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Matinas BioPharma Announces Positive Data in the Ongoing EnACT Trial of MAT2203 (Oral Amphotericin B) for the Treatment of Cryptococcal Meningitis, Exceeding the Prespecified Primary Endpoint Threshold

– Step-down therapy with MAT2203 achieved effective clearance of fungal organisms; Mean Early Fungicidal Activity (EFA) was 0.38, exceeding the prespecified primary endpoint threshold target of >0.20 –

– Overall survival was >95% in 40 patients receiving MAT2203 in Cohort 2 –

– All 39 patients completing induction with MAT2203 achieved sterility, with no evidence of breakthrough or recurrent infections during the first 10 weeks of antifungal treatment –

– Patients received MAT2203 for up to 6 weeks without kidney toxicity or electrolyte abnormalities attributable to MAT2203 –

– DSMB unanimously recommends progression to Cohort 3; Enrollment has commenced –

– Preparing to engage with FDA to review EnACT data as supportive of potential early approval of MAT2203 as step-down therapy –

– Management to host conference call today, Monday, September 13th, at 8:00 a.m. ET –

BEDMINSTER, N.J., Sept. 13, 2021 (GLOBE NEWSWIRE) -- Matinas BioPharma Holdings, Inc. (NYSE AMER: MTNB), a clinical-stage biopharmaceutical company focused on improving the intracellular delivery of critical therapeutics through its paradigm-changing lipid nanocrystal (LNC) platform delivery technology, today announced positive efficacy and safety data from the first two cohorts of patients in the ongoing Encochleated Oral Amphotericin for Cryptococcal Meningitis Trial (EnACT) of MAT2203 (oral amphotericin B) for the treatment of cryptococcal meningitis, which is being sponsored by the National Institute of Allergy and Infectious Diseases (NIAID).

The EnACT independent Data and Safety Monitoring Board (DSMB) recently completed a pre-specified review of available safety and efficacy data from Cohort 2 (stepdown to MAT2203 after two days of IV amphotericin) and unanimously recommended progression to the second half of the study. Enrollment in Cohort 3 of EnACT (the safety lead-in for Cohort

4, which will be an all-oral MAT2203 treatment regimen) has commenced and is expected to complete by the end of 2021.

“These results are a major milestone for Matinas, MAT2203 and our LNC platform delivery technology,” stated Jerome D. Jabbour, Chief Executive Officer of Matinas. “These data are a clear demonstration of how our LNC platform can have a meaningful clinical impact in a deadly disease, and a validation of how this technology can be used to overcome significant drug delivery challenges, including oral delivery of highly toxic drugs across the blood-brain barrier. The global invasive fungal infection market is projected to be more than $8 billion by 2025, and we believe an oral and well tolerated amphotericin B, which preserves the well-established efficacy of this potent drug, if approved, could be poised to capture a meaningful portion of this growing market, and fill a currently large unmet medical need. Finally, we believe these data are supportive of the enormous potential for our LNC platform delivery technology and a key for potential partners and collaborators who are currently evaluating MAT2203 and broader applications of the LNC platform to antivirals, vaccines, and nucleic acid polymers, such as mRNA.”

Topline Results from Cohort 2 of EnACT

Key topline results from Cohort 2 of EnACT include eradication of the fungal infection, survival, and safety, including longer term use of MAT2203 beyond the 2-week induction period.

Potent Early Fungicidal Activity (EFA), Cerebrospinal Fluid (CSF) Sterilization, with No Evidence of Breakthrough Infections During Treatment with MAT2203

- The primary endpoint in EnACT is EFA, a measurement of cerebrospinal fluid fungal clearance. EFA is a well-validated quantitative measure of the efficacy of antifungal agents and is a key surrogate marker for survival. EFAs of less than 0.20 $\log_{10}$ Cryptococcus colony forming units (CFUs) per mL CSF per day are associated with significantly higher mortality and worse clinical outcomes[1]. EFA measured above this threshold is clinically meaningful and represents robust fungal clearance. In the second cohort of EnACT, the mean EFA achieved with patients treated with MAT2203 was 0.38 $\log_{10}$ CFU/mL/day, with 95% confidence intervals (0.30 to 0.46) significantly higher than the prespecified primary endpoint threshold of >0.20.

- All patients treated with MAT2203 who completed the induction phase achieved sterile CSF cultures during treatment (either during induction or early consolidation phases).

- There was no evidence of breakthrough or relapsed cryptococcal infections observed in any of the patients during treatment with MAT2203 through 10 weeks.

Survival

- In Cohort 2, overall survival was 95% in 40 patients randomized to receiving MAT2203.

Safety

- In both Cohorts 1 and 2, MAT2203 showed no evidence of renal toxicity or electrolyte abnormalities attributable to MAT2203, no major safety signals, and no use-limiting

tolerability issues, even with longer-term treatment with MAT2203 extended beyond induction into the consolidation phase, from week 2 to week 6.

“We believe that the positive data from the first half of the EnACT study represent a groundbreaking achievement in the early step-down treatment of cryptococcal meningitis with the use of an oral formulation of amphotericin and we are preparing to engage with the U.S. Food and Drug Administration (FDA) to review these data as supportive of a potential early approval of MAT2203 as step-down therapy,” commented Dr. Theresa Matkovits, Chief Development Officer of Matinas. “When viewed against historical measures of survival and eradication of fungal burden and from the standpoint of safety, MAT2203 exceeded expectations. These data also set the stage for potential longer-term treatment options, including prophylaxis, for patients dealing with, or at risk for, deadly invasive fungal infections without the toxicities usually associated with IV amphotericin. We are pleased to move forward to the next part of the EnACT trial and remain grateful to the patients, the principal investigators, and the dedicated study team at the University of Minnesota and in Uganda for their commitment to this important clinical trial.”

“Overall, using only two days of intravenous amphotericin B followed by rapid transition to oral LNC amphotericin B therapy was well tolerated, resulted in excellent CSF clearance of the Cryptococcus yeast, and had a 95% survival to date, which exceeds our expectations,” said David R. Boulware, M.D., MPH, Professor of Medicine, University of Minnesota Medical School, and co-principal investigator of the EnACT trial. “We are excited to continue to the next stage of the EnACT trial, testing if oral therapy alone is efficacious.”

About the EnACT Study

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

The EnACT trial includes a total of four cohorts of patients, with the first two cohorts testing MAT2203 as early stepdown therapy following initial treatment with IV amphotericin B during the induction period, and the second two cohorts testing MAT2203 as potential monotherapy. 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.

All patients in the induction period of EnACT (both control and MAT2203 arms) receive background therapy of flucytosine, also known as 5-FC, which is specifically recommended to be used with amphotericin B as standard-of-care treatment during induction in patients with CM. During the consolidation/maintenance period, all patients (both control and MAT2203 arms) receive 800 mg/day of fluconazole. An independent DSMB oversees the safety of the study and reviews all available data from each cohort for both safety and efficacy and makes a recommendation on whether to proceed to the next cohort of patients.

In the MAT2203 arm of Cohort 1, 10 patients received IV amphotericin B (with 5-FC) for the first five days of induction, followed by ten days (overlapped on day 5) of oral MAT2203 (with 5-FC). In the MAT2203 arm of Cohort 2, 40 patients first received IV amphotericin B (with 5-

FC) for two days, followed by thirteen days (overlapped on Day 2) of oral MAT2203 (with 5-FC). In both Cohorts 1 and 2, treatment with MAT2203 was continued after induction during the next four weeks of consolidation/maintenance treatment, administered with 800 mg/day of fluconazole.

In the MAT2203 arm of Cohort 3, 10 patients will receive 5 days of oral MAT2203 (with 5-FC), followed by 10 days (overlapped on Day 5) of IV amphotericin (with 5-FC). In the MAT2203 arm of Cohort 4, 40 patients will receive MAT2203 (with 5-FC) for the entire 14-day induction period. In both Cohorts 3 and 4, treatment with MAT2203 will continue after induction during the next four weeks of consolidation/maintenance treatment, administered alongside 800 mg/day of fluconazole.

The primary efficacy endpoint for EnACT is the quantitative microbiologic clearance rate of Cryptococcus yeasts from CSF, termed Early Fungicidal Activity (EFA). This is a quantitative measurement of the efficacy of antifungal agents as well as a key surrogate marker for survival. The primary EFA endpoint is measured from the first CSF culture with 3-4 repeated cultures obtained over the first two weeks of treatment. The prespecified endpoint threshold was achieving EFA >0.20 $\log_{10}$ CFU/mL/day, recognizing that EFAs of less than 0.20 are strongly associated with significantly higher mortality and worse clinical outcomes.

Standard of care active control HIV patients with cryptococcal meningitis (a total of 40 across all 4 cohorts) are included in EnACT, primarily to assess patient safety. The control arms for Cohorts 1 and 2 included 4 and 17 patients, respectively, and we expect that the control arms for Cohorts 3 and 4 will include 4 patients and 16 patients, respectively. In the control arms, patients receive IV amphotericin (with 5-FC) for 7 days, followed by a high dose of oral fluconazole for 7 days (to complete the 14-day induction period), and then transition to 800 mg/day of fluconazole for the 4-week consolidation phase. Either amphotericin B deoxycholate or liposomal amphotericin B (Ambisome®) can be used in the control arm. EnACT was not powered to formally test comparisons with the control arm standard of care.

The 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 has granted orphan drug designation to MAT2203 for the treatment of cryptococcosis.

Conference Call and Webcast Details

The Company will host a live conference call and webcast to discuss these results today, Monday, September 13, 2021, at 8:00 a.m. ET. Presentation slides will be available on the Investors section of Matinas' website, www.matinasbiopharma.com. A question-and-answer session with the Matinas management team will follow the Company's remarks.

To participate in the call, please dial (877) 407-5976 (Toll-Free) or (412) 902-0031 (Toll) and reference conference ID 13722251. The live webcast will be accessible on the Investors section of Matinas' website, www.matinasbiopharma.com, and archived for 90 days.

About Matinas BioPharma

Matinas BioPharma is a biopharmaceutical company focused on improving the intracellular

delivery of critical therapeutics through its paradigm-changing lipid nanocrystal (LNC) delivery platform. The Company is developing its own internal portfolio of products as well as partnering with leading pharmaceutical companies to develop new formulations that take full advantage of the unique characteristics of the LNC platform.

Preclinical and clinical data have demonstrated that this novel technology can provide solutions to many of the complex 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 in both the formulation and route of administration (including oral), position Matinas' LNC technology to potentially become the preferred next-generation intracellular drug delivery vehicle and an important improvement over both lipid nanoparticles and viral vectors.

MAT2203 is an oral, LNC formulation of the highly effective, but also highly toxic, antifungal medicine amphotericin B, primarily used as a first-line treatment for invasive fungal infections. MAT2203 is currently in a Phase 2 open-label, sequential cohort study (EnACT) in HIV-infected patients with cryptococcal meningitis. EnACT has completed the first two patient cohorts. Enrollment in Cohort 3 has commenced following unanimous DSMB approval, with enrollment completion for Cohort 3 expected by the end of 2021.

MAT2501 is an oral, LNC formulation of the broad-spectrum aminoglycoside antibiotic amikacin, primarily used to treat chronic and acute bacterial infections. With the support of the Cystic Fibrosis Foundation, MAT2501 is currently undergoing important preclinical studies and expects to enter a Phase 1 human clinical trial later in 2021. MAT2501 would be the first and only oral aminoglycoside and is being positioned with an initial indication for the treatment of nontuberculous mycobacterial (NTM) lung disease, including infections in patients with cystic fibrosis (CF).

LYPDISO™, is a prescription-only omega-3 fatty acid-based composition, comprised primarily of EPA and DPA, intended for the treatment of cardiovascular and metabolic conditions. This next-generation omega-3 therapy has been shown in two head-to-head studies to provide effective triglyceride-lowering and significantly higher EPA blood levels than Vascepa®. The Company has initiated a process to identity and potentially secure a partner to continue development of LYPDISO.

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 the LNC platform delivery technology, the Company's strategic focus 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.

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Source: Matinas BioPharma Holdings, Inc.

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

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