

PROSPECTUS SUPPLEMENT
(To Prospectus Dated August 23, 2023)

Up to \$7,000,000 Common Stock



MAIA Biotechnology, Inc.

We have entered into an ATM Sales Agreement (the “Sales Agreement”) with ThinkEquity LLC (“ThinkEquity” or “Sales Agent”), relating to the sale of our common stock, par value \$0.0001 per share, offered by this prospectus supplement. In accordance with the terms of the Sales Agreement, we may offer and sell shares of our common stock having an aggregate offering price of up to \$7,000,000 from time to time through ThinkEquity acting as Sales Agent.

Sales of our common stock, if any, under this prospectus supplement and the accompanying base prospectus will be made in sales deemed to be “at the market” offerings as defined in Rule 415 under the Securities Act of 1933, as amended (the “Securities Act”), including sales made directly on or through NYSE American LLC (the “NYSE American”), the existing trading market for our common stock, sales made to or through a market maker other than on an exchange or otherwise, in negotiated transactions at market prices prevailing at the time of sale or at prices related to such prevailing market prices and/or any other method permitted by law, including in privately negotiated transactions. ThinkEquity will use its commercially reasonable efforts to sell on our behalf all the shares of common stock requested to be sold by us, consistent with its normal trading and sales practices, on mutually agreed terms between ThinkEquity and us. There is no arrangement for funds to be received in any escrow, trust or similar arrangement. We provide more information about how the shares of common stock will be sold in the section entitled “Plan of Distribution.”

ThinkEquity will be entitled to compensation at a fixed commission rate of 3.0% of the gross proceeds of each sale of shares of our common stock. In connection with the sale of shares of our common stock on our behalf, ThinkEquity will be deemed to be an “underwriter” within the meaning of the Securities Act and the compensation of ThinkEquity will be deemed to be underwriting commissions or discounts. We have also agreed to provide indemnification and contribution to ThinkEquity with respect to certain liabilities, including liabilities under the Securities Act and the Exchange Act.

Our common stock is traded on NYSE American under the symbol “MAIA.” On August 30, 2023, the last reported sale price of our common stock was \$1.83 per share.

As of the date of this prospectus supplement, the aggregate market value of our common stock held by non-affiliates of our public float was \$23,021,744.31 based on a total number of 13,680,925 shares of common stock outstanding, of which 9,552,591 shares of common stock were held by non-affiliates, at a price of \$2.41 per share, the closing sales price of our common stock on July 19, 2023, which is the highest closing price of our common stock on NYSE American within the prior 60 days. Pursuant to General Instruction I.B.6 of Form S-3, in no event will we sell securities, registered on the registration statement, of which this prospectus supplement is a part, in a public primary offering with a value exceeding \$7,673,914.77 or one-third of the aggregate market value of our public float in any 12-month period so long as our public float remains below \$75 million. We have not sold any securities pursuant to General Instruction I.B.6. of Form S-3 during the prior 12 calendar month period that ends on and includes the date of this prospectus supplement. In the event that, subsequent to the date of this prospectus, the aggregate market value of our outstanding common stock held by non-affiliates equals or exceeds \$75 million, then the one-third limitation on sales set forth in General Instruction I.B.6 of Form S-3 shall not apply to additional sales made pursuant to this prospectus. In any event, we shall file a supplement to this prospectus supplement prior to increasing the amount of shares available for sale pursuant to the Sales Agreement.

Investing in our common stock involves a high degree of risk. See “[Risk Factors](#)” beginning on page PS-8 of this prospectus supplement, page 8 of the accompanying base prospectus and under similar headings in the documents incorporated by reference into this prospectus supplement and the accompanying base prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus supplement or the accompanying base prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

ThinkEquity

The date of this prospectus supplement is September 1, 2023

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ABOUT THIS PROSPECTUS SUPPLEMENT

This prospectus supplement and the accompanying base prospectus form a part of a registration statement on Form S-3 (File No. 333-273984), which was declared effective on August 23, 2023, that we filed with the Securities Exchange Commission (“SEC”) utilizing a “shelf” registration process. This document is in two parts. The first part is the prospectus supplement, which describes the specific terms of this offering. The second part, the accompanying base prospectus, provides more general information about the securities we may offer from time to time, some of which may not apply to the securities offered by this prospectus supplement. Generally, when we refer to this prospectus, we are referring to both parts of this document combined. Before you invest, you should carefully read this prospectus supplement, the accompanying base prospectus, all information incorporated by reference herein and therein, and the additional information described under “Where You Can Find More Information” in this prospectus supplement. These documents contain information you should consider when making your investment decision. This prospectus supplement may add, update or change information contained in the accompanying base prospectus. To the extent that any statement that we make in this prospectus supplement is inconsistent with statements made in the accompanying base prospectus or any documents incorporated by reference therein, the statements made in this prospectus supplement will be deemed to modify or supersede those made in the accompanying base prospectus and such documents incorporated by reference therein.

You should rely only on the information contained or incorporated herein by reference in this prospectus supplement and contained or incorporated therein by reference in the accompanying base prospectus. We have not authorized any other person to provide you with any information that is different. If anyone provides you with different, additional or inconsistent information, you should not rely on it.

We are offering to sell our securities only in jurisdictions where offers and sales are permitted. The distribution of this prospectus supplement and the accompanying base prospectus and the offering of the securities in certain jurisdictions may be restricted by law. This prospectus supplement and the accompanying base prospectus do not constitute, and may not be used in connection with, an offer to sell, or a solicitation of an offer to buy, any securities offered by this prospectus supplement and the accompanying base prospectus by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference in the prospectus supplement and the accompanying base prospectus were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to such agreements, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs.

Unless the context otherwise requires, references in this prospectus supplement to the “Company,” “we,” “us” and “our” refer to MAIA Biotechnology, Inc. and its subsidiaries.

We have authorized only the information contained or incorporated by reference in this prospectus supplement, the accompanying base prospectus, and any free writing prospectus prepared by or on behalf of us or to which we have referred you. We have not, and ThinkEquity and any other underwriters have not, authorized anyone to provide you with information that is different. We and ThinkEquity take no responsibility for, and can provide no assurance as to the reliability of, any information that others may give you. We are offering to sell, and seeking offers to buy, our common stock only in jurisdictions where offers and sales are permitted. The information contained in or incorporated by reference in this document is accurate only as of the date such information was issued, regardless of the time of delivery of this prospectus supplement or the date of any sale of our common stock.

CAUTIONARY NOTE CONCERNING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying base prospectus and the documents that we incorporate by reference, contains forward-looking statements as that term is defined in the federal securities laws. The events described in forward-looking statements contained in this prospectus supplement and the accompanying base prospectus, including the documents that we incorporate by reference, may not occur. Generally, these statements relate to our business plans or strategies, projected or anticipated benefits or other consequences of our plans or strategies, financing plans, projected or anticipated benefits from acquisitions that we may make, or projections involving anticipated revenues, earnings or other aspects of our operating results or financial position, and the outcome of any contingencies. Any such forward-looking statements are based on current expectations, estimates and projections of management. We intend for these forward-looking statements to be covered by the safe-harbor provisions for forward-looking statements. Words such as “may,” “expect,” “believe,” “anticipate,” “project,” “plan,” “intend,” “estimate,” and “continue,” and their opposites and similar expressions are intended to identify forward-looking statements. We caution you that these statements are not guarantees of future performance or events and are subject to a number of uncertainties, risks and other influences, many of which are beyond our control that may influence the accuracy of the statements and the projections upon which the statements are based. Factors that may affect our results include, but are not limited to, the risks and uncertainties discussed in the “Risk Factors” section on page PS-8 of this prospectus supplement, in our Annual Report on Form 10-K for the fiscal year ended December 31, 2022 or in other reports we file with the SEC.

Any one or more of these uncertainties, risks and other influences could materially affect our results of operations and whether forward-looking statements made by us ultimately prove to be accurate. Our actual results, performance and achievements could differ materially from those expressed or implied in these forward-looking statements. We undertake no obligation to publicly update or revise any forward-looking statements, whether from new information, future events or otherwise.

You should rely only on the information in this prospectus supplement, the accompanying prospectus and the documents that we incorporate by reference herein and therein. We have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely upon it.

PROSPECTUS SUPPLEMENT SUMMARY

This summary highlights selected information contained elsewhere in this prospectus supplement, the accompanying base prospectus and in the documents we incorporate by reference. This summary does not contain all of the information you should consider before investing in our common stock. You should read this entire prospectus supplement and the accompanying base prospectus carefully, especially the risks of investing in our common stock discussed under "Risk Factors" beginning on page PS-8 of this prospectus supplement and under similar sections of the accompanying base prospectus and other periodic reports incorporated herein and therein by reference, along with our consolidated financial statements and notes to those consolidated financial statements, before making an investment decision.

The Company

We are a clinical-stage biopharmaceutical company developing targeted immunotherapies for cancer. THIO (6-thio-dG or 6-thio-2'-deoxyguanosine), our lead asset, is an investigational dual mechanism of action drug candidate incorporating telomere targeting and immunogenicity. In July 2022, the first patient was administered with THIO in our Phase 2 human trial (THIO-101) in Australia. In December 2022, regulatory authorities in three European countries, Hungary, Poland, and Bulgaria, approved the implementation of THIO-101, Phase 2 clinical trial evaluating THIO in patients with Non-Small Cell Lung Cancer (NSCLC). Patients with advanced NSCLC will be treated first with THIO followed a few days later by the immune checkpoint inhibitor Libtayo® (cemiplimab) manufactured and commercialized by Regeneron. Cemiplimab is a fully human monoclonal antibody targeting the immune checkpoint receptor PD-1 on T-cells. Cemiplimab has been approved in the United States and the rest of the world for multiple cancer indications, including NSCLC. In February 2021, we signed a clinical supply agreement with Regeneron to receive cemiplimab at no cost, which represents a significant cost-savings for the study. In return, we have granted Regeneron exclusive development rights in combination with PD-1 inhibitors for NSCLC for the study period. Based on the clinical data generated by our THIO-101 trial, in late 2024, we plan to seek an accelerated approval of THIO in the United States for the treatment of patients with advanced NSCLC, but even if granted, accelerated approval status does not guarantee an accelerated review or marketing approval by the FDA. In addition, in the Fourth Quarter of 2023, we plan to initiate a Phase 2 clinical trial in multiple solid tumor indications of THIO administered in sequence with Anti-PD-1 or Anti-PD-L1.

Our Lead Product Candidate

THIO is a telomere-targeting agent currently in clinical development to evaluate its activity in NSCLC. Telomeres, along with the enzyme telomerase, play a fundamental role in the survival of cancer cells and their resistance to current therapies. THIO is being developed as a second- or later line of treatment for NSCLC for patients that have progressed beyond the standard-of-care regimen of existing checkpoint inhibitors.

In 2019, our research team discovered that THIO produced telomere modifications and disruption, which ultimately induced cancer-specific innate and adaptive immune responses against immunologically "cold" or tumor types that were unresponsive to immune checkpoint inhibitors. This hypothesis was tested and demonstrated in syngeneic and humanized mouse models. THIO administered to mice in low doses and followed by an immune-checkpoint inhibiting agent, such as an anti-PD-1 or anti-PD-L1 compound, induced complete tumor regression with no tumor recurrence during the 14 weeks of observation. Further, no toxicities were reported in the tumor-free mice. These new findings were published in the peer-reviewed research scientific journal, *Cancer Cell* in July 2020. Based on these recent discoveries, a new therapeutic approach has been designed to advance THIO into a Phase 2 clinical trial (THIO-101) in patients with advanced NSCLC.

Our regulatory strategy includes a planned filing of an Investigational New Drug application (IND) with the United States Food and Drug Administration (U.S. FDA or FDA). This would allow U.S. sites to participate in the THIO-101 NSCLC trial. The human safety data generated in Australia and Europe would constitute the basis of the IND application. Although we plan to rely solely on the safety and efficacy data we generate in our own clinical trials in support of our planned New Drug Application (NDA) filing, and do not plan to rely on clinical data generated by

unaffiliated third parties, we take added confidence in the potential tolerability of THIO in light of the fact that the THIO doses we plan to test represent a range 4 to 40 times lower than the maximum tolerated dose tested in the earlier clinical trials sponsored by the National Cancer Institute (NCI) in the 1970s. As part of the existing data base of clinical experience with the drug, we expect to reference the older NCI studies in the public domain as well as reference NCI's original IND filing in support of an IND filing, pursuant to FDA regulations, and we are currently working with experts to evaluate the extent and quality of the existing data supporting THIO. The planned THIO-101 phase 2 trial is intended to be a proof-of-concept study that may be modified depending on interim results to include both primary and secondary endpoints and be consistent with previously approved cancer treatments. In September 2022, we submitted a pre-IND meeting request to the FDA to discuss, among other elements, the existing non-clinical and clinical data to support the conduct of our planned THIO-101 phase 2 trial under an IND to include patients from the U.S. MAIA received feedback in-line with the proposed plans from the FDA regarding its manufacturing, preclinical and clinical development plan. MAIA also obtained guidance from the FDA on the assessment of its safety and efficacy in the THIO-101 Phase 2 trial that will be incorporated in the U.S. IND application. MAIA filed its U.S. IND and plans to commence enrolling patients in the U.S. in 2024.

Based on the clinical data we aim to generate in the THIO-101 study and assuming THIO achieves its intended clinical effect with a manageable safety profile at one of the doses tested in the study, we expect to seek early FDA guidance on the possibility of utilizing one or more of FDA's expedited programs for serious conditions, such as fast track designation, breakthrough therapy designation, priority review and/or accelerated approval designation. Even if granted, accelerated approval status does not guarantee an accelerated review or marketing approval by the FDA. The THIO-101 study protocol may need to be amended to increase the number of patients enrolled, undergo modification of the statistical analysis, or change in the trial design and/or primary endpoints.

On April 11, 2023, we announced positive topline data related to the completion of Part A, safety lead-in portion of the THIO-101 trial which showed that administration of THIO, at the highest dose of 360 mg/cycle in sequential combination with Regeneron's anti-PD-1 therapy, Libtayo was well tolerated with no dose limiting toxicities or significant treatment-related adverse events reported.

On April 18, 2023, we published data in Hepatocellular Carcinoma (HCC) models: as monotherapy, THIO achieved complete and durable responses in HCC the dominant histology in primary liver cancer (90%), in in vivo models. When combined with Libtayo®, duration of response was further potentiated. Upon rechallenge with two times more cancer cells and no additional treatment, tumor growth was completely prevented. Administration of THIO alone and in combination with Libtayo® generated anticancer immune memory.

On April 20, 2023, we announced preliminary survival data from Part A of THIO-101. The first two patients enrolled in Part A of the study continue to be alive, approximately 10 and 9 months respectively, from treatment initiation. Both patients have advanced Stage IV metastatic disease and are heavily pretreated, receiving third and fourth line of therapy respectively after previously failing treatment with an immune checkpoint inhibitor. They continue to be progression free following their last dose of THIO, 7 and 6 months respectively, with no new treatment. The current treatment options in patients with advanced relapsed or refractory NSCLC who failed two or more therapy regimens are limited and show minimal benefit. Furthermore, discontinuation of treatment is rapidly followed by physical decline and death, therefore seeing patients with such survival and no disease progression in this clinical setting, is noteworthy. In real-world clinical practice, observed survival in such heavily pretreated patients is 3-4 months.

On June 20, 2023, we announced updates in enrollment in THIO-101 in Europe. To date, 29 patients have been dosed in THIO-101. With the addition of sites in Hungary, Poland, and Bulgaria in March 2023, THIO-101 has rapidly increased the number of patients enrolled and dosed with THIO. Thirteen sites were activated with another two new additional sites ready to open shortly.

On July 10, 2023, we announced updates on preliminary survival data in the Part A safety lead-in of THIO-101. The first 2 patients enrolled in the study continue to be alive, approximately 12.2 and 11.5 months respectively, from treatment initiation. Both patients have advanced Stage IV metastatic disease and failed 2 prior lines of therapy, including one line with an immune checkpoint inhibitor (CPI), and platinum-based chemotherapy. Following the conclusion of study treatment, they have remained free of disease progression for 10.2 and 8.5 months, respectively, without requiring any additional therapy.

On July 11, 2023, we announced updates on disease control data in the part A safety lead-in of THIO-101. Of the first 11 patients enrolled in THIO-101 to complete at least 1 post baseline response assessment, 9 (82%) met the primary endpoint of disease control (defined as a Complete Response, Partial Response, or Stable Disease per RECIST 1.1). All patients enrolled have previously failed 2 or more prior lines of treatment including an immune CPI and platinum-based chemotherapy for advanced NSCLC.

Our Science—Driven Telomere Targeting Approach

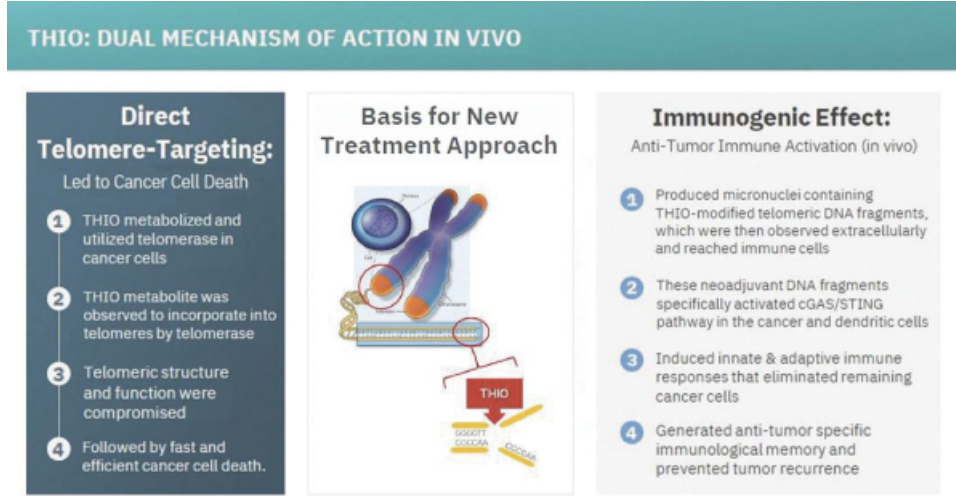
Telomeres are regions of repetitive deoxyribonucleic acid (DNA) nucleotide sequences that are associated with specialized proteins at the ends of linear chromosomes in cells. THIO's mechanism of action comprises telomere targeting and induction of anti-cancer immunogenicity. The enzyme telomerase recognizes THIO's metabolite formed in situ and incorporates it into the structure of the cancer cell's telomeres, creating a faulty structure, which breaks apart the telomere spatial structure. As a result, the THIO-modified telomeric structure unwinds, recognized as DNA damage, and the cancer cells die. We believe THIO transforms "cold" tumors into "hot" tumors rendering them responsive to immunotherapy (checkpoint inhibitors) and this process takes place promptly within 24 to 72 hours. We also believe we can improve the immunotherapy efficacy and we can restore the immunotherapy efficacy in patients who have progressed or developed resistance to prior immunotherapy.

Telomere maintenance is a fundamental biologic process for cell proliferation and resilience in cancer cells, and thus represents one of the key therapeutic targets for cancer treatment. Telomerase is an enzyme that is present in most human cancer cells (over 85% in the aggregate), across various tumor types. In contrast, its activity is detected in less than 1% of normal cells. THIO has only been shown to be active in cancer cells that are telomerase positive (TERT+) and actively dividing. Cancer cells are constantly telomerase positive due to an uncontrolled division process, while a relatively small number of normal cells are telomerase positive only transiently. Therefore, THIO activity is expected to be highly specific to cancer cells versus normal cells. Cancer-specific disturbance of telomeric structure, mediated by telomerase, is likely to lead to disruption in the cell cycle, followed by a very rapid and telomere-length independent cell death. THIO was observed to induce cancer-specific telomere disruption, by using the enzyme telomerase, which differentiates THIO from all other available cancer therapies currently in clinical use. We are also currently developing potential next generation small molecule telomere modifying agents with the goal of identifying additional proprietary drug candidates, across multiple cancer types. We have generated eighty-two (82) new telomere-targeting compounds of which sixty (60) compounds have been evaluated in vitro. Currently, seven (7) molecules have been selected for further evaluation in additional in vitro and in vivo models.

Human clinical trials prior to approval are typically conducted in three sequential Phases that may overlap or be combined. In Phase 1, the drug or biologic is initially introduced into healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution and excretion. In Phase 2, the drug or biologic is evaluated in a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance, optimal dosage and dosing schedule for patients having the specific disease. In Phase 3, larger-scale clinical trials are undertaken to evaluate clinical efficacy and safety and the overall risk/benefit ratio of the product. Post-approval studies, or Phase 4 clinical trials, may be conducted voluntarily, or as a condition of FDA's approval of a drug. These studies may be used to confirm preliminary efficacy results, gain additional experience from the treatment of certain patient populations, or to support additional indications or labeling changes.

We completed our selection process for the clinical sites for our Phase 2 study in Australia and Europe and our application to start the Phase 2 study in Australia was approved on March 1, 2022, by the Australian Regulatory Agency—Bellberry Human Research Ethics Committee. In July 2022, the first patient was administered with THIO in our Phase 2 human trial (THIO-101) in Australia. In December 2022, regulatory authorities in three European countries, Hungary, Poland, and Bulgaria, approved the implementation of THIO-101, Phase 2 clinical trial evaluating THIO in patients with NSCLC.

In March 2022, the FDA granted Orphan Drug Designation (ODD) to THIO for the treatment of HCC and in May 2022, the FDA granted the second ODD to THIO for the treatment of small cell lung cancer. The FDA's Office of Orphan Products Development may grant orphan designation status to drugs and biologics that are intended for the treatment, diagnosis or prevention of rare diseases, or conditions that affect fewer than 200,000 people in the U.S. ODD provides certain benefits, including financial incentives, to support clinical development and the potential for up to seven years of market exclusivity for the drug for the designated orphan indication in the U.S. if the drug is ultimately approved for its designated indication.



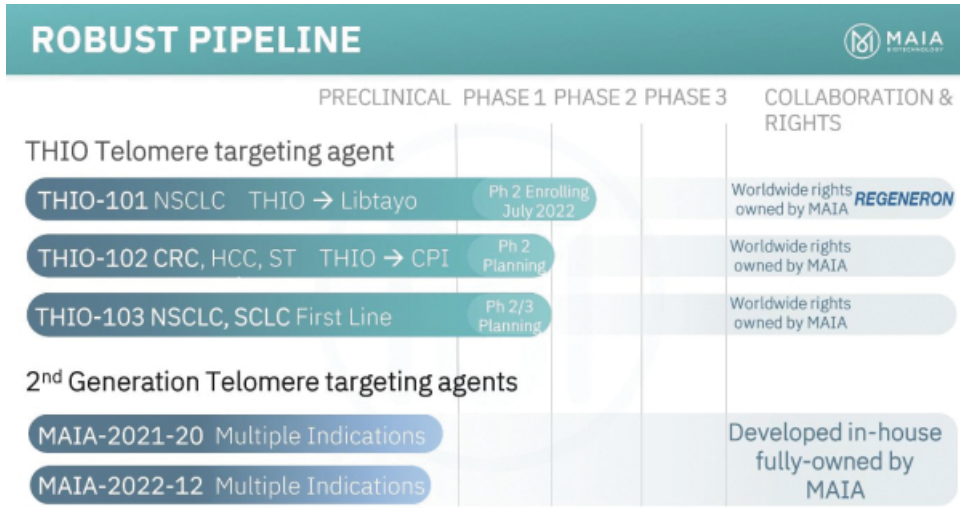
Our Second-Generation Molecule Candidates

Our THIO program drives our development pipeline of second-generation telomere targeting agents. We have initiated an early-stage research and discovery program aimed at identifying new compounds capable of acting through similar mechanisms of activity as THIO, such as the targeting and modifying telomeric structures of cancer cells through cancer-cell intrinsic telomerase activity. The main objective for this program is to discover new compounds with potentially improved specificity towards cancer cells relative to normal cells and with potentially increased anticancer activity. This program may also allow us to strengthen our patent portfolio. Although the program is in early stages and we may not be able to identify suitable compounds, we believe we will be able to create a second generation of THIO-like compounds.

Our current 2nd-generation pipeline of potential telomere-targeting agents includes seven compounds that have successfully undergone in vitro inhibitory testing in five cancer models. The data from those studies showed a significantly lower 50% inhibitory concentration (IC50) for those compounds compared to THIO. Based on those data, we have progressed those seven compounds to in vivo testing. In January 2023, we nominated one lead new molecular entity candidate (designated as MAIA-2021-20) and one back-up new molecular entity candidate (MAIA-2022-12) for further advancement into preclinical GLP-toxicity and other studies and may advance one of these candidates into human clinical trials upon completion of the required preclinical evaluations. We also filed a broad provisional patent application covering the composition of matter for the new telomere-targeting molecules in the fourth quarter of 2022.

OUR PIPELINE

Our robust pipeline includes several targeted immuno-oncology candidates for relapsed and refractory cancers.



Our Strategy

Our goal is to be the leader in the discovery, development and commercialization of cancer telomere targeting agents and other similar small molecules. Our initial focus is to efficiently advance our Phase 2 clinical program using THIO in sequential combination with cemiplimab. Ultimately, we envision positioning THIO as a patient anticancer immunity priming treatment for all immune-activating agents used in the treatment of cancer. To date, THIO has never been tested in clinical trials in combination with any check-point inhibitor. The key elements of our strategy are to:

- Advance our existing clinical programs, including seeking accelerated approval for THIO in NSCLC as a tumor mass-reducing and simultaneously immune system priming agent administered in advance of the immune-activating agent, cemiplimab for treatment of advanced NSCLC, and ultimately, as a cancer treatment foundation in multiple indications and geographies. Even if granted, accelerated approval status does not guarantee an accelerated review or marketing approval by the FDA;
- Broaden the clinical development of THIO by exploring synergistic administration prior to other standard-of care immune-therapies including cell therapy;
- Develop a franchise of telomere-targeting cancer treatments not inclusive of checkpoint inhibitors;
- Leverage our regulatory strategy to acquire additional human data faster outside U.S. for other cancer indications;
- Selectively enter into strategic collaborations with pharmaceutical and biotechnology companies that have immune activating therapies; and
- Expand our existing intellectual property portfolio.

We will face certain challenges in implementing our business strategy including, among others, the fact that earlier development of THIO was not commercially pursued. Even if THIO successfully advances through clinical studies and towards approval for use, we may face early competition from generic alternatives to THIO after expiration of any applicable regulatory exclusivities. The FDA’s accelerated approval pathway, even if initially granted, does not guarantee an accelerated review or marketing approval by the FDA.

Our Intellectual Property

Our global patent and patent-pending estate covers several areas. Telomerase mediated telomere altering compounds and treatment of therapy-resistant cancers are part of our portfolio. Further, THIO’s immunogenic treatment strategy, which focuses on sequential combination with checkpoint inhibitors has been filed. We maintain four issued patents and have sixteen (16) pending applications.

Recent Developments

On April 27, 2023, we sold 2,555,500 shares of the Company’s common stock at a price of \$2.25 per share in an underwritten public offering. ThinkEquity LLC (“ThinkEquity”) served as underwriter of the offering. The aggregate net proceeds of the offering were approximately \$5.1 million, after deducting underwriting discounts and estimated offering expenses. The shares of common stock were offered, issued and sold to the public pursuant to the Registration Statement on Form S-1, as amended from time to time (File No. 333-269606). We intend to use the net proceeds from the offering to fund the ongoing clinical trials of THIO, pre-clinical development of second-generation of telomere targeting compounds, and other research and development activities, as well as for working capital and other general corporate purposes. Concurrently with the closing of the public offering, we also issued warrants to purchase an aggregate of up to 127,775 shares of our common stock to ThinkEquity or its designees, at an exercise price of \$2.8125 per share. These warrants are exercisable beginning on October 24, 2023, and expire on April 24, 2028, pursuant to the terms and conditions of the warrants.

Our Leadership Team

We have assembled an experienced management team with deep research, development, and commercialization experience in the areas of cancer treatment, telomere-related science, immunotherapy, and spreading across a vast array of oncology indications. Members of our team bring experiences from multiple biotech and pharmaceutical companies including Pfizer Inc., Bayer Oncology, Novartis Oncology, Astellas Pharma Inc., Janssen—a Johnson & Johnson pharmaceutical company, Incyte Corporation, Pharmacyclics Inc., Juno Therapeutics Inc., Celgene, Cephalon Inc., Geron Corporation, and AbbVie Bio Corp., among others.

Corporate Information

We were incorporated in Delaware in August 2018, and have operations in Chicago, Illinois, with some of our team members setup virtually and working remotely in California, Nevada and Florida, among others. Our principal executive office is located at 444 West Lake Street, Suite 1700, Chicago, IL 60606, and our phone number is (312) 416-8592. In July 2021, we established a wholly-owned Australian subsidiary, MAIA Biotechnology Australia Pty Ltd., to conduct various preclinical and clinical activities for the development of our product candidates. In April 2022, we established a wholly owned Romanian subsidiary, MAIA Biotechnology Romania S.R.L. to conduct various preclinical and clinical activities for the development of our product candidates. Our website address is www.MAIBiotech.com. The information contained on our website is not incorporated by reference into this prospectus supplement, and you should not consider any information contained on, or that can be accessed through, our website as part of this prospectus supplement or in deciding whether to purchase our securities.

OFFERING SUMMARY

Common Stock to be offered by us pursuant to this prospectus supplement	Shares of our common stock having an aggregate offering price of up to \$7,000,000.
Common Stock outstanding after this offering⁽¹⁾	Up to 17,506,062 shares of common stock, assuming sales of 3,825,137 shares of common stock at a price of \$1.83 per share, which was the closing price of our common stock on NYSE American on August 30, 2023. The actual number of shares of our common stock issued will vary depending on the sales price under this offering.
Market for Common Stock	Our common stock is listed on NYSE American under the symbol “MAIA.”
Manner of offering	Sales of shares of our common stock, if any, will be made pursuant to the terms of the ATM Sales Agreement between us and ThinkEquity LLC. Sales of the shares will be made in sales deemed to be “at-the-market” equity offerings as defined in Rule 415 promulgated under the Securities Act. ThinkEquity LLC will act as Sales Agent and will use commercially reasonable efforts to sell on our behalf all of the shares of common stock requested to be sold by us, consistent with its normal trading and sales practices. See “Plan of Distribution.”
Use of Proceeds	We plan to use the net proceeds from this offering, if any, for general working capital and general corporate purposes. See “Use of Proceeds.”
Risk factors	See “Risk Factors” beginning on page PS-8 of this prospectus supplement, as well as the other information included in or incorporated by reference in this prospectus supplement and the accompanying base prospectus, for a discussion of risks you should carefully consider before investing in our securities.
Exclusive Sales Agent	ThinkEquity LLC is acting as the exclusive Sales Agent in connection with this offering.
(1)	<p>The number of shares of our common stock to be outstanding after this offering is based on 13,680,925 shares of our common stock outstanding as of August 30, 2023 and excludes, as of that date, the following:</p> <ul style="list-style-type: none">• 7,779,610 shares of common stock issuable upon exercise of options to purchase shares of common stock outstanding as of August 30, 2023 with a weighted-average exercise price of \$2.63 per share;• 1,994,424 shares of common stock reserved for future issuance as of August 30, 2023 under our 2021 Equity Incentive Plan (the “2021 Plan”);• 796,985 shares of common stock issuable upon exercise of warrants to purchase shares of common stock outstanding as of August 30, 2023 with a weighted-average exercise price of \$6.04 per share; and• 127,775 shares of common stock issuable upon the exercise of representative warrants that were issued in connection with the April 2023 public offering at an exercise price of \$2.81 per share.

RISK FACTORS

Before you make a decision to invest in our securities, you should consider carefully the risks described below, together with other information in this prospectus supplement, the accompanying base prospectus and the information incorporated by reference herein and therein, including any risk factors contained in our annual and other reports filed with the SEC. If any of the following events actually occur, our business, operating results, prospects or financial condition could be materially and adversely affected. This could cause the trading price of our common stock to decline and you may lose all or part of your investment. The risks described below are not the only ones that we face. Additional risks not presently known to us or that we currently deem immaterial may also significantly impair our business operations and could result in a complete loss of your investment.

Risks Related to this Offering

The actual number of shares we will issue under the Sales Agreement, at any one time or in total, is uncertain.

Subject to certain limitations in the Sales Agreement and compliance with applicable law, we have the discretion to deliver instruction to the Sales Agent to sell shares of our common stock at any time throughout the term of the Sales Agreement. The number of shares that are sold through the Sales Agent after our instruction will fluctuate based on a number of factors, including the market price of our common stock during the sales period, the limits we set with the Sales Agent in any instruction to sell shares, and the demand for our common stock during the sales period. Because the price per share of each share sold will fluctuate during this offering, it is not currently possible to predict the number of shares that will be sold or the gross proceeds to be raised in connection with those sales.

The common stock offered hereby will be sold in “at the market offerings,” and investors who buy shares at different times will likely pay different prices.

Investors who purchase shares in this offering at different times will likely pay different prices, and so may experience different levels of dilution, and different outcomes in their investment results. We will have discretion, subject to market demand, to vary the timing, prices, and numbers of shares sold in this offering. Investors may experience a decline in the value of the shares they purchase in this offering as a result of sales made at prices lower than the prices they paid.

Our management will have broad discretion over the use of the net proceeds from this offering, you may not agree with how we use the proceeds, and the proceeds may not be invested successfully.

Our management will have broad discretion in the application of the net proceeds from this offering, and our stockholders will not have the opportunity as part of their investment decision to assess whether the net proceeds are being used appropriately. Because of the number and variability of factors that will determine our use of the net proceeds from this offering, their ultimate use may vary substantially from their currently intended use. The failure by our management to apply these funds effectively could harm our business. See “Use of Proceeds” on page PS-10 of this prospectus supplement for a description of our proposed use of proceeds from this offering.

If you purchase shares of our common stock sold in this offering, you will experience immediate and substantial dilution in the net tangible book value of your shares. In addition, we may issue additional equity or convertible debt securities in the future, which may result in additional dilution to investors.

The price per common share in this offering is substantially higher than the net tangible book value of each outstanding share of our common stock, and accordingly investors in this offering will experience immediate and substantial dilution. See “Dilution” on page PS-10 of this prospectus supplement for a more detailed discussion of the dilution you will incur if you purchase shares in this offering. To the extent outstanding warrants are exercised or if we issue equity-based awards under the 2021 Plan, there could be further dilution to new investors. In addition, to the extent we need to raise additional capital in the future and we issue additional equity or convertible debt securities, our then existing stockholders may experience dilution and the new securities may have rights senior to those of our common stock offered in this offering.

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Our common stock price may be volatile and could decline substantially.

The trading price of our common stock may experience wide fluctuations. The price of the common stock that will prevail in the market may be higher or lower than that of this offering depending on numerous factors, some of which are beyond our control and may not be directly related to our operating performance. These factors include, but are not limited to, the following:

- actual or anticipated fluctuations in our operating results;
- the absence of securities analysts covering us and distributing research and recommendations about us;
- we may have a low trading volume for a number of reasons, including that a large portion of our stock is closely held;
- overall stock market fluctuations;
- announcements concerning our business or those of our competitors;
- actual or perceived limitations on our ability to raise capital when we require it, and to raise such capital on favorable terms;
- conditions or trends in the industry;
- litigation;
- changes in market valuations of other similar companies;
- future sales of common stock;
- departure of key personnel or failure to hire key personnel; and
- general market conditions.

Any of these factors could have a significant and adverse impact on the market price of our common stock. In addition, the stock market in general has at times experienced extreme volatility and rapid decline that has often been unrelated or disproportionate to the operating performance of particular companies. These broad market fluctuations may adversely affect the trading price of our common stock and/or warrants, regardless of our actual operating performance.

We cannot assure you that the market price of our common stock will not decline. Accordingly, we cannot assure you that you will be able to sell your common stock at a price equal to or greater than the purchase price.

We do not anticipate paying any dividends on our common stock for the foreseeable future.

We have not paid any dividends on our common stock to date, and we do not anticipate paying any such dividends in the foreseeable future. We anticipate that any earnings experienced by us will be retained to finance the implementation of our operational business plan and expected future growth.

USE OF PROCEEDS

We may offer and sell shares of our common stock having aggregate sales proceeds of up to \$7,000,000 from time to time. The amount of proceeds we receive, if any, will depend on the actual number of shares of our common stock sold and the market price at which such shares are sold. There can be no assurance that we will be able to sell any shares or fully utilize the Equity Distribution Agreement with ThinkEquity as a source of financing. Because there is no minimum offering amount required as a condition to close this offering, the net proceeds to us, if any, are not determinable at this time.

We currently intend to use the net proceeds from this offering, if any, for general corporate purposes, which may include funding research, development and commercialization of our product candidates, clinical trials, acquisitions or investments in businesses, products or technologies that are complementary to our own, increasing our working capital and capital expenditures.

We have broad discretion in determining how the proceeds of this offering will be used, and our discretion is not limited by the aforementioned possible uses. Our board of directors believes the flexibility in application of the net proceeds is prudent. See the section entitled “*Risk Factors—Risks Relating to this Offering—Our management will have broad discretion over the use of the net proceeds from this offering, you may not agree with how we use the proceeds, and the proceeds may not be invested successfully.*”

DILUTION

If you invest in this offering, your ownership interest will be diluted to the extent of the difference between the public offering price per share and the as adjusted net tangible book value per share after giving effect to this offering.

We calculate net tangible book value per share by dividing the net tangible book value, which is the total tangible assets less total liabilities, by the number of outstanding shares of our common stock. Dilution represents the difference between the amount per share paid by purchasers of shares in this offering and the as-adjusted net tangible book value per share of our common stock immediately after giving effect to this offering. Our net tangible book value as of June 30, 2023 was approximately \$6,874,334, or \$0.50 per share of common stock.

After giving effect to the sale of 3,825,137 shares of our common stock pursuant to this prospectus supplement and the accompanying base prospectus in the aggregate amount of approximately \$7,000,000 at an assumed offering price of \$1.83 per share, the last reported sale price of our common stock on NYSE American on August 30, 2023, and after deducting commissions and estimated aggregate offering expenses payable by us, our as adjusted net tangible book value as of June 30, 2023 would have been approximately \$13,424,334, or \$0.77 per share of common stock. This represents an immediate increase in net tangible book value of \$0.27 per share to our existing stockholders and an immediate dilution in net tangible book value of \$1.06 per share to new investors.

The following table illustrates this dilution on a per share basis:

Assumed public offering price per share	\$1.83
Historical net tangible book value per common share as of June 30, 2023	\$0.50
Increase in net tangible book value per share attributable to new investors purchasing our common stock in this offering	\$0.27
As adjusted net tangible book value per share as of June 30, 2023	\$0.77
Dilution in net tangible book value per share to new investors purchasing our common stock in this offering	\$1.06

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The table above assumes for illustrative purposes that an aggregate of 3,825,137 shares of our common stock are sold pursuant to this prospectus supplement and the accompanying base prospectus at a price of \$1.83 per share, the last reported sale price of our common stock on NYSE American on August 30, 2023, for aggregate gross proceeds of approximately \$7,000,000. The shares sold in this offering, if any, will be sold from time to time at various prices. An increase of \$1.00 per share in the price at which the shares are sold from the assumed offering price of \$1.83 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$7,000,000 is sold at that price, would result in an as adjusted net tangible book value per share after the offering of \$0.83 per share and would increase the dilution in net tangible book value per share to new investors in this offering to \$2.00 per share, after deducting commissions and estimated aggregate offering expenses payable by us. A decrease of \$1.00 per share in the price at which the shares are sold from the assumed offering price of \$1.83 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$7,000,000 is sold at that price, would result in an as adjusted net tangible book value per share after the offering of \$0.61 per share and would increase the dilution in net tangible book value per share to new investors in this offering to \$0.22 per share, after deducting commissions and estimated aggregate offering expenses payable by us.

The above discussion and table are based on 13,648,425 shares of our common stock outstanding as of June 30, 2023 and excludes the following as of June 30, 2023:

- 7,784,325 shares of common stock issuable upon exercise of outstanding options to purchase shares of common stock with a weighted-average exercise price of \$2.65 per share; and
- 1,989,709 shares of common stock reserved for future issuance under our 2021 Equity Incentive Plan (the “2021 Plan”);
- 796,895 shares of common stock issuable upon exercise of outstanding warrants to purchase shares of common stock with a weighted-average exercise price of \$6.04 per share; and
- 127,775 shares of common stock issuable upon the exercise of representative warrants that were issued in connection with the April 2023 public offering at an exercise price of \$2.81 per share.

To the extent that options or warrants are exercised or other derivative securities are exercised or converted into common stock, there may be further dilution to new investors.

PLAN OF DISTRIBUTION

We entered into the Sales Agreement with the Sales Agent under which we may issue and sell from time to time up to \$7,000,000 of our common stock through or to the Sales Agent as sales agent or principal. This following summary of the material provisions of the Sales Agreement does not purport to be a complete statement of its terms and conditions. The Sales Agreement will be filed as an exhibit to a Current Report on Form 8-K dated the date of this prospectus supplement and will be incorporated herein by reference. Sales of the common stock, if any, will be made at market prices by methods deemed to be an “at the market offering” as defined in Rule 415(a) promulgated under the Securities Act.

Upon delivery of a placement notice, the Sales Agent may offer the common stock subject to the terms and conditions of the Sales Agreement on a daily basis or as otherwise agreed upon by us and the Sales Agent. We will designate the maximum amount of common stock to be sold through the Sales Agent on a daily basis or otherwise determine such maximum amount together with the Sales Agent. Subject to the terms and conditions of the Sales Agreement, the Sales Agent will use its commercially reasonable efforts to sell on our behalf all of the shares of common stock requested to be sold by us. We may instruct the Sales Agent not to sell common stock if the sales cannot be effected at or above the price designated by us in any such instruction. We or the Sales Agent may suspend the offering of the common stock being made through the Sales Agent under the Sales Agreement upon proper notice to the other party and subject to other conditions.

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Under the terms of the Sales Agreement, in no event will we issue or sell through the Sales Agent such number or dollar amount of shares of common stock that would (i) exceed the number or dollar amount of shares of common stock registered and available on the Registration Statement, (ii) exceed the number of authorized but unissued shares of common stock, (iii) exceed the number or dollar amount of shares of common stock permitted to be sold under Form S-3 (including General Instruction I.B.6 thereof, if applicable), or (iv) exceed the number or dollar amount of common stock for which we have filed a prospectus supplement to the Registration Statement. Notwithstanding the foregoing, we will not sell shares of our common stock in excess of \$7,000,000 unless our public float increases and we determine to increase the amount available for sale pursuant to the Sales Agreement or our public float equals or exceeds \$75.0 million. In the event that, subsequent to the date of this prospectus, the aggregate market value of our outstanding common stock held by non-affiliates equals or exceeds \$75.0 million, then the one-third limitation on sales set forth in General Instruction I.B.6 of Form S-3 shall not apply to additional sales made pursuant to this prospectus. In any event, we shall file a supplement to this prospectus supplement prior to increasing the amount of shares available for sale pursuant to the Sales Agreement.

We will pay the Sales Agent a commission, in cash, for its services in acting as agent in the sale of our common stock. The aggregate compensation payable to the Sales Agent shall be equal to 3.0% of the gross sales price per share of all shares sold through the Sales Agent under the Sales Agreement. We also have agreed to reimburse the Sales Agent for all expenses related to the offering including, without limitation, the fees and expenses of the Sales Agent's legal counsel up to \$50,000, and we shall reimburse the Sales Agent, upon request, for such costs, fees and expenses in an amount not to exceed \$7,500 on a quarterly basis for the first three fiscal quarters of each year and \$10,000 for the fiscal fourth quarter of each year. Because there is no minimum offering amount required as a condition to close this offering, the actual total public offering amount, commissions and proceeds to us, if any, are not determinable at this time.

Settlement for sales of common stock will occur on the second business day following the date on which any sales are made, or on some other date that is agreed upon by us and the Sales Agent in connection with a particular transaction, in return for payment of the net proceeds to us. Sales of our common stock as contemplated in this prospectus will be settled through the facilities of The Depository Trust Company or by such other means as we and the Sales Agent may agree upon. There is no arrangement for funds to be received in an escrow, trust or similar arrangement.

The Sales Agent is not required to sell any specific amount of securities, but will act as our sales agent using its commercially reasonable efforts, consistent with its sales and trading practices under the terms and subject to the conditions set forth in the Sales Agreement. In connection with the sales of the common stock on our behalf, the Sales Agent will be deemed to be an "underwriter" within the meaning of the Securities Act, and the compensation to them will be deemed to be underwriting commissions or discounts. We have also agreed in the Sales Agreement to provide indemnification and contribution to the Sales Agent with respect to certain liabilities, including liabilities under the Securities Act.

The offering of our common stock pursuant to the Sales Agreement will terminate automatically upon the sale of all shares of our common stock subject to the Sales Agreement and this prospectus supplement or as otherwise permitted therein. We and the Sales Agent may each terminate the Sales Agreement at any time upon ten days' prior written notice.

We will report at least quarterly the number of shares of common stock sold through the Sales Agent under the Sales Agreement, the net proceeds to us and the compensation paid by us to the Sales Agent in connection with the sales of shares of common stock during the relevant period.

The Sales Agent and its affiliates may in the future provide various investment banking, commercial banking and other financial services for us and our affiliates, for which services they may in the future receive customary fees. To the extent required by Regulation M, the Sales Agent will not engage in any market making activities involving our common stock while the offering is ongoing under this prospectus.

A prospectus supplement and the accompanying prospectus in electronic format may be made available on a website maintained by the Sales Agent, and the Sales Agent may distribute the prospectus supplement and the accompanying prospectus electronically.

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The Transfer Agent and Registrar for our common stock is Computershare Trust Company, N.A., and its address is 6200 S. Quebec St. Greenwood Village, CO 80111.

Our common stock is listed on NYSE American under the symbol “MAIA.”

Other Relationships

In addition, the Sales Agent has in the past provided, and may in the future provide, various investment banking, commercial banking and other financial services for us and our affiliates for which they may in the future receive customary fees.

To the extent required by Regulation M, the Sales Agent will not engage in any market making activities involving our common stock while the offering is ongoing under this prospectus supplement.

Foreign Regulatory Restrictions on Purchase of Securities Offered Hereby Generally

No action has been or will be taken in any jurisdiction (except in the United States) that would permit a public offering of the securities offered by this prospectus supplement and accompanying base prospectus, or the possession, circulation or distribution of this prospectus supplement and accompanying base prospectus or any other material relating to us or the securities offered hereby in any jurisdiction where action for that purpose is required. Accordingly, the securities offered hereby may not be offered or sold, directly or indirectly, and neither of this prospectus supplement and accompanying base prospectus nor any other offering material or advertisements in connection with the securities offered hereby may be distributed or published, in or from any country.

LEGAL MATTERS

Mitchell Silberberg & Knupp LLP, New York, New York, has passed upon the validity of the common stock offered hereby. Venable LLP, New York, New York, is counsel for the Sales Agent in connection with this offering.

EXPERTS

The audited financial statements incorporated by reference in this prospectus supplement and elsewhere in the registration statement have been so incorporated by reference in reliance upon the report of Grant Thornton LLP, independent registered public accountants, upon the authority of said firm as experts in accounting and auditing.

The consolidated balance sheet of MAIA Biotechnology, Inc. and Subsidiaries as of December 31, 2021, and the related consolidated statements of operations, changes in stockholders' equity (deficit), and cash flows for the year then ended, have been audited by EisnerAmper LLP, independent registered public accounting firm, as stated in their report which is incorporated herein. Such financial statements have been incorporated herein in reliance on the report of such firm given upon their authority as experts in accounting and auditing.

MAIA Biotechnology, Inc. has agreed to indemnify and hold EisnerAmper LLP harmless against and from any and all legal costs and expenses incurred by EisnerAmper LLP in successful defense of any legal action or proceeding that arises as a result of EisnerAmper LLP's consent to the inclusion of its audit report on the Company's past financial statements included in this prospectus supplement and elsewhere in the registration statement.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the Securities and Exchange Commission (the “SEC”) a registration statement on Form S-3 under the Securities Act, with respect to the securities covered by this prospectus. This prospectus supplement, which is a part of the registration statement, does not contain all of the information set forth in the registration statement or the exhibits and schedules filed therewith. For further information with respect to us and the securities

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covered by this prospectus supplement, please see the registration statement and the exhibits filed with the registration statement. The SEC maintains an Internet website that contains reports, proxy and information statements and other information regarding registrants that file electronically with the SEC. The address of the website is <http://www.sec.gov>.

We are subject to the information and periodic reporting requirements of the Exchange Act and, in accordance therewith, we file periodic reports, proxy statements and other information with the SEC. Such periodic reports, proxy statements and other information are available for inspection and copying at the website of the SEC referred to above. We maintain a website at <http://www.MAIABiotech.com>. You may access our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed pursuant to Sections 13(a) or 15(d) of the Exchange Act with the SEC free of charge at our website as soon as reasonably practicable after such material is electronically filed with, or furnished to, the SEC. Our website and the information contained on that site, or connected to that site, are not incorporated into and are not a part of this prospectus supplement or the accompanying prospectus.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to “incorporate by reference” the information we file with them, which means that we can disclose important information by referring you to those documents. The information incorporated by reference is considered to be part of the accompanying base prospectus, and information that we file later with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below:

- Our Annual Report on Form 10-K for the year ended December 31, 2022, filed with the SEC on [March 24, 2023](#);
- Our Quarterly Reports on Form 10-Q for the quarter ended March 31, 2023, filed with the SEC on [May 8, 2023](#), and for the quarter ended June 30, 2023, filed with the SEC on [August 8, 2023](#);
- Our Current Reports on Form 8-K filed with the SEC on [February 6, 2023](#), [March 17, 2023](#), [April 27, 2023](#) and [May 30, 2023](#) (other than any portions thereof deemed furnished and not filed);
- Our Definitive Proxy Statement on Schedule 14A, filed with the SEC on [April 19, 2023](#); and
- The description of our common stock, par value \$0.0001 per share, contained in Exhibit 4.1 to our Annual Report on Form 10-K filed with the SEC on [March 24, 2023](#), including any amendment or report filed for the purpose of updating such description.

In addition, all filed information contained in reports and documents filed with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act subsequent to the date of this prospectus supplement and before the termination or completion of this offering, shall be deemed to be incorporated by reference in this prospectus supplement. Any statement contained herein or in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes hereof to the extent that a statement contained herein or in any other subsequently filed document which is also incorporated or deemed to be incorporated herein modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus supplement.

We will provide, without charge, to each person to whom a copy of this prospectus supplement is delivered, including any beneficial owner, upon the written or oral request of such person, a copy of any or all of the documents incorporated by reference herein, including exhibits. Requests should be directed to:

MAIA Biotechnology, Inc.
444 West Lake Street, Suite 1700
Chicago, IL 60606
Attention: Vlad Vitoc
Telephone number: (312) 416-8592

In addition, you may obtain a copy of these filings from the SEC as described in the section entitled “Where You Can Find More Information.”

PROSPECTUS



MAIA Biotechnology, Inc.

\$150,000,000

Common Stock
Preferred Stock
Warrants
Debt Securities
Subscription Rights
Units

We may offer, issue and sell from time to time together or separately, in one or more offerings, any combination of (i) our common stock, (ii) our preferred stock, which we may issue in one or more series, (iii) warrants, (iv) senior or subordinated debt securities, (v) subscription rights and (vi) units. The preferred stock, warrants, debt securities and subscription rights may be convertible into, or exercisable or exchangeable for, common or preferred stock or other securities of ours. The debt securities may consist of debentures, notes, or other types of debt. The units may consist of any combination of the securities listed above.

The aggregate public offering price of the securities that we may offer will not exceed \$150,000,000. We will offer the securities in an amount and on terms that market conditions will determine at the time of the offering. Our common stock is listed on NYSE American under the symbol "MAIA." On August 11, 2023, the last reported sale price of our common stock was \$2.08. We have no preferred stock, warrants, debt securities, subscription rights or units listed on any market. Each prospectus supplement will indicate if the securities offered thereby will be listed on any securities exchange.

As of August 11, 2023, the aggregate market value of our outstanding common stock held by non-affiliates, or public float, was \$15,170,591.80, based on 13,648,425 shares of outstanding common stock, of which approximately 7,506,485 shares were held by affiliates, and a price of \$2.47 per share, which was the price at which our common stock was last sold on NYSE American on June 12, 2023. We have not offered any securities pursuant to General Instruction I.B.6 of Form S-3 during the prior 12-calendar-month period that ends on and includes the date of this prospectus. Pursuant to General Instruction I.B.6 of Form S-3, in no event will we sell securities registered on this registration statement in a public primary offering with a value exceeding more than one-third of our public float in any 12-month period so long as our public float remains below \$75 million.

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Investing in our securities involves risk. You should carefully consider the risks that we refer you to under the section captioned "[Risk Factors](#)" in this prospectus on page 8 before buying our securities.

Should we offer any of the securities described in this prospectus, we will provide you with the specific terms of the particular securities being offered in supplements to this prospectus. You should read this prospectus and any supplement, together with additional information described under the headings "Additional Information" and "Incorporation of Certain Information by Reference" carefully before you invest. This prospectus may not be used to sell securities unless accompanied by a prospectus supplement.

We may sell these securities directly to our stockholders or to other purchasers or through agents on our behalf or through underwriters or dealers as designated from time to time. If any agents or underwriters are involved in the sale of any of these securities, the applicable prospectus supplement will provide the names of the agents or underwriters and any applicable fees, commissions or discounts.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

The date of this prospectus is August 23, 2023.

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As used in this prospectus, unless the context indicates or otherwise requires, “the Company,” “we,” “us” and “our” refer to MAIA Biotechnology, Inc., a Delaware corporation, and its consolidated subsidiaries.

MAIA Biotechnology, Inc. is referred to herein as “MAIA,” “the Company,” “we,” “us,” and “our,” unless the context indicates otherwise.

You may only rely on the information contained in this prospectus and the accompanying prospectus supplement or that we have referred you to. We have not authorized anyone to provide you with different information. This prospectus and any prospectus supplement do not constitute an offer to sell or a solicitation of an offer to buy any securities other than the securities offered by this prospectus and the prospectus supplement. This prospectus and any prospectus supplement do not constitute an offer to sell or a solicitation of an offer to buy any securities in any circumstances in which such offer or solicitation is unlawful. Neither the delivery of this prospectus or any prospectus supplement nor any sale made hereunder shall, under any circumstances, create any implication that there has been no change in our affairs since the date of this prospectus or such prospectus supplement or that the information contained by reference to this prospectus or any prospectus supplement is correct as of any time after its date.

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission, or SEC, using a “shelf” registration process. Under this shelf registration process, we may from time to time offer and sell, in one or more offerings, any or all of the securities described in this prospectus, separately or together, up to an aggregate offering price of \$150,000,000. This prospectus provides you with a general description of our securities being offered. When we issue the securities being offered by this prospectus, we will provide a prospectus supplement that will contain specific information about the terms of that offering. The prospectus supplement may also add, update or change information contained in this prospectus. You should read both this prospectus and any prospectus supplement together with additional information described under the heading “Additional Information” and “Incorporation of Certain Information by Reference.”

PROSPECTUS SUMMARY

The following summary highlights some information from this prospectus. It is not complete and does not contain all of the information that you should consider before making an investment decision. You should read this entire prospectus, including the “Risk Factors” section on page 8 and the disclosures to which that section refers you, the financial statements and related notes and the other more detailed information appearing elsewhere or incorporated by reference into this prospectus before investing in any of the securities described in this prospectus.

This prospectus includes trademarks, service marks and trade names owned by us or other companies. All trademarks, service marks and trade names included in this prospectus are the property of their respective owners.

About Us

We are a clinical-stage biopharmaceutical company developing targeted immunotherapies for cancer. THIO (6-thio-dG or 6-thio-2'-deoxyguanosine), our lead asset, is an investigational dual mechanism of action drug candidate incorporating telomere targeting and immunogenicity. In July 2022, the first patient was administered with THIO in our Phase 2 human trial (THIO-101) in Australia. In December 2022, regulatory authorities in three European countries, Hungary, Poland, and Bulgaria, approved the implementation of THIO-101, Phase 2 clinical trial evaluating THIO in patients with Non-Small Cell Lung Cancer (NSCLC). Patients with advanced NSCLC will be treated first with THIO followed a few days later by the immune checkpoint inhibitor Libtayo® (cemiplimab) manufactured and commercialized by Regeneron. Cemiplimab is a fully human monoclonal antibody targeting the immune checkpoint receptor PD-1 on T-cells. Cemiplimab has been approved in the United States and the rest of the world for multiple cancer indications, including NSCLC. In February 2021, we signed a clinical supply agreement with Regeneron to receive cemiplimab at no cost, which represents a significant cost-savings for the study. In return, we have granted Regeneron exclusive development rights in combination with PD-1 inhibitors for NSCLC for the study period. Based on the clinical data generated by our THIO-101 trial, in late 2024 we plan to seek an accelerated approval of THIO in the United States for the treatment of patients with advanced NSCLC, but even if granted, accelerated approval status does not guarantee an accelerated review or marketing approval by the FDA. In addition, in the Fourth Quarter of 2023, we plan to initiate a Phase 2 clinical trial in multiple solid tumor indications of THIO administered in sequence with Anti-PD-1 or Anti-PD-L1.

Our Lead Product Candidate

THIO is a telomere-targeting agent currently in clinical development to evaluate its activity in NSCLC. Telomeres, along with the enzyme telomerase, play a fundamental role in the survival of cancer cells and their resistance to current therapies. THIO is being developed as a second- or later line of treatment for NSCLC for patients that have progressed beyond the standard-of-care regimen of existing checkpoint inhibitors.

In 2019, our research team discovered that THIO produced telomere modifications and disruption, which ultimately induced cancer-specific innate and adaptive immune responses against immunologically “cold” or tumor types that were unresponsive to immune checkpoint inhibitors. This hypothesis was tested and demonstrated in syngeneic and humanized mouse models. THIO administered to mice in low doses and followed by an immune-checkpoint inhibiting agent, such as an anti-PD-1 or anti-PD-L1 compound, induced complete tumor regression with no tumor recurrence during the 14 weeks of observation. Further, no toxicities were reported in the tumor-free mice. These new findings were published in the peer-reviewed research scientific journal, *Cancer Cell* in July 2020. Based on these recent discoveries, a new therapeutic approach has been designed to advance THIO into a Phase 2 clinical trial (THIO-101) in patients with advanced NSCLC.

Our regulatory strategy includes a planned filing of an Investigational New Drug application (IND) with the United States Food and Drug Administration (U.S. FDA or FDA). This would allow U.S. sites to participate in the THIO-101 NSCLC trial. The human safety data generated in Australia and Europe would constitute the basis of the IND application. Although we plan to rely solely on the safety and efficacy data we generate in our own clinical trials in support of our planned New Drug Application (NDA) filing, and do not plan to rely on clinical data generated by unaffiliated third parties, we take added confidence in the potential tolerability of THIO in light of the fact that the THIO doses we plan to test represent a range 4 to 40 times lower than the maximum tolerated dose tested in the earlier clinical trials sponsored by the National Cancer Institute (NCI) in the 1970s. As part of the existing data base of clinical experience with the drug, we expect to reference the older NCI studies in the public domain as well as reference NCI's original IND filing in support of an IND filing, pursuant to FDA regulations, and we are currently working with

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experts to evaluate the extent and quality of the existing data supporting THIO. The planned THIO-101 phase 2 trial is intended to be a proof-of-concept study that may be modified depending on interim results to include both primary and secondary endpoints and be consistent with previously approved cancer treatments. In September 2022, we submitted a pre-IND meeting request to the FDA to discuss, among other elements, the existing non-clinical and clinical data to support the conduct of our planned THIO-101 phase 2 trial under an IND to include patients from the U.S. MAIA received feedback in-line with the proposed plans from the FDA regarding its manufacturing, preclinical and clinical development plan. MAIA also obtained guidance from the FDA on the assessment of its safety and efficacy in the THIO-101 Phase 2 trial that will be incorporated in the U.S. IND application. MAIA filed its U.S. IND and plans to commence enrolling patients in the U.S. in 2024.

Based on the clinical data we aim to generate in the THIO-101 study and assuming THIO achieves its intended clinical effect with a manageable safety profile at one of the doses tested in the study, we expect to seek early FDA guidance on the possibility of utilizing one or more of FDA's expedited programs for serious conditions, such as fast track designation, breakthrough therapy designation, priority review and/or accelerated approval designation. Even if granted, accelerated approval status does not guarantee an accelerated review or marketing approval by the FDA. The THIO-101 study protocol may need to be amended to increase the number of patients enrolled, undergo modification of the statistical analysis, or change in the trial design and/or primary endpoints.

On April 11, 2023, we announced positive topline data related to the completion of Part A, safety lead-in portion of the THIO-101 trial which showed that administration of THIO, at the highest dose of 360 mg/cycle in sequential combination with Regeneron's anti-PD-1 therapy, Libtayo was well tolerated with no dose limiting toxicities or significant treatment-related adverse events reported.

On April 18, 2023, we published data in Hepatocellular Carcinoma (HCC) models: as monotherapy, THIO achieved complete and durable responses in HCC the dominant histology in primary liver cancer (90%), in in vivo models. When combined with Libtayo®, duration of response was further potentiated. Upon rechallenge with two times more cancer cells and no additional treatment, tumor growth was completely prevented. Administration of THIO alone and in combination with Libtayo® generated anticancer immune memory.

On April 20, 2023, we announced preliminary survival data from Part A of THIO-101. The first two patients enrolled in Part A of the study continue to be alive, approximately 10 and 9 months respectively, from treatment initiation. Both patients have advanced Stage IV metastatic disease and are heavily pretreated, receiving third and fourth line of therapy respectively after previously failing treatment with an immune checkpoint inhibitor. They continue to be progression free following their last dose of THIO, 7 and 6 months respectively, with no new treatment. The current treatment options in patients with advanced relapsed or refractory NSCLC who failed two or more therapy regimens are limited and show minimal benefit. Furthermore, discontinuation of treatment is rapidly followed by physical decline and death, therefore seeing patients with such survival and no disease progression in this clinical setting, is noteworthy. In real-world clinical practice, observed survival in such heavily pretreated patients is 3-4 months.

On June 20, 2023, we announced updates in enrollment in THIO-101 in Europe. To date, 29 patients have been dosed in THIO-101. With the addition of sites in Hungary, Poland, and Bulgaria in March 2023, THIO-101 has rapidly increased the number of patients enrolled and dosed with THIO. Thirteen sites were activated with another two new additional sites ready to open shortly.

On July 10, 2023, we announced updates on preliminary survival data in the Part A safety lead-in of THIO-101. The first 2 patients enrolled in the study continue to be alive, approximately 12.2 and 11.5 months respectively, from treatment initiation. Both patients have advanced Stage IV metastatic disease and failed 2 prior lines of therapy, including one line with an immune checkpoint inhibitor (CPI), and platinum-based chemotherapy. Following the conclusion of study treatment, they have remained free of disease progression for 10.2 and 8.5 months, respectively, without requiring any additional therapy.

On July 11, 2023, we announced updates on disease control data in the part A safety lead-in of THIO-101. Of the first 11 patients enrolled in THIO-101 to complete at least 1 post baseline response assessment, 9 (82%) met the primary endpoint of disease control (defined as a Complete Response, Partial Response, or Stable Disease per RECIST 1.1). All patients enrolled have previously failed 2 or more prior lines of treatment including an immune CPI and platinum-based chemotherapy for advanced NSCLC.

Our Science—Driven Telomere Targeting Approach

Telomeres are regions of repetitive deoxyribonucleic acid (DNA) nucleotide sequences that are associated with specialized proteins at the ends of linear chromosomes in cells. THIO's mechanism of action comprises telomere targeting and induction of anti-cancer immunogenicity. The enzyme telomerase recognizes THIO's metabolite formed in situ and incorporates it into the structure of the cancer cell's telomeres, creating a faulty structure, which breaks apart the telomere spatial structure. As a result, the THIO-modified telomeric structure unwinds, recognized as DNA damage, and the cancer cells die. We believe THIO transforms "cold" tumors into "hot" tumors rendering them responsive to immunotherapy (checkpoint inhibitors) and this process takes place promptly within 24 to 72 hours. We also believe we can improve the immunotherapy efficacy and we can restore the immunotherapy efficacy in patients who have progressed or developed resistance to prior immunotherapy.

Telomere maintenance is a fundamental biologic process for cell proliferation and resilience in cancer cells, and thus represents one of the key therapeutic targets for cancer treatment. Telomerase is an enzyme that is present in most human cancer cells (over 85% in the aggregate), across various tumor types. In contrast, its activity is detected in less than 1% of normal cells. THIO has only been shown to be active in cancer cells that are telomerase positive (TERT+) and actively dividing. Cancer cells are constantly telomerase positive due to an uncontrolled division process, while a relatively small number of normal cells are telomerase positive only transiently. Therefore, THIO activity is expected to be highly specific to cancer cells versus normal cells. Cancer-specific disturbance of telomeric structure, mediated by telomerase, is likely to lead to disruption in the cell cycle, followed by a very rapid and telomere-length independent cell death. THIO was observed to induce cancer-specific telomere disruption, by using the enzyme telomerase, which differentiates THIO from all other available cancer therapies currently in clinical use. We are also currently developing potential next generation small molecule telomere modifying agents with the goal of identifying additional proprietary drug candidates, across multiple cancer types. We have generated eighty-two (82) new telomere-targeting compounds of which sixty (60) compounds have been evaluated in vitro. Currently, seven (7) molecules have been selected for further evaluation in additional in vitro and in vivo models.

Human clinical trials prior to approval are typically conducted in three sequential Phases that may overlap or be combined. In Phase 1, the drug or biologic is initially introduced into healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution and excretion. In Phase 2, the drug or biologic is evaluated in a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance, optimal dosage and dosing schedule for patients having the specific disease. In Phase 3, larger-scale clinical trials are undertaken to evaluate clinical efficacy and safety and the overall risk/benefit ratio of the product. Post-approval studies, or Phase 4 clinical trials, may be conducted voluntarily, or as a condition of FDA's approval of a drug. These studies may be used to confirm preliminary efficacy results, gain additional experience from the treatment of certain patient populations, or to support additional indications or labeling changes.

We completed our selection process for the clinical sites for our Phase 2 study in Australia and Europe and our application to start the Phase 2 study in Australia was approved on March 1, 2022, by the Australian Regulatory Agency—Bellberry Human Research Ethics Committee. In July 2022, the first patient was administered with THIO in our Phase 2 human trial (THIO-101) in Australia. In December 2022, regulatory authorities in three European countries, Hungary, Poland, and Bulgaria, approved the implementation of THIO-101, Phase 2 clinical trial evaluating THIO in patients with NSCLC.

In March 2022, the FDA granted Orphan Drug Designation (ODD) to THIO for the treatment of HCC and in May 2022, the FDA granted the second ODD to THIO for the treatment of small cell lung cancer. The FDA's Office of Orphan Products Development may grant orphan designation status to drugs and biologics that are intended for the treatment, diagnosis or prevention of rare diseases, or conditions that affect fewer than 200,000 people in the U.S. ODD provides certain benefits, including financial incentives, to support clinical development and the potential for up to seven years of market exclusivity for the drug for the designated orphan indication in the U.S. if the drug is ultimately approved for its designated indication.



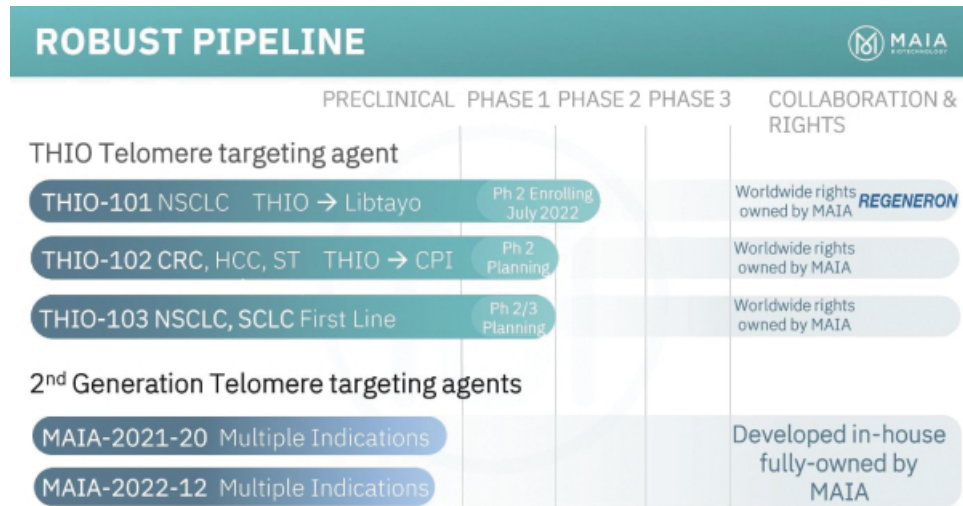
Our Second-Generation Molecule Candidates

Our THIO program drives our development pipeline of second-generation telomere targeting agents. We have initiated an early-stage research and discovery program aimed at identifying new compounds capable of acting through similar mechanisms of activity as THIO, such as the targeting and modifying telomeric structures of cancer cells through cancer-cell intrinsic telomerase activity. The main objective for this program is to discover new compounds with potentially improved specificity towards cancer cells relative to normal cells and with potentially increased anticancer activity. This program may also allow us to strengthen our patent portfolio. Although the program is in early stages and we may not be able to identify suitable compounds, we believe we will be able to create a second generation of THIO-like compounds.

Our current 2nd-generation pipeline of potential telomere-targeting agents includes seven compounds that have successfully undergone in vitro inhibitory testing in five cancer models. The data from those studies showed a significantly lower 50% inhibitory concentration (IC₅₀) for those compounds compared to THIO. Based on those data, we have progressed those seven compounds to in vivo testing. In January 2023, we nominated one lead new molecular entity candidate (designated as MAIA-2021-20) and one back-up new molecular entity candidate (MAIA-2022-12) for further advancement into preclinical GLP-toxicity and other studies and may advance one of these candidates into human clinical trials upon completion of the required preclinical evaluations. We also filed a broad provisional patent application covering the composition of matter for the new telomere-targeting molecules in the fourth quarter of 2022.

OUR PIPELINE

Our robust pipeline includes several targeted immuno-oncology candidates for relapsed and refractory cancers.



Pipeline products are under investigation and have not been proven to be safe or effective. There is no guarantee any product will be approved in the sought-after indication or will meet the developmental milestones set forth above.

Our Strategy

Our goal is to be the leader in the discovery, development and commercialization of cancer telomere targeting agents and other similar small molecules. Our initial focus is to efficiently advance our Phase 2 clinical program using THIO in sequential combination with cemiplimab. Ultimately, we envision positioning THIO as a patient anticancer immunity priming treatment for all immune-activating agents used in the treatment of cancer. To date, THIO has never been tested in clinical trials in combination with any check-point inhibitor. The key elements of our strategy are to:

- Advance our existing clinical programs, including seeking accelerated approval for THIO in NSCLC as a tumor mass-reducing and simultaneously immune system priming agent administered in advance of the immune-activating agent, cemiplimab for treatment of advanced NSCLC, and ultimately, as a cancer treatment foundation in multiple indications and geographies. Even if granted, accelerated approval status does not guarantee an accelerated review or marketing approval by the FDA;
- Broaden the clinical development of THIO by exploring synergistic administration prior to other standard-of care immune-therapies including cell therapy;
- Develop a franchise of telomere-targeting cancer treatments not inclusive of checkpoint inhibitors;
- Leverage our regulatory strategy to acquire additional human data faster outside U.S. for other cancer indications;
- Selectively enter into strategic collaborations with pharmaceutical and biotechnology companies that have immune activating therapies; and
- Expand our existing intellectual property portfolio.

We will face certain challenges in implementing our business strategy including, among others, the fact that earlier development of THIO was not commercially pursued. Even if THIO successfully advances through clinical studies and towards approval for use, we may face early competition from generic alternatives to THIO after expiration of any applicable regulatory exclusivities. The FDA's accelerated approval pathway, even if initially granted, does not guarantee an accelerated review or marketing approval by the FDA.

Our Intellectual Property

Our global patent and patent-pending estate covers several areas. Telomerase mediated telomere altering compounds and treatment of therapy-resistant cancers are part of our portfolio. Further, THIO's immunogenic treatment strategy, which focuses on sequential combination with checkpoint inhibitors has been filed. We maintain four issued patents and have sixteen (16) pending applications.

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Our Leadership Team

We have assembled an experienced management team with deep research, development, and commercialization experience in the areas of cancer treatment, telomere-related science, immunotherapy, and spreading across a vast array of oncology indications. Members of our team bring experiences from multiple biotech and pharmaceutical companies including Pfizer Inc., Bayer Oncology, Novartis Oncology, Astellas Pharma Inc., Janssen—a Johnson & Johnson pharmaceutical company, Incyte Corporation, Pharmacyclics Inc., Juno Therapeutics Inc., Celgene, Cephalon Inc., Geron Corporation, and AbbVie Bio Corp., among others.

Recent Developments

On April 27, 2023, we sold 2,555,500 shares of the Company's common stock at a price of \$2.25 per share in an underwritten public offering. ThinkEquity LLC ("ThinkEquity") served as underwriter of the offering. The aggregate net proceeds of the offering were approximately \$5.1 million, after deducting underwriting discounts and estimated offering expenses. The shares of common stock were offered, issued and sold to the public pursuant to the Registration Statement on Form S-1, as amended from time to time (File No. 333-269606). We intend to use the net proceeds from the offering to fund the ongoing clinical trials of THIO, pre-clinical development of second-generation of telomere targeting compounds, and other research and development activities, as well as for working capital and other general corporate purposes. Concurrently with the closing of the public offering, we also issued warrants to purchase an aggregate of up to 127,775 shares of our common stock to ThinkEquity or its designees, at an exercise price of \$2.8125 per share. These warrants are exercisable beginning on October 24, 2023, and expire on April 24, 2028, pursuant to the terms and conditions of the warrants.

Corporate Information

We were incorporated in Delaware in August 2018, and have operations in Chicago, Illinois, with some of our team members setup virtually and working remotely in California, Nevada and Florida, among others. Our principal executive office is located at 444 West Lake Street, Suite 1700, Chicago, IL 60606, and our phone number is (312) 416-8592. In July 2021, we established a wholly-owned Australian subsidiary, MAIA Biotechnology Australia Pty Ltd., to conduct various preclinical and clinical activities for the development of our product candidates. In April 2022, we established a wholly owned Romanian subsidiary, MAIA Biotechnology Romania S.R.L. to conduct various preclinical and clinical activities for the development of our product candidates. Our website address is www.MAIBiotech.com. The information contained on our website is not incorporated by reference into this prospectus, and you should not consider any information contained on, or that can be accessed through, our website as part of this prospectus or in deciding whether to purchase our securities.

RISK FACTORS

Before purchasing any of the securities you should carefully consider the risk factors incorporated by reference in this prospectus from our Annual Report on Form 10-K for the fiscal year ended December 31, 2022 and any subsequent updates described in our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, as well as the risks, uncertainties and additional information set forth in our reports filed with the Securities and Exchange Commission (the “SEC”) on Forms 10-K, 10-Q and 8-K and in the other documents incorporated by reference in this prospectus. For a description of these reports and documents, and information about where you can find them, see “Additional Information” and “Incorporation of Certain Information by Reference.” Additional risks not presently known or that we presently consider to be immaterial could subsequently materially and adversely affect our financial condition, results of operations, business and prospects.

FORWARD-LOOKING STATEMENTS

This prospectus, including the documents that we incorporate by reference, contains forward-looking statements as that term is defined in the federal securities laws. The events described in forward-looking statements contained in this prospectus, including the documents that we incorporate by reference, may not occur. Generally, these statements relate to our business plans or strategies, projected or anticipated benefits or other consequences of our plans or strategies, financing plans, projected or anticipated benefits from acquisitions that we may make, or projections involving anticipated revenues, earnings or other aspects of our operating results or financial position, and the outcome of any contingencies. Any such forward-looking statements are based on current expectations, estimates and projections of management. We intend for these forward-looking statements to be covered by the safe-harbor provisions for forward-looking statements. Words such as “may,” “expect,” “believe,” “anticipate,” “project,” “plan,” “intend,” “estimate,” and “continue,” and their opposites and similar expressions are intended to identify forward-looking statements. We caution you that these statements are not guarantees of future performance or events and are subject to a number of uncertainties, risks and other influences, many of which are beyond our control that may influence the accuracy of the statements and the projections upon which the statements are based. Factors that may affect our results include, but are not limited to, the risks and uncertainties discussed in the “Risk Factors” section on page 8 of this prospectus, in our Annual Report on Form 10-K for the fiscal year ended December 31, 2022 or in other reports we file with the Securities and Exchange Commission.

Any one or more of these uncertainties, risks and other influences could materially affect our results of operations and whether forward-looking statements made by us ultimately prove to be accurate. Our actual results, performance and achievements could differ materially from those expressed or implied in these forward-looking statements. We undertake no obligation to publicly update or revise any forward-looking statements, whether from new information, future events or otherwise.

You should rely only on the information in this prospectus. We have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely upon it.

USE OF PROCEEDS

Unless we inform you otherwise in the prospectus supplement relating to a particular offering of securities, we will use the net proceeds from the sale of the securities offered by this prospectus and the exercise price from the exercise of any convertible securities, if any, for general corporate purposes, which may include funding research, development and commercialization of our product candidates, clinical trials, acquisitions or investments in businesses, products or technologies that are complementary to our own, increasing our working capital and capital expenditures.

When particular securities are offered, the prospectus supplement relating to that offering will set forth our intended use of the net proceeds received from the sale of those securities we sell. Pending the application of the net proceeds for these purposes, we expect to invest the proceeds in short-term, interest-bearing instruments or other investment-grade securities.

THE SECURITIES WE MAY OFFER

General

The descriptions of the securities contained in this prospectus, together with the applicable prospectus supplements, summarize all of the material terms and provisions of the various types of securities that we may offer. We will describe in the applicable prospectus supplement relating to any securities the particular terms of the securities offered by that prospectus supplement. If we indicate in the applicable prospectus supplement, the terms of the securities may differ from the terms we have summarized below. We may also include in the prospectus supplement information about material United States federal income tax considerations relating to the securities, and the securities exchange, if any, on which the securities will be listed.

We may sell from time to time, in one or more offerings:

- common stock;
- preferred stock;
- warrants to purchase shares of common stock or preferred stock;
- debt securities;
- subscription rights to purchase shares of common stock, preferred stock, warrants, debt securities or units; and
- units consisting of any combination of the securities listed above.

In this prospectus, we refer to the common stock, preferred stock, warrants, debt securities, subscription rights and units collectively as “securities.” The total dollar amount of all securities that we may sell pursuant to this prospectus will not exceed \$150,000,000.

If we issue debt securities at a discount from their original stated principal amount, then, for purposes of calculating the total dollar amount of all securities issued under this prospectus, we will treat the initial offering price of the debt securities as the total original principal amount of the debt securities.

This prospectus may not be used to consummate a sale of securities unless it is accompanied by a prospectus supplement.

DESCRIPTION OF CAPITAL STOCK

General

Our authorized capital stock consists of:

- 70,000,000 shares of common stock, par value \$0.0001 per share; and
- 30,000,000 shares of preferred stock, par value \$0.0001 per share.

As of August 11, 2023, 13,648,425 shares of common stock were issued and outstanding and no shares of preferred stock were issued and outstanding.

The additional shares of our authorized capital stock available for issuance may be issued at times and under circumstances so as to have a dilutive effect on earnings per share and on the equity ownership of the holders of our common stock. The ability of our board of directors to issue additional shares of stock could enhance the board's ability to negotiate on behalf of the stockholders in a takeover situation but could also be used by the board to make a change of control more difficult, thereby denying stockholders the potential to sell their shares at a premium and entrenching current management. The following description is a summary of the material provisions of our capital stock. You should refer to our certificate of incorporation and our bylaws (each as amended and restated, our "certificate of incorporation" and our "bylaws", respectively), both of which are on file with the SEC as exhibits to previous SEC filings, for additional information. The summary below is qualified by provisions of applicable law.

Common Stock

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. An election of directors by our stockholders shall be determined by a plurality of the votes cast by the stockholders entitled to vote in the election. Subject to the supermajority votes for some matters, other matters shall be decided by the affirmative vote of our stockholders having a majority in voting power of the votes cast by the stockholders present or represented and voting on such matter. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of any series of preferred stock that we may designate and issue in the future.

In the event of our liquidation or dissolution, the holders of common stock are entitled to receive on a pro rata basis our net assets available for distribution to stockholders after the payment of all debts and other liabilities, subject to the prior rights of any holders of outstanding preferred stock. Holders of common stock have no preemptive, subscription, redemption or conversion rights. Our outstanding shares of common stock are validly issued, fully paid and nonassessable. The rights, preferences and privileges of holders of common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Transfer Agent and Registrar

Our stock transfer agent and registrar is Computershare Trust Company, N.A., and its address is 6200 S. Quebec St. Greenwood Village, CO 80111.

Preferred Stock

Under the terms of our certificate of incorporation our board of directors is authorized to direct us to issue shares of preferred stock in one or more series without stockholder approval. Our board of directors has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock.

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The purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a majority of our outstanding voting stock. As of the date of this registration statement, there are no shares of preferred stock outstanding, and we have no present plans to issue any shares of preferred stock.

Transfer Agent and Registrar for Preferred Stock

The transfer agent and registrar for any series or class of preferred stock will be set forth in each applicable prospectus supplement.

Anti-takeover Effects of Delaware Law and our Certificate of Incorporation

Some provisions of Delaware law, our certificate of incorporation and our bylaws contain provisions that delay, defer, or discourage transactions involving an actual or potential change in control of us or change in our management. It is possible that these provisions could make it more difficult to accomplish or could deter transactions that stockholders may otherwise consider to be in their best interest or in our best interests, including transactions which provide for payment of a premium over the market price for our shares. These provisions, summarized below, are intended to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors. We believe that the benefits of the increased protection of our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us outweigh the disadvantages of discouraging these proposals because negotiation of these proposals could result in an improvement of their terms.

Authorized but Unissued Shares

Our authorized but unissued shares of common stock and preferred stock are available for future issuance without stockholder approval. These additional shares may be utilized for a variety of corporate purposes, including future public offerings to raise additional capital and corporate acquisitions. The existence of authorized but unissued shares of common stock and preferred stock could render more difficult or discourage an attempt to obtain control of a majority of our common stock by means of a proxy contest, tender offer, merger or otherwise.

Stockholder Meetings

Any action to be taken by our stockholders must be effected at a duly called annual or special meeting of stockholders and not be taken by written consent.

Requirements for Advance Notification of Stockholder Nominations and Proposals

Stockholders seeking to present proposals before a meeting of stockholders or to nominate candidates for election as directors at a meeting of stockholders must provide advance notice in writing, and also specify requirements as to the form and content of a stockholder's notice.

Delaware Anti-Takeover Statute

We are subject to Section 203 of the Delaware's General Corporation Law (DGCL), which prohibits persons deemed to be "interested stockholders" from engaging in a "business combination" with a publicly held Delaware corporation for three years following the date these persons become interested stockholders unless the business combination is, or the transaction in which the person became an interested stockholder was, approved in a prescribed manner or another prescribed exception applies. Generally, an "interested stockholder" is a person who, together with affiliates and associates, owns, or within three years prior to the determination of interested stockholder status did own, 15% or more of a corporation's voting stock. Generally, a "business combination" includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. The existence of this provision may have an anti-takeover effect with respect to transactions not approved in advance by the board of directors.

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Choice of Forum

The Court of Chancery of the State of Delaware is the exclusive forum in which we and our directors may be sued by our stockholders, to the fullest extent permitted by law, for: any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the DGCL, our certificate of incorporation, or our bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. Our bylaws will not apply to suits brought to enforce a duty or liability created by the Securities Act or the Exchange Act, or any other claim for which federal courts have exclusive jurisdiction. Section 22 of the Securities Act of 1933, as amended (the “Securities Act”) creates concurrent jurisdiction

Warrants

In connection with the sale of certain of our outstanding convertible promissory notes in 2020 and 2021, we issued to each such lender warrants equal to that number of shares of common stock as determined by multiplying the number of shares which would be issuable upon conversion of such note by 50%, for a total of 686,489 warrants at an exercise price of \$6.00 per share. As of August 11th, 2023, 681,985 of these warrants were outstanding and will expire on the earlier of the occurrence of a change of control or September 2028.

In January 2022, the Company and certain warrant holders executed waivers related to the acceptance and approval of an amendment to the holders’ warrant agreements originally issued between May 6, 2020 and February 26, 2021 in connection with the Company’s issuance of convertible notes. The amendment removed the IPO expiration provision from the warrant agreements, and the warrants will only be exercisable, in whole or in part, during the exercise period ending on earliest to occur of: (a) various dates in 2028 as stated within the warrant agreements; or (b) immediately prior to the closing of a change of control.

In connection with the closing of our initial public offering, we issued the representative of the underwriters warrants to purchase up to 115,000 shares of common stock at an exercise price of \$6.25 per share. The representative’s warrants are exercisable beginning on January 23, 2023, and expire on July 27, 2027.

In connection with the closing of our April 2023 public offering, we issued the representative of the underwriters warrants to purchase up to 127,775 shares of our common stock at an exercise price of \$2.8125 per share. The representative’s warrants are exercisable beginning on October 24, 2023, and expire on April 24, 2028.

National Securities Exchange Listing

Our common stock is listed on NYSE American, or the “NYSE American,” under the symbol “MAIA.”

DESCRIPTION OF STOCK WARRANTS

We summarize below some of the provisions that will apply to the warrants unless the applicable prospectus supplement provides otherwise. This summary may not contain all information that is important to you. The complete terms of the warrants will be contained in the applicable warrant certificate and warrant agreement. These documents have been or will be included or incorporated by reference as exhibits to the registration statement of which this prospectus is a part. You should read the warrant certificate and the warrant agreement. You should also read the prospectus supplement, which will contain additional information and which may update or change some of the information below.

General

We may issue, together with common or preferred stock as units or separately, warrants for the purchase of shares of our common or preferred stock. The terms of each warrant will be discussed in the applicable prospectus supplement relating to the particular series of warrants. The form(s) of certificate representing the warrants and/or the warrant agreement will be, in each case, filed with the SEC as an exhibit to a document incorporated by reference in the registration statement of which this prospectus is a part on or prior to the date of any prospectus supplement relating to an offering of the particular warrant. The following summary of material provisions of the warrants and the warrant agreements are subject to, and qualified in their entirety by reference to, all the provisions of the warrant agreement and warrant certificate applicable to a particular series of warrants.

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The prospectus supplement relating to any series of warrants that are offered by this prospectus will describe, among other things, the following terms to the extent they are applicable to that series of warrants:

- the procedures and conditions relating to the exercise of the warrants;
- the number of shares of our common or preferred stock, if any, issued with the warrants;
- the date, if any, on and after which the warrants and any related shares of our common or preferred stock will be separately transferable;
- the offering price of the warrants, if any;
- the number of shares of our common or preferred stock which may be purchased upon exercise of the warrants and the price or prices at which the shares may be purchased upon exercise;
- the date on which the right to exercise the warrants will begin and the date on which the right will expire;
- a discussion of the material United States federal income tax considerations applicable to the exercise of the warrants;
- anti-dilution provisions of the warrants, if any;
- call provisions of the warrants, if any; and
- any other material terms of the warrants.

Each warrant may entitle the holder to purchase for cash, or, in limited circumstances, by effecting a cashless exercise for, the number of shares of our common or preferred stock at the exercise price that is described in the applicable prospectus supplement. Warrants will be exercisable during the period of time described in the applicable prospectus supplement. After that period, unexercised warrants will be void. Warrants may be exercised in the manner described in the applicable prospectus supplement.

A holder of a warrant will not have any of the rights of a holder of our common or preferred stock before the stock is purchased upon exercise of the warrant. Therefore, before a warrant is exercised, the holder of the warrant will not be entitled to receive any dividend payments or exercise any voting or other rights associated with shares of our common or preferred stock which may be purchased when the warrant is exercised.

Transfer Agent and Registrar

The transfer agent and registrar, if any, for any warrants will be set forth in the applicable prospectus supplement.

DESCRIPTION OF DEBT SECURITIES

This prospectus describes certain general terms and provisions of debt securities that we may offer. The debt securities may be issued pursuant to, in the case of senior debt securities, a senior indenture, and in the case of subordinated debt securities, a subordinated indenture, in each case in the forms filed as exhibits to this registration statement, which we refer to as the “indentures.” The indentures will be entered into between us and a trustee to be named prior to the issuance of any debt securities, which we refer to as the “trustee.” The indentures will not limit the amount of debt securities that can be issued thereunder and will provide that the debt securities may be issued from time to time in one or more series pursuant to the terms of one or more securities resolutions or supplemental indentures creating such series.

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We have summarized below the material provisions of the indentures and the debt securities or indicated which material provisions will be described in the related prospectus supplement for any offering of debt securities. These descriptions are only summaries, and you should refer to the relevant indenture for the particular offering of debt securities itself which will describe completely the terms and definitions of the offered debt securities and contain additional information about the debt securities.

Terms

When we offer to sell a particular series of debt securities, we will describe the specific terms of the securities in a prospectus supplement. The prospectus supplement will set forth the following terms, as applicable, of the debt securities offered thereby:

- the designation, aggregate principal amount, currency or composite currency and denominations;
- the price at which such debt securities will be issued and, if an index formula or other method is used, the method for determining amounts of principal or interest;
- the maturity date and other dates, if any, on which principal will be payable;
- whether the debt securities rank as senior debt, senior subordinated debt, subordinated debt or any combination thereof, and the terms of any subordination;
- whether or not the debt securities will be secured or unsecured, and the terms of any secured debt;
- the interest rate (which may be fixed or variable), if any;
- the date or dates from which interest will accrue and on which interest will be payable, and the record dates for the payment of interest;
- the manner of paying principal and interest;
- the place or places where principal and interest will be payable;
- the terms of any mandatory or optional redemption by us or any third party including any sinking fund;
- the terms of any conversion or exchange;
- the terms of any redemption at the option of holders or put by the holders;
- any tax indemnity provisions;
- if the debt securities provide that payments of principal or interest may be made in a currency other than that in which the debt securities are denominated, the manner for determining such payments;
- the portion of principal payable upon acceleration of a Discounted Debt Security (as defined below);
- whether and upon what terms debt securities may be defeased;
- any events of default or covenants in addition to or in lieu of those set forth in the indentures;
- provisions for electronic issuance of debt securities or for the issuance of debt securities in uncertificated form; and
- any additional provisions or other special terms not inconsistent with the provisions of the indentures, including any terms that may be required or advisable under United States or other applicable laws or regulations, or advisable in connection with the marketing of the debt securities.

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Debt securities of any series may be issued as registered debt securities or uncertificated debt securities, in such denominations as specified in the terms of the series.

Securities may be issued under the indentures as Discounted Debt Securities to be offered and sold at a substantial discount from the principal amount thereof. Special United States federal income tax and other considerations applicable thereto will be described in the prospectus supplement relating to such Discounted Debt Securities. "Discounted Debt Security" means a security where the amount of principal due upon acceleration is less than the stated principal amount.

We are not obligated to issue all debt securities of one series at the same time and, unless otherwise provided in the prospectus supplement, we may reopen a series, without the consent of the holders of the debt securities of that series, for the issuance of additional debt securities of that series. Additional debt securities of a particular series will have the same terms and conditions as outstanding debt securities of such series, except for the date of original issuance and the offering price, and will be consolidated with, and form a single series with, such outstanding debt securities.

Ranking

The senior debt securities will rank equally with all of our other senior and unsubordinated debt. Our secured debt, if any, will be effectively senior to the senior debt securities to the extent of the value of the assets securing such debt. The subordinated debt securities will be subordinate and junior in right of payment to all of our present and future senior indebtedness to the extent and in the manner described in the prospectus supplement and as set forth in the board resolution, officer's certificate or supplemental indenture relating to such offering.

The debt securities will be obligations exclusively of MAIA. To the extent that our ability to service our debt, including the debt securities, may be dependent upon the earnings of our subsidiaries, our ability to do so will be dependent on the ability of our subsidiaries to distribute those earnings to us as dividends, loans or other payments.

Certain Covenants

Any covenants that may apply to a particular series of debt securities will be described in the prospectus supplement relating thereto.

Successor Obligor

The indentures will provide that, unless otherwise specified in the securities resolution or supplemental indenture establishing a series of debt securities, we shall not consolidate with or merge into, or transfer all or substantially all of our assets to, any person in any transaction in which we are not the survivor, unless:

- the person is organized under the laws of the United States or a jurisdiction within the United States;
- the person assumes by supplemental indenture all of our obligations under the relevant indenture, the debt securities and any coupons;
- immediately after the transaction no Default (as defined below) exists; and
- we deliver to the trustee an officers' certificate and opinion of counsel stating that the transaction complies with the foregoing requirements and that all conditions precedent provided for in the indenture relating to the transaction have been complied with.

In such event, the successor will be substituted for us, and thereafter all of our obligations under the relevant indenture, the debt securities and any coupons will terminate.

The indentures will provide that these limitations shall not apply if our board of directors makes a good faith determination that the principal purpose of the transaction is to change our state of incorporation.

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Exchange of Debt Securities

Registered debt securities may be exchanged for an equal aggregate principal amount of registered debt securities of the same series and date of maturity in such authorized denominations as may be requested upon surrender of the registered debt securities at an agency of the Company maintained for such purpose and upon fulfillment of all other requirements of such agent.

Default and Remedies

Unless the securities resolution or supplemental indenture establishing the series otherwise provides (in which event the prospectus supplement will so state), an “Event of Default” with respect to a series of debt securities will occur if:

1. we default in any payment of interest on any debt securities of such series when the same becomes due and payable and the default continues for a period of 30 days;
2. we default in the payment of all or any part of the principal and premium, if any, of any debt securities of such series when the same becomes due and payable at maturity or upon redemption, acceleration or otherwise and such default shall continue for five or more days;
3. we default in the performance of any of our other agreements applicable to the series and the default continues for 30 days after the notice specified below;
4. a court of competent jurisdiction enters an order or decree under any Bankruptcy Law (as defined below) that:
 - a. is for relief against us in an involuntary case,
 - b. appoints a Custodian (as defined below) for us or for any substantial part of our property, or
 - c. orders the winding up or liquidation of us, and the order or decree remains unstayed and in effect for 90 days;
5. we, pursuant to or within the meaning of any Bankruptcy Law:
 - a. commence a voluntary case,
 - b. consent to the entry of an order for relief against us in an involuntary case,
 - c. consent to the appointment of a Custodian for us or for any substantial part of our property, or
 - d. make a general assignment for the benefit of our creditors; or

The term “Bankruptcy Law” means Title 11 of the United States Code or any similar Federal or State law for the relief of debtors. The term “Custodian” means any receiver, trustee, assignee, liquidator or a similar official under any Bankruptcy Law.

“Default” means any event which is, or after notice or passage of time would be, an Event of Default. A Default under subparagraph (3) above is not an Event of Default until the trustee or the holders of at least 25% in principal amount of the series notify us of the Default and we do not cure the Default within the time specified after receipt of the notice.

The trustee may require indemnity satisfactory to it before it enforces the indentures or the debt securities of the series. Subject to certain limitations, holders of a majority in principal amount of the debt securities of the series may direct the trustee in its exercise of any trust or power with respect to such series. Except in the case of Default in payment on a series, the trustee may withhold from securityholders of such series notice of any continuing Default if the trustee determines that withholding notice is in the interest of such securityholders. We are required to furnish the trustee annually a brief certificate as to our compliance with all conditions and covenants under the indentures.

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The indentures will not have cross-default provisions. Thus, a default by us on any other debt, including any other series of debt securities, would not constitute an Event of Default.

Amendments and Waivers

The indentures and the debt securities or any coupons of the series may be amended, and any Default may be waived as follows:

Unless the securities resolution or supplemental indenture otherwise provides (in which event the applicable prospectus supplement will so state), the debt securities and the indentures may be amended with the consent of the holders of a majority in principal amount of the debt securities of all series affected voting as one class. Unless the securities resolution or supplemental indenture otherwise provides (in which event the applicable prospectus supplement will so state), a Default other than a Default in payment on a particular series may be waived with the consent of the holders of a majority in principal amount of the debt securities of the series. However, without the consent of each securityholder affected, no amendment or waiver may:

- change the fixed maturity of or the time for payment of interest on any debt security;
- reduce the principal, premium or interest payable with respect to any debt security;
- change the place of payment of a debt security or the currency in which the principal or interest on a debt security is payable;
- change the provisions for calculating any redemption or repurchase price with respect to any debt security;
- adversely affect any holder's right to receive payment of principal and interest or to institute suit for the enforcement of any such payment;
- reduce the amount of debt securities whose holders must consent to an amendment or waiver;
- make any change that materially adversely affects the right to convert any debt security;
- waive any Default in payment of principal of or interest on a debt security; or
- adversely affect any holder's rights with respect to redemption or repurchase of a debt security.

Without the consent of any securityholder, the indentures or the debt securities may be amended to:

- provide for assumption of our obligations to securityholders in the event of a merger or consolidation requiring such assumption;
- cure any ambiguity, omission, defect or inconsistency;
- conform the terms of the debt securities to the description thereof in the prospectus and prospectus supplement offering such debt securities;
- create a series and establish its terms;
- provide for the acceptance of appointment by a successor trustee or to facilitate the administration of the trusts by more than one trustee;
- provide for uncertificated or unregistered securities;
- make any change that does not adversely affect the rights of any securityholder;

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- add to our covenants; or
- make any other change to the indentures so long as no debt securities are outstanding.

Conversion Rights

Any securities resolution or supplemental indenture establishing a series of debt securities may provide that the debt securities of such series will be convertible at the option of the holders thereof into or for our common stock or other equity or debt instruments. The securities resolution or supplemental indenture may establish, among other things, (1) the number or amount of shares of common stock or other equity or debt instruments for which \$1,000 aggregate principal amount of the debt securities of the series is convertible, as may be adjusted pursuant to the terms of the relevant indenture and the securities resolution; and (2) provisions for adjustments to the conversion rate and limitations upon exercise of the conversion right. The indentures provide that we will not be required to make an adjustment in the conversion rate unless the adjustment would require a cumulative change of at least 1% in the conversion rate. However, we will carry forward any adjustments that are less than 1% of the conversion rate and take them into account in any subsequent adjustment of the conversion rate.

Legal Defeasance and Covenant Defeasance

Debt securities of a series may be defeased in accordance with their terms and, unless the securities resolution or supplemental indenture establishing the terms of the series otherwise provides, as set forth below. We at any time may terminate as to a series all of our obligations (except for certain obligations, including obligations with respect to the defeasance trust and obligations to register the transfer or exchange of a debt security, to replace destroyed, lost or stolen debt securities and coupons and to maintain paying agencies in respect of the debt securities) with respect to the debt securities of the series and any related coupons and the relevant indenture, which we refer to as legal defeasance. We at any time may terminate as to a series our obligations with respect to any restrictive covenants which may be applicable to a particular series, which we refer to as covenant defeasance.

We may exercise our legal defeasance option notwithstanding our prior exercise of our covenant defeasance option. If we exercise our legal defeasance option, a series may not be accelerated because of an Event of Default. If we exercise our covenant defeasance option, a series may not be accelerated by reference to any covenant which may be applicable to a series.

To exercise either defeasance option as to a series, we must (1) irrevocably deposit in trust with the trustee (or another trustee) money or U.S. Government Obligations (as defined below), deliver a certificate from a nationally recognized firm of independent accountants expressing their opinion that the payments of principal and interest when due on the deposited U.S. Government Obligations, without reinvestment, plus any deposited money without investment will provide cash at such times and in such amounts as will be sufficient to pay the principal and interest when due on all debt securities of such series to maturity or redemption, as the case may be; and (2) comply with certain other conditions. In particular, we must obtain an opinion of tax counsel that the defeasance will not result in recognition of any gain or loss to holders for federal income tax purposes.

“U.S. Government Obligations” means direct obligations of the United States or any agency or instrumentality of the United States, the payment of which is unconditionally guaranteed by the United States, which, in either case, have the full faith and credit of the United States pledged for payment and which are not callable at the issuer’s option, or certificates representing an ownership interest in such obligations.

Regarding the Trustee

Unless otherwise indicated in a prospectus supplement, the trustee will also act as depository of funds, transfer agent, paying agent and conversion agent, as applicable, with respect to the debt securities. In certain circumstances, we or the securityholders may remove the trustee as the trustee under a given indenture. The indenture trustee may also provide additional unrelated services to us as a depository of funds, registrar, trustee and similar services.

Governing Law

The indentures and the debt securities will be governed by New York law, except to the extent that the Trust Indenture Act of 1939 is applicable.

DESCRIPTION OF SUBSCRIPTION RIGHTS

We may issue subscription rights to purchase our common stock, preferred stock, warrants, debt securities or units in any combination. These subscription rights may be offered independently or together with any other security offered hereby and may or may not be transferable by the stockholder receiving the subscription rights in such offering. In connection with any offering of subscription rights, we may enter into a standby arrangement with one or more underwriters or other purchasers pursuant to which the underwriters or other purchasers may be required to purchase any securities remaining unsubscribed for after such offering.

The prospectus supplement relating to any subscription rights we offer, if any, will, to the extent applicable, include specific terms relating to the offering, including some or all of the following:

- the price, if any, for the subscription rights;
- the exercise price payable for our securities upon the exercise of the subscription rights;
- the number of subscription rights to be issued to each stockholder;
- the number and terms of our securities which may be purchased per each subscription right;
- the extent to which the subscription rights are transferable;
- any other terms of the subscription rights, including the terms, procedures and limitations relating to the exchange and exercise of the subscription rights;
- the date on which the right to exercise the subscription rights shall commence, and the date on which the subscription rights shall expire;
- the extent to which the subscription rights may include an over-subscription privilege with respect to unsubscribed securities or an over-allotment privilege to the extent the securities are fully subscribed; and
- if applicable, the material terms of any standby underwriting or purchase arrangement which may be entered into by us in connection with the offering of subscription rights.

DESCRIPTION OF UNITS

We may issue units comprised of one or more of the other securities described in this prospectus in any combination. Each unit will be issued so that the holder of the unit is also the holder of each security included in the unit. Thus, the holder of a unit will have the rights and obligations of a holder of each included security (but, to the extent convertible securities are included in the units, the holder of the units will be deemed the holder of the convertible securities and not the holder of the underlying securities). The unit agreement under which a unit is issued, if any, may provide that the securities included in the unit may not be held or transferred separately, at any time or at any time before a specified date. The applicable prospectus supplement may describe:

- the designation and terms of the units and of the securities comprising the units, including whether and under what circumstances those securities may be held or transferred separately;
- any provisions for the issuance, payment, settlement, transfer or exchange of the units or of the securities comprising the units;

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- the terms of the unit agreement governing the units;
- United States federal income tax considerations relevant to the units; and
- whether the units will be issued in fully registered global form.

This summary of certain general terms of units and any summary description of units in the applicable prospectus supplement do not purport to be complete and are qualified in their entirety by reference to all provisions of the applicable unit agreement and, if applicable, collateral arrangements and depositary arrangements relating to such units. The forms of the unit agreements and other documents relating to a particular issue of units will be filed with the SEC each time we issue units, and you should read those documents for provisions that may be important to you.

FORMS OF SECURITIES

Each security may be represented either by a certificate issued in definitive form to a particular investor or by one or more global securities representing the entire issuance of securities. Certificated securities in definitive form and global securities will be issued in registered form. Definitive securities name you or your nominee as the owner of the security, and in order to transfer or exchange these securities or to receive payments other than interest or other interim payments, you or your nominee must physically deliver the securities to the trustee, registrar, paying agent or other agent, as applicable. Global securities name a depositary or its nominee as the owner of the debt securities or warrants represented by these global securities. The depositary maintains a computerized system that will reflect each investor's beneficial ownership of the securities through an account maintained by the investor with its broker/dealer, bank, trust company or other representative, as we explain more fully below.

Global Securities

Registered Global Securities. We may issue the securities in the form of one or more fully registered global securities that will be deposited with a depositary or its nominee identified in the applicable prospectus supplement and registered in the name of that depositary or nominee. In those cases, one or more registered global securities will be issued in a denomination or aggregate denominations equal to the portion of the aggregate principal or face amount of the securities to be represented by registered global securities. Unless and until it is exchanged in whole for securities in definitive registered form, a registered global security may not be transferred except as a whole by and among the depositary for the registered global security, the nominees of the depositary or any successors of the depositary or those nominees.

If not described below, any specific terms of the depositary arrangement with respect to any securities to be represented by a registered global security will be described in the prospectus supplement relating to those securities. We anticipate that the following provisions will apply to all depositary arrangements.

Ownership of beneficial interests in a registered global security will be limited to persons, called participants, that have accounts with the depositary or persons that may hold interests through participants. Upon the issuance of a registered global security, the depositary will credit, on its book-entry registration and transfer system, the participants' accounts with the respective principal or face amounts of the securities beneficially owned by the participants. Any dealers, underwriters or agents participating in the distribution of the securities will designate the accounts to be credited. Ownership of beneficial interests in a registered global security will be shown on, and the transfer of ownership interests will be effected only through, records maintained by the depositary, with respect to interests of participants, and on the records of participants, with respect to interests of persons holding through participants. The laws of some states may require that some purchasers of securities take physical delivery of these securities in definitive form. These laws may impair your ability to own, transfer or pledge beneficial interests in registered global securities.

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So long as the depository, or its nominee, is the registered owner of a registered global security, that depository or its nominee, as the case may be, will be considered the sole owner or holder of the securities represented by the registered global security for all purposes under the applicable indenture or warrant agreement. Except as described below, owners of beneficial interests in a registered global security will not be entitled to have the securities represented by the registered global security registered in their names, will not receive or be entitled to receive physical delivery of the securities in definitive form and will not be considered the owners or holders of the securities under the applicable indenture, warrant agreement or unit agreement. Accordingly, each person owning a beneficial interest in a registered global security must rely on the procedures of the depository for that registered global security and, if that person is not a participant, on the procedures of the participant through which the person owns its interest, to exercise any rights of a holder under the applicable indenture, warrant agreement or unit agreement. We understand that under existing industry practices, if we request any action of holders or if an owner of a beneficial interest in a registered global security desires to give or take any action that a holder is entitled to give or take under the applicable indenture, warrant agreement or unit agreement, the depository for the registered global security would authorize the participants holding the relevant beneficial interests to give or take that action, and the participants would authorize beneficial owners owning through them to give or take that action or would otherwise act upon the instructions of beneficial owners holding through them.

Payments to holders with respect to securities represented by a registered global security registered in the name of a depository or its nominee will be made to the depository or its nominee, as the case may be, as the registered owner of the registered global security. None of the Company, the trustees, the warrant agents, the unit agents or any other agent of the Company, the trustees, the warrant agents or the unit agents will have any responsibility or liability for any aspect of the records relating to payments made on account of beneficial ownership interests in the registered global security or for maintaining, supervising or reviewing any records relating to those beneficial ownership interests.

We expect that the depository for any of the securities represented by a registered global security, upon receipt of any payment of principal, premium, interest or other distribution of underlying securities or other property to holders on that registered global security, will immediately credit participants' accounts in amounts proportionate to their respective beneficial interests in that registered global security as shown on the records of the depository. We also expect that payments by participants to owners of beneficial interests in a registered global security held through participants will be governed by standing customer instructions and customary practices, as is now the case with the securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of those participants.

If the depository for any of these securities represented by a registered global security is at any time unwilling or unable to continue as depository or ceases to be a clearing agency registered under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and a successor depository registered as a clearing agency under the Exchange Act is not appointed by us within 90 days, we will issue securities in definitive form in exchange for the registered global security that had been held by the depository. Any securities issued in definitive form in exchange for a registered global security will be registered in the name or names that the depository gives to the relevant trustee or warrant agent or other relevant agent of ours or theirs. It is expected that the depository's instructions will be based upon directions received by the depository from participants with respect to ownership of beneficial interests in the registered global security that had been held by the depository.

PLAN OF DISTRIBUTION

Initial Offering and Sale of Securities

Unless otherwise set forth in a prospectus supplement accompanying this prospectus, we may sell the securities being offered hereby, from time to time, by one or more of the following methods:

- to or through underwriting syndicates represented by managing underwriters;
- through one or more underwriters without a syndicate for them to offer and sell to the public;
- through dealers or agents; and

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- to investors directly in negotiated sales or in competitively bid transactions.

Offerings of securities covered by this prospectus also may be made into an existing trading market for those securities in transactions at other than a fixed price, either:

- on or through the facilities of The Nasdaq Capital Market or any other securities exchange or quotation or trading service on which those securities may be listed, quoted, or traded at the time of sale; and/or
- to or through a market maker other than on the securities exchanges or quotation or trading services set forth above.

Those at-the-market offerings, if any, will be conducted by underwriters acting as principal or agent of the Company, who may also be third-party sellers of securities as described above. The prospectus supplement with respect to the offered securities will set forth the terms of the offering of the offered securities, including:

- the name or names of any underwriters, dealers or agents;
- the purchase price of the offered securities and the proceeds to us from such sale;
- any underwriting discounts and commissions or agency fees and other items constituting underwriters' or agents' compensation;
- any initial public offering price and any discounts or concessions allowed or reallocated or paid to dealers;
- any securities exchange on which such offered securities may be listed; and
- any underwriter, agent or dealer involved in the offer and sale of any series of the securities.

The distribution of the securities may be effected from time to time in one or more transactions:

- at fixed prices, which may be changed;
- at market prices prevailing at the time of the sale;
- at varying prices determined at the time of sale; or
- at negotiated prices.

Each prospectus supplement will set forth the manner and terms of an offering of securities including:

- whether that offering is being made to underwriters, through agents or directly to the public;
- the rules and procedures for any auction or bidding process, if used;
- the securities' purchase price or initial public offering price; and
- the proceeds we anticipate from the sale of the securities, if any.

In addition, we may enter into derivative or hedging transactions with third parties, or sell securities not covered by this prospectus to third parties in privately negotiated transactions. The applicable prospectus supplement may indicate, in connection with such a transaction, that the third parties may sell securities covered by and pursuant to this prospectus and an applicable prospectus supplement. If so, the third party may use securities pledged by us or borrowed from us or others to settle such sales and may use securities received from us to close out any related short positions. We may also loan or pledge securities covered by this prospectus and an applicable prospectus supplement to third parties, who may sell the loaned securities or, in an event of default in the case of a pledge, sell the pledged securities pursuant to this prospectus and the applicable prospectus supplement.

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Sales Through Underwriters

If underwriters are used in the sale of some or all of the securities covered by this prospectus, the underwriters will acquire the securities for their own account. The underwriters may resell the securities, either directly to the public or to securities dealers, at various times in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. The obligations of the underwriters to purchase the securities will be subject to certain conditions. Unless indicated otherwise in a prospectus supplement, the underwriters will be obligated to purchase all the securities of the series offered if any of the securities are purchased.

Any initial public offering price and any concessions allowed or reallocated to dealers may be changed intermittently.

Sales Through Agents

Unless otherwise indicated in the applicable prospectus supplement, when securities are sold through an agent, the designated agent will agree, for the period of its appointment as agent, to use specified efforts to sell the securities for our account and will receive commissions from us as will be set forth in the applicable prospectus supplement.

Securities bought in accordance with a redemption or repayment under their terms also may be offered and sold, if so indicated in the applicable prospectus supplement, in connection with a remarketing by one or more firms acting as principals for their own accounts or as agents for us. Any remarketing firm will be identified and the terms of its agreement, if any, with us and its compensation will be described in the prospectus supplement. Remarketing firms may be deemed to be underwriters in connection with the securities remarketed by them.

If so indicated in the applicable prospectus supplement, we may authorize agents, underwriters or dealers to solicit offers by certain specified institutions to purchase securities at a price set forth in the prospectus supplement pursuant to delayed delivery contracts providing for payment and delivery on a future date specified in the prospectus supplement. These contracts will be subject only to those conditions set forth in the applicable prospectus supplement, and the prospectus supplement will set forth the commissions payable for solicitation of these contracts.

Direct Sales

We may also sell offered securities directly to institutional investors or others. In this case, no underwriters or agents would be involved. The terms of such sales will be described in the applicable prospectus supplement.

General Information

Broker-dealers, agents or underwriters may receive compensation in the form of discounts, concessions or commissions from us and/or the purchasers of securities for whom such broker-dealers, agents or underwriters may act as agents or to whom they sell as principal, or both. This compensation to a particular broker-dealer might be in excess of customary commissions.

Underwriters, dealers and agents that participate in any distribution of the offered securities may be deemed “underwriters” within the meaning of the Securities Act, so any discounts or commissions they receive in connection with the distribution may be deemed to be underwriting compensation. Those underwriters and agents may be entitled, under their agreements with us, to indemnification by us against certain civil liabilities, including liabilities under the Securities Act, or to contribution by us to payments that they may be required to make in respect of those civil liabilities. Certain of those underwriters or agents may be customers of, engage in transactions with, or perform services for, us or our affiliates in the ordinary course of business. We will identify any underwriters or agents, and describe their compensation, in a prospectus supplement. Any institutional investors or others that purchase offered securities directly, and then resell the securities, may be deemed to be underwriters, and any discounts or commissions received by them from us and any profit on the resale of the securities by them may be deemed to be underwriting discounts and commissions under the Securities Act.

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We will file a supplement to this prospectus, if required, pursuant to Rule 424(b) under the Securities Act, if we enter into any material arrangement with a broker, dealer, agent or underwriter for the sale of securities through a block trade, special offering, exchange distribution or secondary distribution or a purchase by a broker or dealer. Such prospectus supplement will disclose:

- the name of any participating broker, dealer, agent or underwriter;
- the number and type of securities involved;
- the price at which such securities were sold;
- any securities exchanges on which such securities may be listed;
- the commissions paid or discounts or concessions allowed to any such broker, dealer, agent or underwriter, where applicable; and
- other facts material to the transaction.

In order to facilitate the offering of certain securities under this prospectus or an applicable prospectus supplement, certain persons participating in the offering of those securities may engage in transactions that stabilize, maintain or otherwise affect the price of those securities during and after the offering of those securities. Specifically, if the applicable prospectus supplement permits, the underwriters of those securities may over-allot or otherwise create a short position in those securities for their own account by selling more of those securities than have been sold to them by us and may elect to cover any such short position by purchasing those securities in the open market.

In addition, the underwriters may stabilize or maintain the price of those securities by bidding for or purchasing those securities in the open market and may impose penalty bids, under which selling concessions allowed to syndicate members or other broker-dealers participating in the offering are reclaimed if securities previously distributed in the offering are repurchased in connection with stabilization transactions or otherwise. The effect of these transactions may be to stabilize or maintain the market price of the securities at a level above that which might otherwise prevail in the open market. The imposition of a penalty bid may also affect the price of securities to the extent that it discourages resales of the securities. No representation is made as to the magnitude or effect of any such stabilization or other transactions. Such transactions, if commenced, may be discontinued at any time.

In order to comply with the securities laws of certain states, if applicable, the securities must be sold in such jurisdictions only through registered or licensed brokers or dealers. In addition, in certain states the securities may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

Rule 15c6-1 under the Exchange Act generally requires that trades in the secondary market settle in two business days, unless the parties to any such trade expressly agree otherwise. Your prospectus supplement may provide that the original issue date for your securities may be more than two scheduled business days after the trade date for your securities. Accordingly, in such a case, if you wish to trade securities on any date prior to the second business day before the original issue date for your securities, you will be required, by virtue of the fact that your securities initially are expected to settle in more than two scheduled business days after the trade date for your securities, to make alternative settlement arrangements to prevent a failed settlement.

This prospectus, any applicable prospectus supplement and any applicable pricing supplement in electronic format may be made available on the internet sites of, or through other online services maintained by, us and/or one or more of the agents and/or dealers participating in an offering of securities, or by their affiliates. In those cases, prospective investors may be able to view offering terms online and, depending upon the particular agent or dealer, prospective investors may be allowed to place orders online.

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Other than this prospectus, any applicable prospectus supplement and any applicable pricing supplement in electronic format, the information on our website or the website of any agent or dealer, and any information contained in any other website maintained by any agent or dealer:

- is not part of this prospectus, any applicable prospectus supplement or any applicable pricing supplement or the registration statement of which they form a part;
- has not been approved or endorsed by us or by any agent or dealer in its capacity as an agent or dealer, except, in each case, with respect to the respective website maintained by such entity; and
- should not be relied upon by investors.

There can be no assurance that we will sell all or any of the securities offered by this prospectus.

This prospectus may also be used in connection with any issuance of common stock or preferred stock upon exercise of a warrant if such issuance is not exempt from the registration requirements of the Securities Act.

In addition, we may issue the securities as a dividend or distribution or in a subscription rights offering to our existing securityholders. In some cases, we or dealers acting with us or on our behalf may also purchase securities and reoffer them to the public by one or more of the methods described above. This prospectus may be used in connection with any offering of our securities through any of these methods or other methods described in the applicable prospectus supplement.

LEGAL MATTERS

Unless otherwise indicated in the applicable prospectus supplement, the validity of the securities offered hereby will be passed upon for us by Mitchell Silberberg & Knupp, LLP, New York, New York. If the validity of the securities offered hereby in connection with offerings made pursuant to this prospectus are passed upon by counsel for the underwriters, dealers or agents, if any, such counsel will be named in the prospectus supplement relating to such offering.

EXPERTS

The audited financial statements incorporated by reference in this prospectus and elsewhere in the registration statement have been so incorporated by reference in reliance upon the report of Grant Thornton LLP, independent registered public accountants, upon the authority of said firm as experts in accounting and auditing. The consolidated balance sheet of MAIA Biotechnology, Inc. and Subsidiaries as of December 31, 2021, and the related consolidated statements of operations, changes in stockholders' equity (deficit), and cash flows for the year then ended, have been audited by EisnerAmper LLP, independent registered public accounting firm, as stated in their report which is incorporated herein. Such financial statements have been incorporated herein in reliance on the report of such firm given upon their authority as experts in accounting and auditing.

MAIA Biotechnology, Inc. has agreed to indemnify and hold EisnerAmper LLP harmless against and from any and all legal costs and expenses incurred by EisnerAmper LLP in successful defense of any legal action or proceeding that arises as a result of EisnerAmper LLP's consent to the inclusion of its audit report on the Company's past financial statements included in this registration statement.

ADDITIONAL INFORMATION

This prospectus is part of a registration statement on Form S-3 that we have filed with the SEC relating to the shares of our securities being offered hereby. This prospectus does not contain all of the information in the registration statement and its exhibits. The registration statement, its exhibits and the documents incorporated by reference in this prospectus and their exhibits, all contain information that is material to the offering of the securities hereby. Whenever a reference is made in this prospectus to any of our contracts or other documents, the reference may not be complete. You should refer to the exhibits that are a part of the registration statement in order to review a copy of the contract or documents.

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We file annual, quarterly and current reports, proxy statements and other information with the SEC. The SEC maintains an Internet site at <http://www.sec.gov> that contains reports, proxy and information statements, and other information regarding issuers, such as us, that file electronically with the SEC. Additionally, you may access our filings with the SEC through our website at www.MAIBiotech.com. We have included our website address as an inactive textual reference only and our website and the information contained on, or that can be accessed through, our website will not be deemed to be incorporated by reference in, and are not considered part of, this prospectus.

We will provide you without charge, upon your oral or written request, with an electronic or paper copy of any or all reports, proxy statements and other documents we file with the SEC, as well as any or all of the documents incorporated by reference in this prospectus (other than exhibits to such documents unless such exhibits are specifically incorporated by reference into such documents). Requests for such copies should be directed to:

MAIA Biotechnology, Inc.
444 West Lake Street, Suite 1700
Chicago, IL 60606
Attention: Vlad Vitoc
Telephone number: (312) 416-8592

You should rely only on the information in this prospectus and the additional information described above and under the heading “Incorporation of Certain Information by Reference” below. We have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely upon it. We are not making an offer to sell these securities in any jurisdiction where such offer or sale is not permitted. You should assume that the information in this prospectus was accurate on the date of the front cover of this prospectus only. Our business, financial condition, results of operations and prospects may have changed since that date.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to “incorporate by reference” information that we file with it into this prospectus, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this prospectus. The information incorporated by reference is considered to be a part of this prospectus, and information that we file later with the SEC will automatically update and supersede information contained in this prospectus and any accompanying prospectus supplement.

We incorporate by reference the documents listed below that we have previously filed with the SEC:

- Our Annual Report on [Form 10-K](#) for the year ended December 31, 2022, filed with the SEC on [March 24, 2023](#);
- Our Quarterly Reports on [Form 10-Q](#) for the quarter ended March 31, 2023, filed with the SEC on [May 8, 2023](#), and for the quarter ended June 30, 2023, filed with the SEC on [August 8, 2023](#);
- Our Current Reports on Form 8-K filed with the SEC on [February 6, 2023](#), [March 17, 2023](#), [April 27, 2023](#) and [May 30, 2023](#) (other than any portions thereof deemed furnished and not filed);
- Our [Definitive Proxy Statement](#) on Schedule 14A, filed with the SEC on [April 19, 2023](#); and
- The description of our common stock, par value \$0.0001 per share, contained in Exhibit 4.1 to our [Annual Report on Form 10-K](#) filed with the SEC on [March 24, 2023](#), including any amendment or report filed for the purpose of updating such description.

All reports and other documents that we file with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of this prospectus but before the termination of the offering of the securities hereunder will also be considered to be incorporated by reference into this prospectus from the date of the filing of these reports and

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documents, and will supersede the information herein; provided, however, that all reports, exhibits and other information that we “furnish” to the SEC will not be considered incorporated by reference into this prospectus. We undertake to provide without charge to each person (including any beneficial owner) who receives a copy of this prospectus, upon written or oral request, a copy of all of the preceding documents that are incorporated by reference (other than exhibits, unless the exhibits are specifically incorporated by reference into these documents). You may request a copy of these materials in the manner set forth under the heading “Additional Information,” above.

**Up to \$7,000,000
Common Stock**



MAIA Biotechnology, Inc.

PROSPECTUS SUPPLEMENT

ThinkEquity

September 1, 2023
