will be 10% and total enrollment is planned to be approximately 270 patients, with an adaptive, de-risking design allowing for the potential for additional patients once enrollment has reached 75%. The primary endpoint will be 2-week all-cause mortality, with a pooled analysis across the two MAT2203 treatment arms compared with SOC control to support a potential indication for the treatment of cryptococcal meningitis. To evaluate opportunities to improve survival by extending MAT2203 therapy, a key secondary endpoint is 10-week relapse free survival of optimized treatment (2-weeks or 6-weeks) against SOC will be evaluated for non-inferiority. Selection of the optimal treatment regimen will be based on predefined and protocolized clinical criteria and will then form the basis for a final NDA submission. Following substantial collaboration with the U.S. Food and Drug Administration (FDA) and written feedback from the European Medicines Agency (EMA) in the form of Scientific Advice, as well as external NIH peer-review, the planned Phase 3 study design, including endpoints, is well-positioned to potentially support registration of MAT2203 in both the US and Europe.

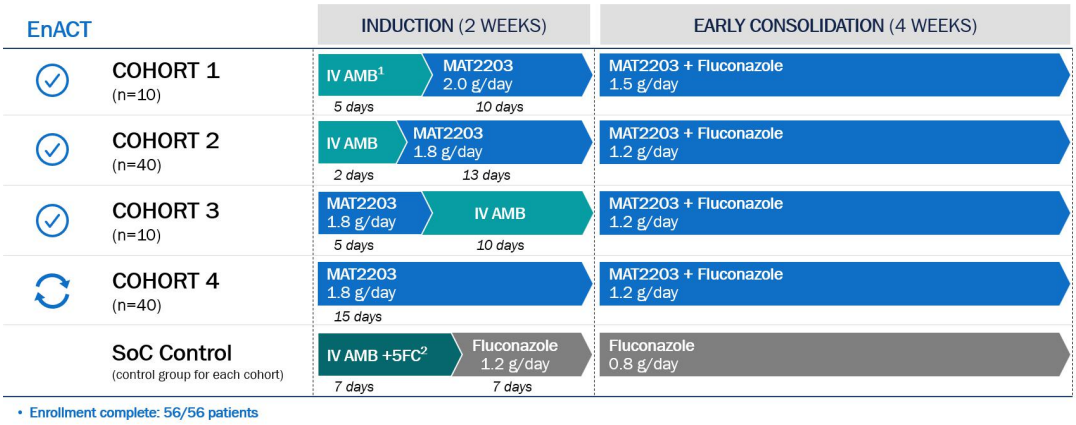
FDA has designated MAT2203 as a Qualified Infectious Disease Product (QIDP) with Fast Track status for four indications, specifically, the prevention of invasive fungal infections due to immunosuppressive therapy, and the treatment of invasive candidiasis, invasive aspergillus and cryptococcal meningitis. In addition, the FDA and EMA have granted orphan drug designation to MAT2203 for the treatment of cryptococcosis. If approved, MAT2203 would be eligible for up to 12 years of regulatory exclusivity.

About the EnACT Phase 2 Study

EnACT is a Phase 2 prospective, randomized, open-label, sequential cohort study, financially supported by the NIH NINDS, evaluating the safety, tolerability, and efficacy of MAT2203 in 100 HIV-positive persons with cryptococcal meningitis. MAT2203 utilizes the Company’s LNC platform delivery technology to orally deliver the traditionally IV-only fungicidal drug, amphotericin B.

MATINAS BIOPHARMA

The EnACT trial includes a total of four cohorts of patients, with the first two cohorts testing MAT2203 as early step-down therapy following initial treatment with IV amphotericin B during the induction period, and the second two cohorts testing MAT2203 as potentially all oral therapy. Cohorts 1 and 3 were safety lead-ins to Cohorts 2 and 4, respectively. The induction period for all patients in each cohort (active or control) is 14 days, followed by an additional four weeks of treatment (active or control) during a consolidation/maintenance period.



About Matinas BioPharma

Matinas BioPharma is a biopharmaceutical company focused on improving the intracellular delivery of nucleic acids and small molecules with its lipid nanocrystal (LNC) platform technology. The Company is developing its own internal portfolio of products as well as partnering with leading pharmaceutical companies to develop novel formulations that capitalize on the unique characteristics of the LNC platform.

Preclinical and clinical data have demonstrated that this novel technology can provide solutions to many of the challenges in achieving safe and effective intracellular delivery, for both small molecules and larger, more complex molecules, such as mRNA, DNA plasmids, antisense oligonucleotides, and vaccines. The combination of a unique mechanism of action and flexibility with formulation and route of administration (including oral), positions Matinas' LNC technology to potentially become the preferred next-generation intracellular drug delivery vehicle with distinct advantages over both lipid nanoparticles and viral vectors.

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Forward Looking Statements

This release contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995, including those relating to our business activities, our strategy and plans, our collaboration with BioNTech, the potential of our LNC platform delivery technology, and the future development of its product candidates, including MAT2203, MAT2501, the anticipated timing of regulatory submissions, the anticipated timing of clinical studies, the anticipated timing of regulatory interactions, the Company's ability to identify and pursue development and partnership opportunities for its products or platform delivery technology on favorable terms, if at all, and the ability to obtain required regulatory approval and other statements that are predictive in nature, that depend upon or refer to future events or conditions. All statements other than statements of historical fact are statements that could be forward-looking statements. Forward-looking statements include words such as "expects," "anticipates," "intends," "plans," "could," "believes," "estimates" and similar expressions. These statements involve known and unknown risks, uncertainties and other factors which may cause actual results to be materially different from any future results expressed or implied by the forward-looking statements. Forward-looking statements are subject to a number of risks and uncertainties, including, but not limited to, our ability to obtain additional capital to meet our liquidity needs on acceptable terms, or at all, including the additional capital which will be necessary to complete the clinical trials of our product candidates; our ability to successfully complete research and further development and commercialization of our product candidates; the uncertainties inherent in clinical testing; the timing, cost and uncertainty of obtaining regulatory approvals; our ability to protect the Company's intellectual property; the loss of any executive officers or key personnel or consultants; competition; changes in the regulatory landscape or the imposition of regulations that affect the Company's products; and the other factors listed under "Risk Factors" in our filings with the SEC, including Forms 10-K, 10-Q and 8-K. Investors are cautioned not to place undue reliance on such forward-looking statements, which speak only as of the date of this release. Except as may be required by law, the Company does not undertake any obligation to release publicly any revisions to such forward-looking statements to reflect events or circumstances after the date hereof or to reflect the occurrence of unanticipated events. Matinas BioPharma's product candidates are all in a development stage and are not available for sale or use.

Investor and Media Contacts

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Allele Communications
815-721-4912
matinas@allelecomms.com

Source: Matinas BioPharma Holdings, Inc.

Exhibit 99.2

MATINAS BIOPHARMA

Corporate Presentation

October 2022

Forward Looking Statements

This presentation contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995, including those relating to the Company's product development, clinical and regulatory timelines, market opportunity, cash flow and other statements that are predictive in nature, that depend upon or refer to future events or conditions. All statements other than statements of historical fact are statements that could be forward-looking statements. Forward-looking statements include words such as "expects," "anticipates," "intends," "plans," "could," "believes," "estimates" and similar expressions. These statements involve known and unknown risks, uncertainties and other factors which may cause actual results to be materially different from any future results expressed or implied by the forward-looking statements. Forward-looking statements are subject to a number of risks and uncertainties, including, but not limited to, our ability to obtain additional capital to meet our liquidity needs on acceptable terms, or at all, including the additional capital which will be necessary to complete the clinical trials of our product candidates; our ability to successfully complete research and further development and commercialization of our product candidates; the uncertainties inherent in clinical testing; the timing, cost and uncertainty of obtaining regulatory approvals; our ability to protect the Company's intellectual property; the loss of any executive officers or key personnel or consultants; competition; changes in the regulatory landscape or the imposition of regulations that affect the Company's products; and the other factors listed under "Risk Factors" in our filings with the SEC, including Forms 10-K, 10-Q and 8-K. Investors are cautioned not to place undue reliance on such forward-looking statements, which speak only as of the date of this release. Except as may be required by law, the Company does not undertake any obligation to release publicly any revisions to such forward-looking statements to reflect events or circumstances after the date hereof or to reflect the occurrence of unanticipated events. Matinas BioPharma's product candidates are all in a development stage and are not available for sale or use

Lipid Nanocrystal (LNC) Platform: Clinically Validated Intracellular Delivery

Next generation delivery - beyond LNPs and viral vectors

Extra-hepatic Targeting

- Primary component (phosphatidylserine) facilitates preferential cellular uptake
- Demonstrated uptake by phagocytes and cells with externalized PS
- Enables targeted extra-hepatic delivery in infection, inflammation and oncology
- Demonstrated delivery across the BBB

Safe

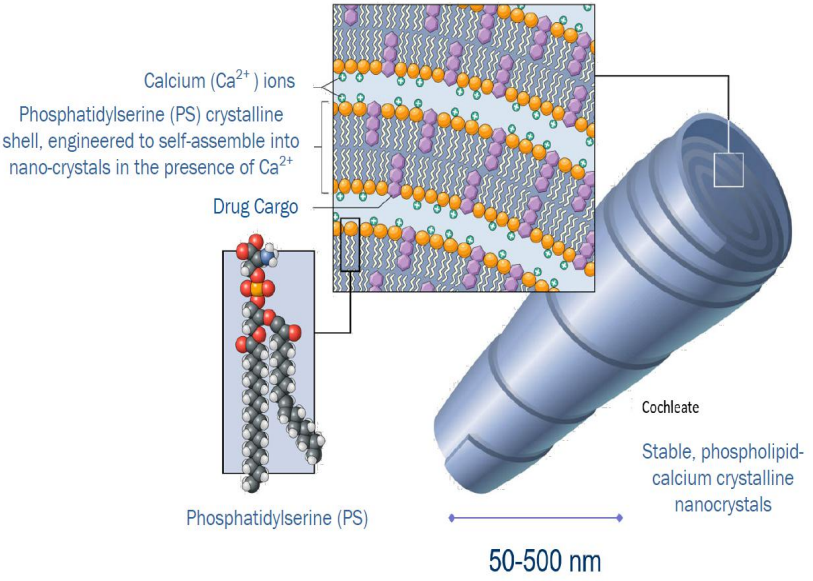
- No evidence of immunogenicity
- No cytotoxicity
- Delivers high tissue concentrations of drug with low plasma levels
- No off-target toxicity observed to date

Versatile

- Delivery of small molecules, proteins, nucleic acid polymers (ASOs, siRNA, DNA, mRNA), and vaccines - without membrane damage
- Multiple routes of administration (including oral)
- Improved stability and shelf-life

What Are Lipid Nanocrystals (LNCs) and What Cargos Can They Deliver?

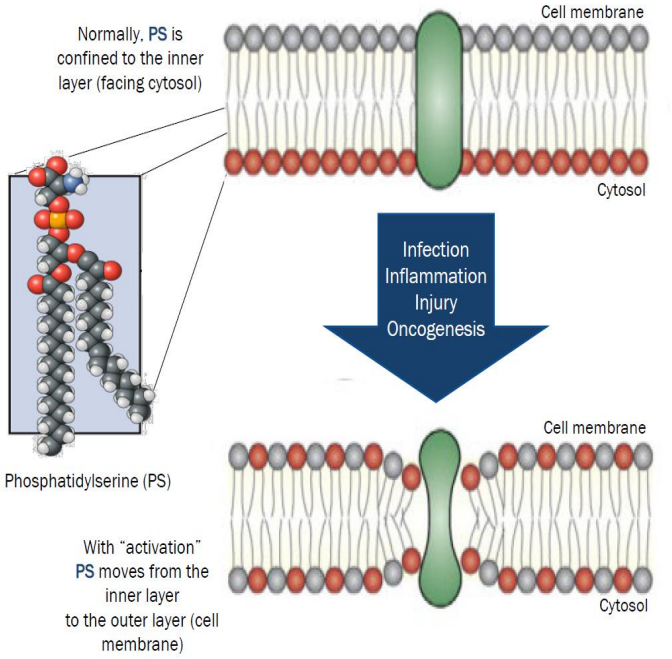
LNC Structure



Delivery of various APIs

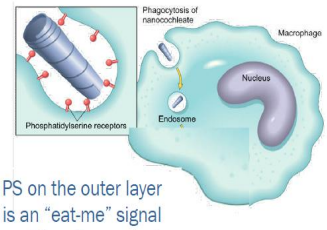
- Small molecules
- Proteins / peptides
- siRNA
- ASOs
- DNA

Phosphatidylserine Enables Intracellular Delivery

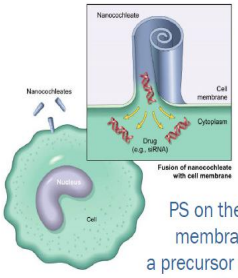


LNCs achieve effective intracellular delivery via BOTH phagocytosis and fusion.

LNC Delivery



PS on the outer layer is an "eat-me" signal enabling phagocytosis



PS on the outer cell membrane is also a precursor for cell-to-cell fusion

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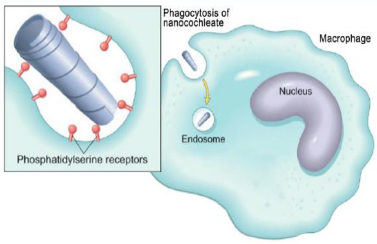
With Uptake via both Phagocytosis and Fusion, LNCs Potentially Target a Wide Array of Cells & Tissues

PHAGOCYTOSIS

Initiated by binding of PS to PS receptors

Macrophages readily engulf LNCs and their cargo into vesicles (endosomes)



✓ DOCUMENTED UPTAKE

PROFESSIONAL PHAGOCYTES

- ✓ Macrophages / monocytes
  - Neutrophils, dendritic cells

NON-PROFESSIONAL PHAGOCYTES

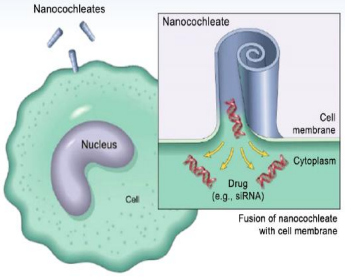
- ✓ Fibroblasts, epithelial cells, endothelial cells

LNC uptake mimics the uptake of enveloped viruses

FUSION

Initiated by expression of PS on the surface of cells

LNCs can fuse with cell membranes and deliver cargo molecules directly to the cytoplasm



INJURED CELLS

- ✓ Infection
- ✓ Inflammation
  - Axonal repair
  - [Other Damage]

- ✓ TUMOR CELLS
- ✓ HUMAN T CELLS
- ✓ OTHER ACTIVELY DIVIDING CELLS (including external pathogens)

PS=phosphatidylserine

MATINAS BIOPHARMA

Unlocking the Full Potential of the LNC Platform

Matinas is working internally and with third parties to push the boundaries of LNC delivery

Past

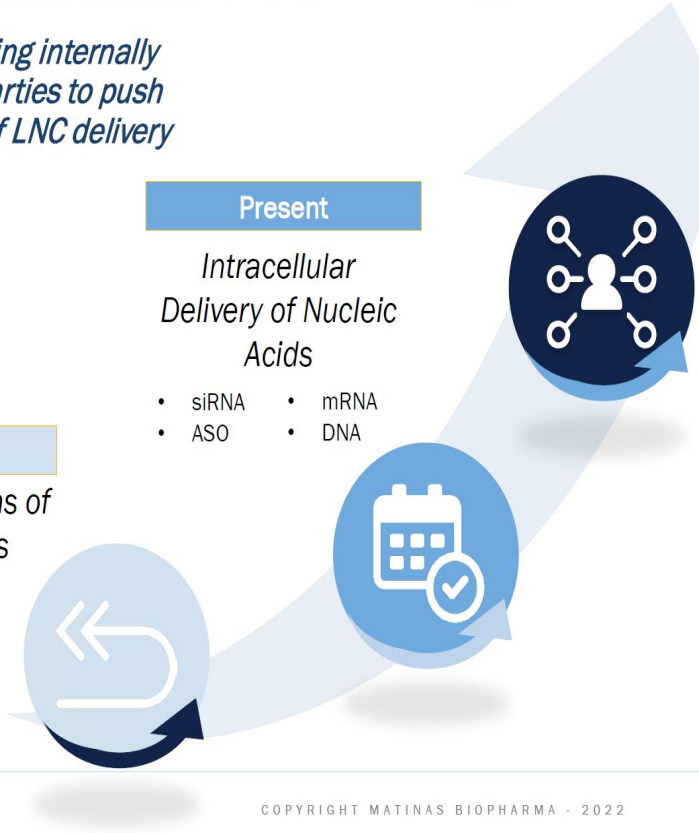
Oral Formulations of Anti-Infectives

- MAT2203
- MAT2501

Present

Intracellular Delivery of Nucleic Acids

- siRNA
- ASO
- mRNA
- DNA



Future

Broad Therapeutic Applications

Infection
- Anti-infectives
- Antivirals

Immune Rx
- Vaccines
- Immune tolerance

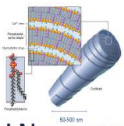
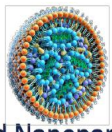
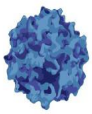
Pulmonary
- Acute/chronic respiratory diseases

Oncology
- Hematologic & solid tumor malignancies

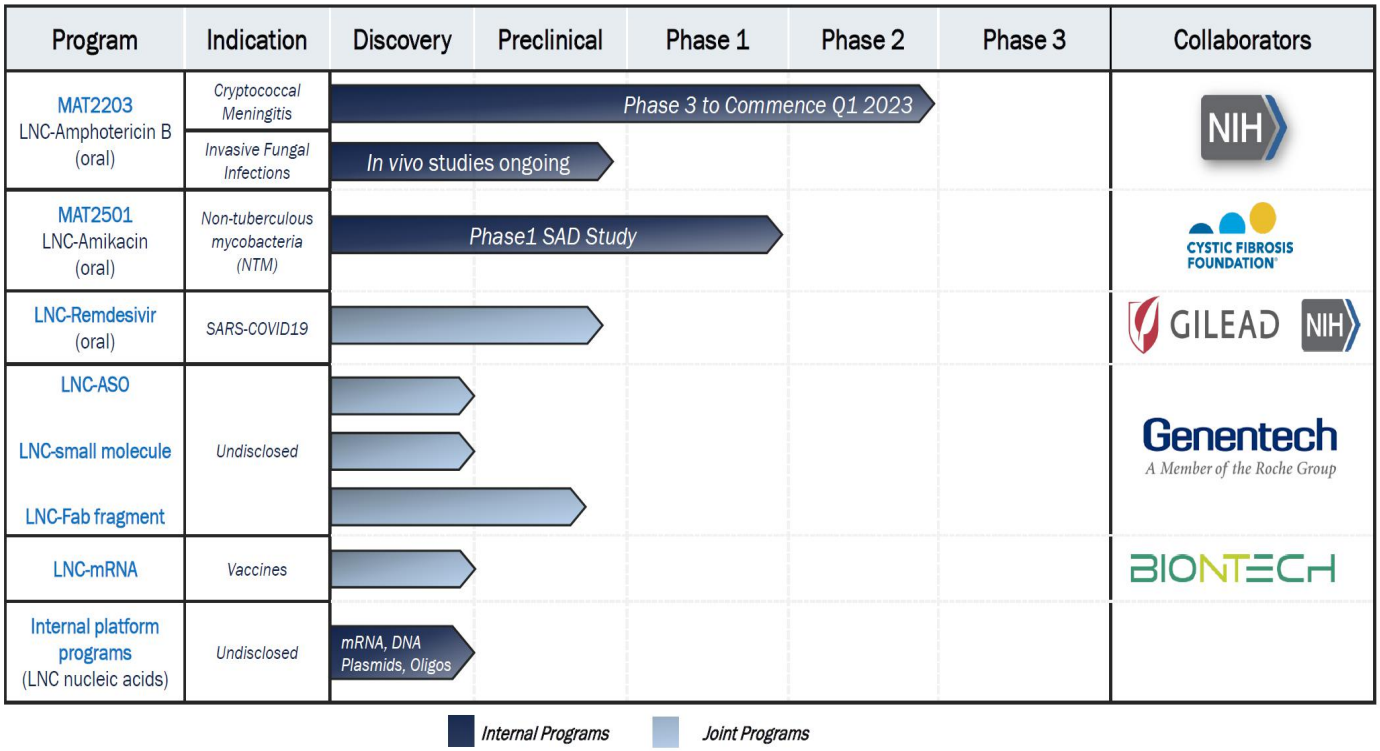
Inflammation
- Neuro-inflammatory diseases
- Autoimmune diseases
- Acute/chronic Inflammatory diseases

Fibrosis
- Organ fibrosis
- Wound healing

LNCs: The Next Generation of Intracellular Nucleic Acid Delivery

	 Lipid Nanocrystals (LNCs)	 Lipid Nanoparticle (LNP)	 Adeno-Associated Virus (AAV)
Oral Dosing	✓ 2 Proven Assets	✗ Not Orally Available	✗ Not Orally Available
Targeting	✓ Phagocytes & activated cells	✗ RES, spleen, liver uptake	✗ Local delivery to eye and CNS
Payload size	✓ > 11 kb genomes	✓ No practical limits	✗ < 5 kb genomes
Safety / Redosing	✓ Non-immunogenic platform	✗ Anti-PEG allergy can limit redosing	✗ Genome integration; limited redosing
Stability	✓ mRNA stable for 4 months at room temp.	✗ Cold chain with limited shelf life	✗ Cold chain required

Matinas' Pipeline and Discovery Programs: Internal and Collaborative



MAT2203

ORAL AMPHOTERICIN B

Phase 3 to Commence Q1 2023

MATINAS BIOPHARMA

MAT2203: Unmet Medical Need in Invasive Fungal Infections

MAT2203 is a promising potential therapeutic option
for the treatment of multiple serious and life-threatening fungal infections

MAT2203: A Novel Approach with a Proven Therapeutic Agent

MAT2203

Oral amphotericin B formulation utilizing LNCs

Initial indication in cryptococcal meningitis

Efficient intracellular delivery to immune cells and delivery directly to infected tissues

IMPROVED PROFILE

LNC formulation enables oral administration, bioavailability and **improved nephrotoxicity** over IV amphotericin

Demonstrated ability to **cross the blood-brain barrier (BBB)** with an oral therapy

POTENTIAL CLINICAL IMPACT

Potential to **expand the use of amphotericin B** beyond treatment of CM to other invasive infections and prophylaxis for immunocompromised (IC) patients

Orphan Drug Designation (ODD) + 4 Qualified Infectious Disease (QIDP) and Fast Track Designation

Cryptococcal Meningitis Is a Severe Fungal Infection with High Mortality

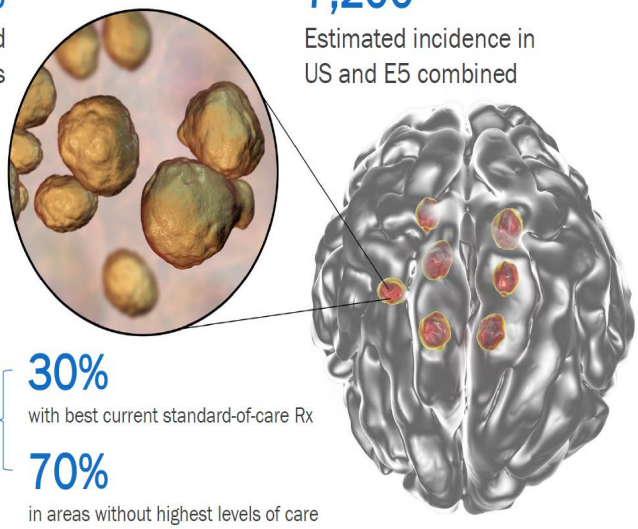
Deadly invasive fungal infection of the brain

Typically affects immunocompromised individuals

10-20%
of all HIV-related deaths

180,000
deaths per year worldwide

7,200
Estimated incidence in US and E5 combined



Mortality VERY HIGH

30%
with best current standard-of-care Rx

70%
in areas without highest levels of care

TREATMENT ALGORITHM

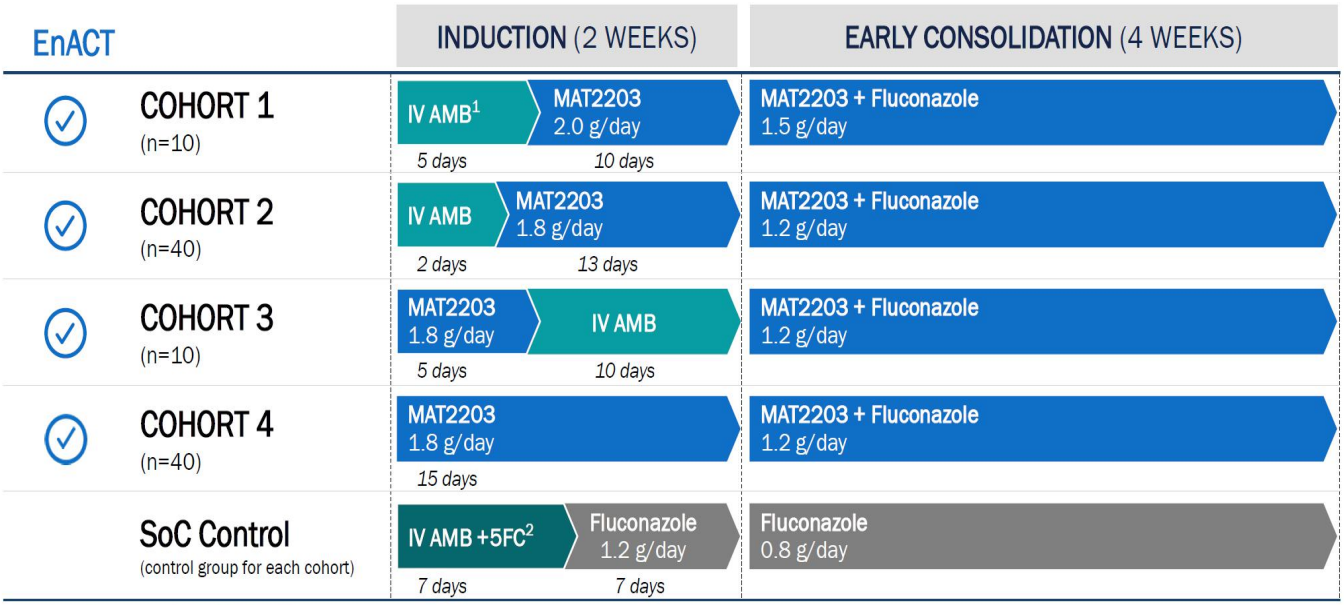
Induction:
IV amphotericin B (either liposomal Ambisome™ or Amphotericin B deoxycholate) + flucytosine (5FC) for 1-2 weeks

Consolidation:
fluconazole for 8-12 weeks

MAJOR CHALLENGES

- High mortality
- Complex, resource-intense regimens requiring daily administration of IV amphotericin B
- Treatment-associated renal toxicity limits options

MAT2203: EnACT, a Successful Phase 2 Study



- **Enrollment COMPLETE**
  56/56 patients; follow-up ongoing

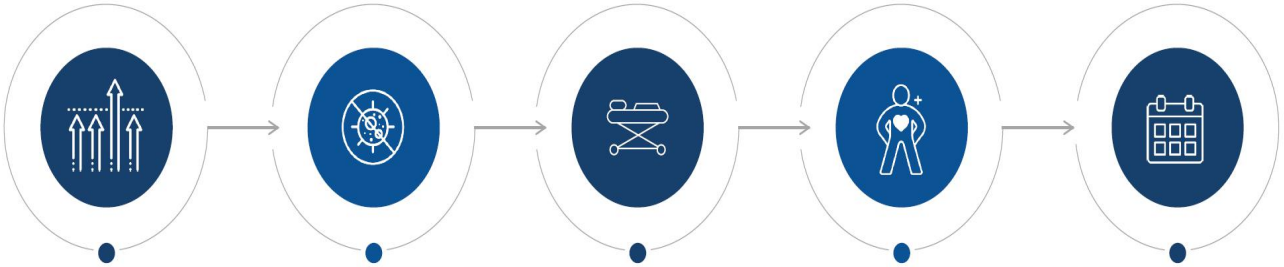
PRIMARY ENDPOINT:
Early Fungicidal Activity (EFA) > 0.20

KEY SECONDARY ENDPOINTS:
Sterilization of CSF cultures,
Prevention of relapse (no breakthroughs),
Survival at 18 weeks, and Demonstrated safety

1. IV AMB = intravenous amphotericin B
2. Flucytosine

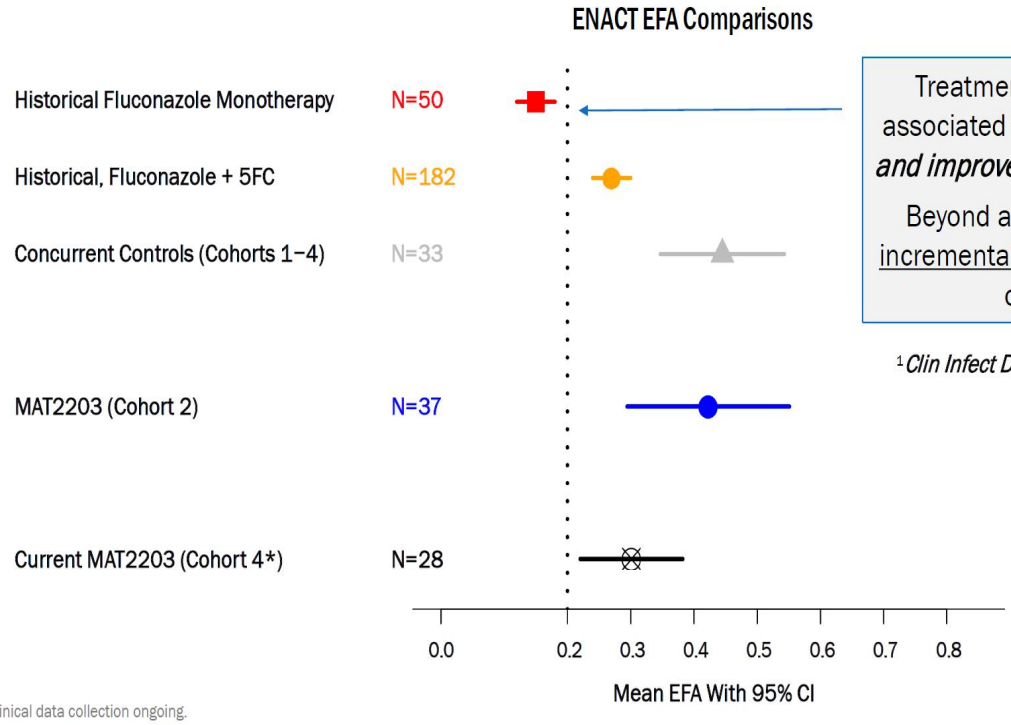
EnACT : Cohort 2 Results (Phase 3 Design Replicates Cohort 2)

EnACT Clinical Data Validates the Use of the LNC Platform to Enable Oral Administration and Overcome Toxicity



Exceeded the primary endpoint threshold	All patients completing induction achieved CSF sterility	No breakthrough Infections	"Early Survival" at Day 30	MAT2203 was safe and well-tolerated over 6 weeks of treatment
▪ EFA for MAT2203 was 0.42 (95% CI 0.29 to 0.55)	▪ 97% for patients receiving MAT2203 ▪ 76% for patients receiving SOC	▪ Over 10 weeks, no patients showed breakthrough infections post MAT2203 treatment	▪ 98% for patients receiving MAT2203 ▪ 88% for patients receiving IV Ampho (SOC)	▪ Repeat dosing showed no renal toxicity or electrolyte abnormalities ▪ No discontinuations due to AEs nor MAT2203-related SAEs

CSF Early Fungicidal Activity log_{10} CFU /mL CSF/day



Treatment EFAs > *0.2* are associated with ***lower mortality and improved clinical outcomes***.

Beyond a *0.2* threshold, no incremental benefits have been observed.[1]

[1] ***Clin Infect Dis.*** 2020;71(5):e45-49

* Interim data, clinical data collection ongoing.

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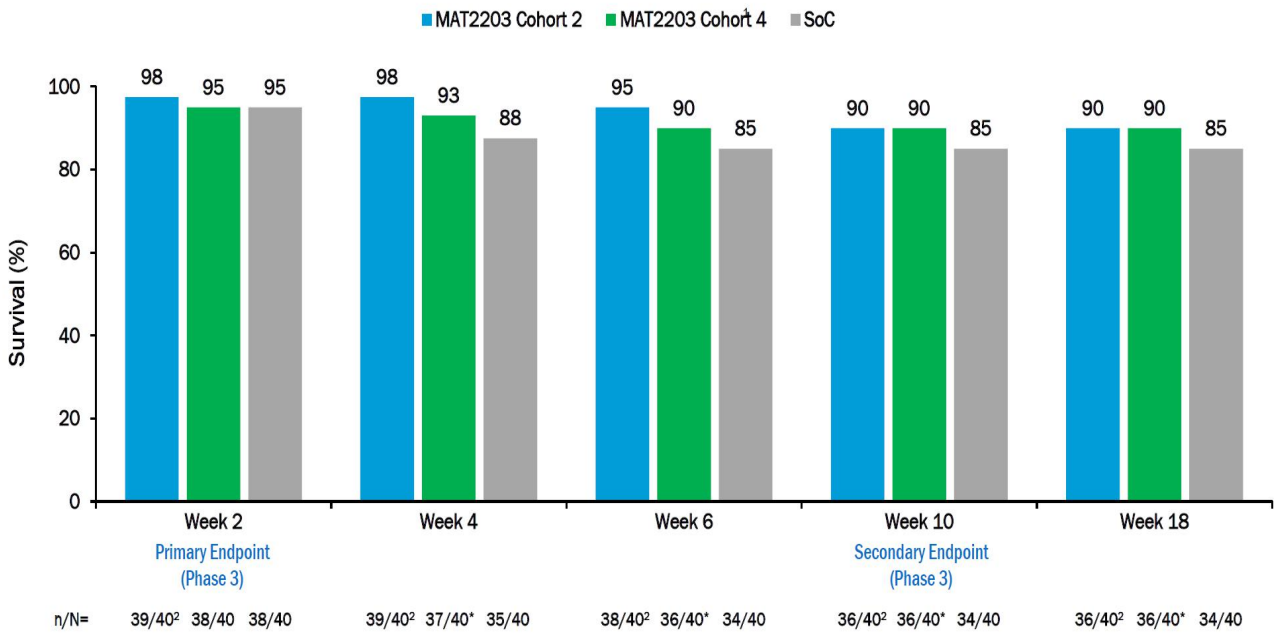
Cohort 2 and Cohort 4 Key Secondary Efficacy Endpoint: Survival

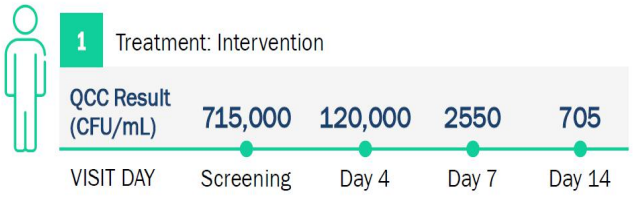


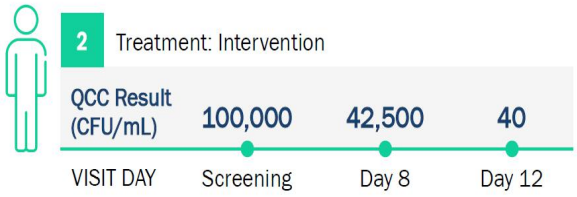
1. Combined SoC Cohorts 1 through 4.
2. Patient 110554 died on Day 2 while on IV AMB and did not receive a full daily dose on MAT2203.

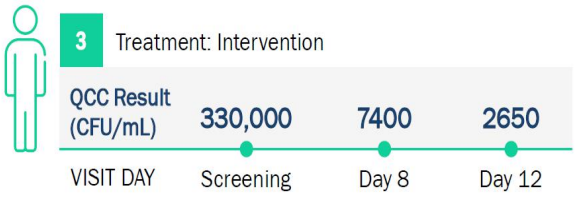
* Interim data, clinical data collection ongoing

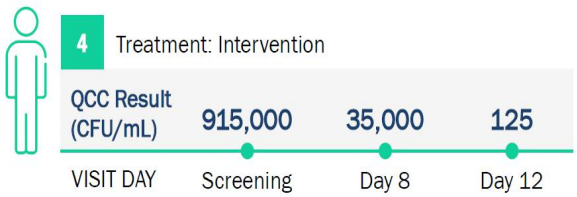
Abbreviations: SoC=standard of care.

Cohort 4 Examples of Noteworthy Antifungal Activity in Patients with High Baseline Counts









EnACT Cohorts 2 and 4 Summary

MAT2203 EnACT Phase 2 Trial

Cohorts 2 and 4 EXCEEDED primary endpoint threshold

- Potent antifungal activity (EFAs>0.20) when administered as part of a step-down and all-oral treatment regimen for cryptococcal meningitis through 6 Weeks of treatment

Positive impact on overall survival at all timepoints

- 90%+ survival across cohorts
- Key endpoint for the upcoming Phase 3 registration trial

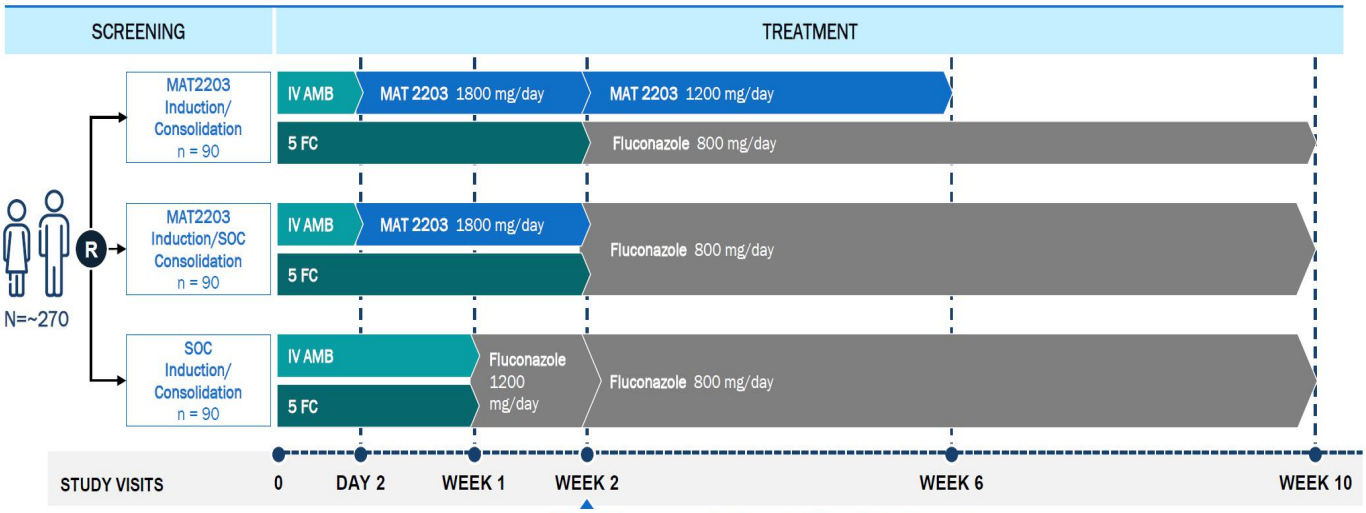
Favorable safety and tolerability data support longer-term use of MAT2203 with no evidence of renal toxicity seen with 6 weeks of oral MAT2203 treatment

- Supports ability to treat with an AmB product for longer treatment duration than has been feasible to date

- Data provide confidence for Phase 3 program in Cryptococcal Meningitis
- Data provide additional evidence to potentially support the use of this safe and targeted delivery of AMB for the treatment of other severe and life threatening invasive fungal infections such as mucormycosis and aspergillosis which require longer-term antifungal treatment

Phase III Pivotal Study Design – To Initiate Q1 2023

Assess MAT2203 as step-down therapy after 2 days of IV AMB for the Treatment of Cryptococcal Meningitis
Validate results observed in EnACT
Randomized 1:1:1 ratio to 1 of 2 MAT2203 arms or SoC



- ~270 participants
- 4 sites in Uganda
- Study Initiation Q1 2023
- NDA Filing H1 2025

PRIMARY ENDPOINT:
All-cause mortality at 2 weeks

Key Secondary Efficacy Endpoint:
Survival time through 10 weeks without *Cryptococcus* culture-positive relapse of meningitis

Other Secondary Endpoints include:
- Incidence of Grade 3-5 lab AEs
- Rate of CSF Cryptococcus clearance (EFA)
- CSF culture sterility (cumulative incidence over 10 weeks)
- 10-week survival time
- Use of rescue/additional IV AMB beyond scheduled use

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Value Proposition for MAT2203

Oral Administration
enables earlier release
from hospital or avoidance
of home infusion

+

Lack of Nephrotoxicity
enables longer treatment duration
supported by oral
administration

LIFE CYCLE MANAGEMENT

Overall Development Strategy:

Cryptococcal meningitis is a gateway indication, with plans to secure multiple orphan indications including IFI and prophylaxis

IFI Phase 3 study start projected for 2H 2023

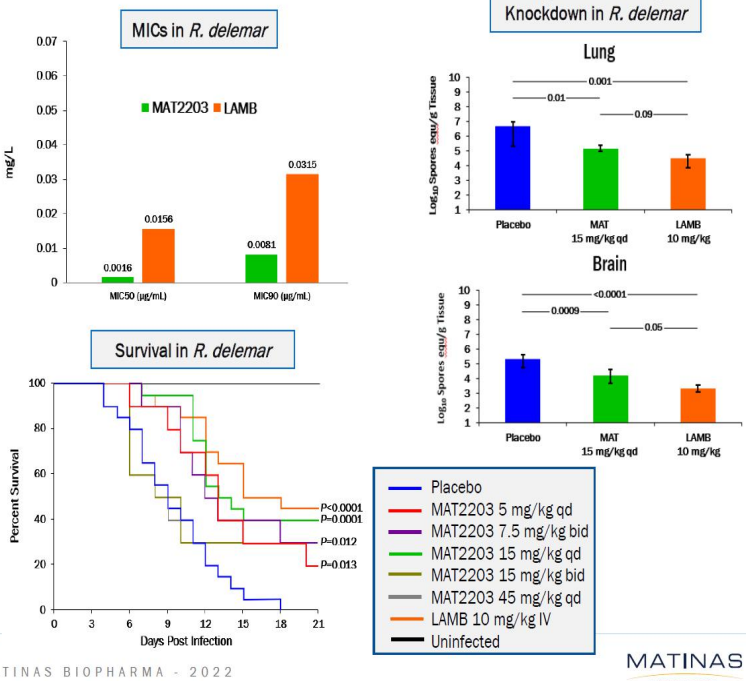
MAT2203: Potential for Treating Mucormycosis

Mucormycosis (Black Fungus)

A life-threatening infection commonly caused by Rhizopus species, seen in immunocompromised patients, with mortality rates >50% to 100%

Current Approved Rx
- Amphotericin B
- Isavuconazole

- MAT2203 demonstrated *in vitro* killing activity ***5-10-fold higher than AmBisome®*** against two clinical isolates of *R. delemar* and *M. circinelloides* activity
- MAT2203 demonstrated *in vivo* efficacy in treating *R. delemar* or *M. circinelloides* pulmonary infection in immunosuppressed mice
  - Prolonged median survival time
  - Enhanced overall survival
  - Reduced tissue fungal burden of target organs
- *In vivo* efficacy of MAT2203 was equivalent to the efficacy shown by the current standard of care (AmBisome®)



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MAT2203: Addressing a $550M+ Market with Active Regional and Global Pharma

- Cryptococcal Meningitis
- Invasive fungal infections
- Prophylaxis in IC patients

Comparable Deals

CIDARA THERAPEUTICS / mundipharma — *September 2019*

Cidara licenses ex-US / ex-Japan rights of rezafungin to Mundipharma

Upfront: $30M w/ $9M equity
Milestones: Co-development funding

Total Deal Value: Potentially $568M+

SCYNEXIS / HANSOH PHARMA — *February 2022*

Scynexis licenses Greater China rights of Ibrexafungorpis to Hansoh

Upfront: $10M
Milestones: $112M in regulatory / commercial milestones, plus royalties

Total Deal Value: $122M

F2G / SHIONOGI — *May 2022*

F2G licenses Asia & Europe rights of olorofim to Shionogi

Upfront: $100M
Milestones: $380M in regulatory / commercial milestones, plus royalties and shared dev. costs

Total Deal Value: $480M

CIDARA THERAPEUTICS / melinta therapeutics — *July 2022*

Cidara licenses US rights of rezafungin to Melinta

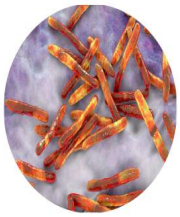
Upfront: $30M
Milestones: $60M in regulatory, $370M in commercial, plus royalties

Total Deal Value: $480M

MAT2501

& ONGOING PARTNERSHIP PROGRAMS

MAT2501: NTM Program Overview and SAD Topline Results



- NTM organisms are a frequent cause of challenging pulmonary infections, especially in patients with pre-existing inflammatory lung diseases such as cystic fibrosis
- LNC formulation enables oral administration, bioavailability and potentially eliminates oto-& nephron-toxicity, both of which are significant risks with the current standard of care, IV amikacin

Single Ascending Dose (SAD) PK Study Topline Results

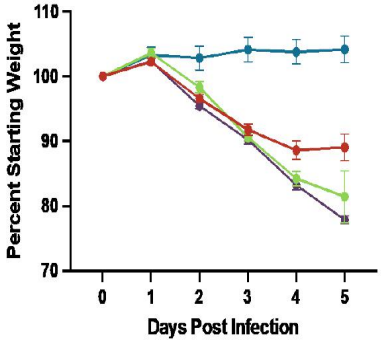
QIDP & ODD potentially provide 12+ years exclusivity upon approval

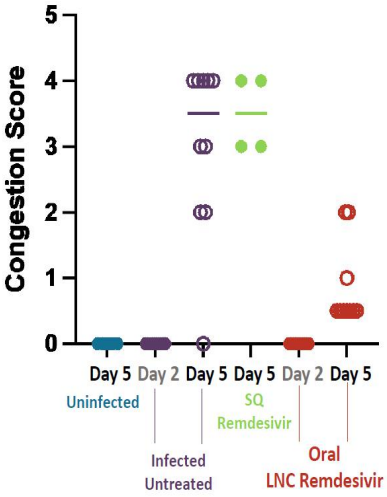
Accelerated with $4.5M Cystic Fibrosis Foundation award

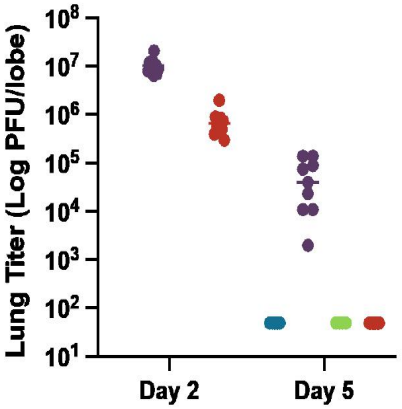
- Results confirmed earlier findings with legacy formulation at the same doses (200, 400, 800) with an additional higher dose (1000 mg; fasted/fed) tested in this study
- No SAEs or study discontinuations (only dose-related adverse event was diarrhea (mild to moderate))
- No evidence of ototoxicity or renal toxicity
- Rapid absorption with oral administration (T_{max} 2 hours)
- Dose-proportional increases in exposure
- Exposure significantly lower compared with IV administered amikacin, expected to translate to better safety profile

LNC-remdesivir: *In vivo* Assessment of Efficacy Against SARS-CoV-2

In mice infected with SARS-CoV-2, oral LNC-Remdesivir reduced viral lung titers (beginning on Day 2), improved congestion scores, and mitigated weight loss





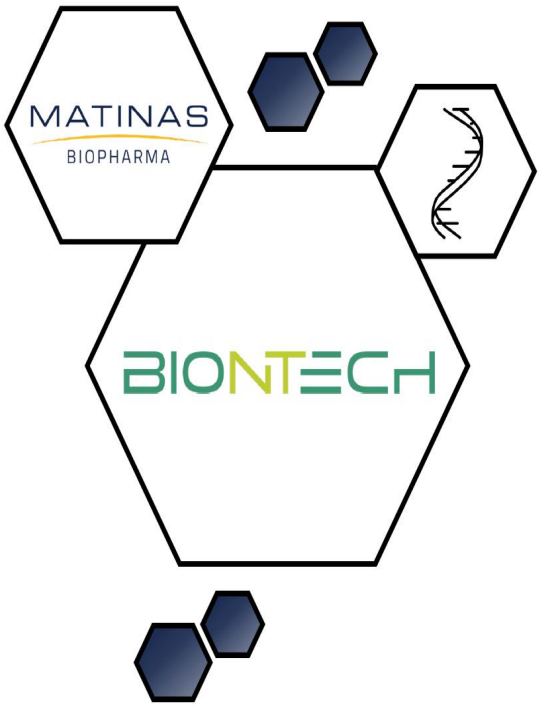


- Uninfected Control
- Infected, Untreated Control
- SQ Remdesivir 25 mg/kg BID
- Oral LNC-Remdesivir 30 mg/kg BID

LNC-mRNA: Exclusive Research Collaboration with BioNTech

Focused on mRNA and certain other nucleic acids

- $2.75 million upfront exclusive access fee plus research funding
- Ongoing license agreement negotiations
- BioNTech's mRNA vaccine development expertise combined with Matinas' LNC delivery platform
- Builds on Matinas' extensive prior preclinical *in-vitro* vaccine work with LNC formulations of proteins, peptides and DNA plasmids
  - Oral bioavailability and enhanced stability
  - Non-immunogenic transfection
  - Able to elicit strong humoral and cellular immunity



Expanding LNC Intellectual Property Portfolio

Continuingly increasing our patent suite to increase protection and exclusivity

MAT2203 & 2501 potentially entitled to 12+ years of exclusivity (QIDP & ODD status)

Global Platform IP base protection out to 2037 with 20 patents issued in last 5 years

Experienced Leadership Team

Executive Team

Jerome D. Jabbour, J.D.
Chief Executive Officer

Thomas J. Hoover, MBA
Chief Business Officer

Theresa Matkovits, Ph.D.
Chief Development Officer

James J. Ferguson, M.D.
Chief Medical Officer

Keith A. Kucinski, CPA, MBA
Chief Financial Officer

Hui Liu, Ph.D., MBA
Chief Technology Officer

Raphael J. Mannino, Ph.D.
Chief Scientific Officer

Board of Directors

Eric J. Ende, MD, MBA
Chairman of the Board

Herbert Conrad
Director

James. S. Scibetta
Director

Kathryn P. Corzo
Director

Natasha Giordano
Director

Matthew A. Wikler, MD, MBA
Director

Jerome D. Jabbour, J.D.
CEO

Matinas Has Executed on Multiple Milestones..... With More to Come

	1H 2022 Milestones & Catalysts	2H 2022 and Beyond Milestones & Catalysts
MAT2203	☑ FDA approval on Phase 3 of EnACT ☑ Initiate preclinical studies in *C. auris* and *mucormycosis* ☑ Data available from Phase 1 SAD study in healthy volunteers	☑ Feedback from EMA (ODD and Scientific Advice) ☑ PoC data from preclinical studies in *mucormycosis* ☑ Interim topline data from Cohort 4 of EnACT (all oral regimen) October 2022 Initiate Phase 3 confirmatory study for treatment of CM (Q1 2023) Potential Global or Regional Commercialization partner
LNC Platform & Collaborations	☑ Initiate & receive data from 2nd *in vivo* study of oral LNC-RDV (sponsored by NIAID/Gilead ☑ *In vivo* & *in-vitro* studies with mRNA, DNA, oligonucleotides ☑ Nucleic acid research collaboration with large pharma	Potential BioNTech License Agreement & expansion of established research collaboration Potential additional platform collaborations

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