

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

**FORM S-3**

REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933

**MATINAS BIOPHARMA HOLDINGS, INC.**

(Exact name of registrant as specified in its charter)

**Delaware**

(State or other jurisdiction of  
incorporation or organization)

**46-3011414**

(I.R.S. Employer  
Identification Number)

**1545 Route 206 South, Suite 302  
Bedminster, New Jersey  
(908) 484-8805**

*(Address, including zip code, and telephone number,  
including area code, of registrant's principal executive offices)*

**Jerome D. Jabbour  
Chief Executive Officer  
Matinas BioPharma Holdings, Inc.  
1545 Route 206 South, Suite 302  
Bedminster, New Jersey 07921  
(908) 484-8805**

*(Name, address, including zip code, and telephone number,  
including area code, of agent for service)*

*Copies of all communications, including communications sent to the agent for service, to:*

**Michael J. Lerner, Esq.  
Steven M. Skolnick, Esq.  
Lowenstein Sandler LLP  
1251 Avenue of the Americas  
New York, New York 10020  
(212) 262-6400**

**Approximate date of commencement of proposed sale to the public:** From time to time after this Registration Statement becomes effective.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box: ☐

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box: ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box. ☐

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box. ☐

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

Large accelerated filer ☐  
Non-accelerated filer ☒

Accelerated filer ☐  
Smaller reporting company ☒  
Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act. ☐

**The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the Registration Statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.**

The information in this preliminary prospectus is not complete and may be changed. The Selling Stockholders may not resell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities, nor is it a solicitation of offers to buy these securities, in any state where the offer or sale is not permitted.

PRELIMINARY PROSPECTUS

SUBJECT TO COMPLETION

DATED APRIL 22, 2025



### 16,894,212 Shares of Common Stock

This prospectus relates to the resale of up to 16,894,212 shares of common stock, par value \$0.0001 per share ("Common Stock"), of Matinas Biopharma Holdings, Inc. (the "Company," "we," "our" or "us") by the Selling Stockholders listed in this prospectus (the "Selling Stockholders"). The shares of Common Stock registered for resale pursuant to this prospectus consist of (i) 5,631,404 shares of Common Stock issuable upon the conversion of 3,300 shares of the Company's Series C Convertible Preferred Stock, par value \$0.0001 (the "Preferred Stock"), and (ii) 11,262,808 shares of Common Stock issuable upon the exercise of warrants (the "Warrants"). The Preferred Stock and Warrants were issued to the Selling Stockholders in a private placement offering (the "Private Placement") which closed in two separate closings that occurred on February 13, 2025 and April 8, 2025. For additional information about the Private Placement, see "Private Placement" beginning on page 6 of this prospectus.

The Selling Stockholders may, from time to time, sell, transfer, assign or otherwise dispose of any or all of their shares of Common Stock or interests in their shares of Common Stock on any stock exchange, market or trading facility on which the shares of Common Stock are traded or in private transactions. These dispositions may be at fixed prices, at prevailing market prices at the time of sale, at prices related to the prevailing market price, at varying prices determined at the time of sale, or at negotiated prices. We will not receive any proceeds from the resale or other disposition of the shares of Common Stock by the Selling Stockholders. See "Use of Proceeds" beginning on page 9 and "Plan of Distribution" beginning on page 10 of this prospectus for more information.

Our Common Stock is listed on the NYSE American LLC ("NYSE American") under the symbol "MTNB." On April 21, 2025, the last reported sale price of our Common Stock as reported on NYSE American was \$0.5570.

You should read this prospectus, together with additional information described under the headings "Incorporation of Certain Information by Reference" and "Where You Can Find More Information," carefully before you invest in any of our securities.

An investment in our securities involves a high degree of risk. Before deciding whether to invest in our securities, you should consider carefully the risks and uncertainties described in the section captioned "Risk Factors" contained in our Annual Report on Form 10-K for the fiscal year ended December 31, 2024, filed with the Securities and Exchange Commission, or the SEC, on April 15, 2025 and our other filings we make with the SEC from time to time, which are incorporated by reference herein in their entirety, together with other information in this prospectus and the information incorporated by reference herein.

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 , 2025.

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### ABOUT THIS PROSPECTUS

Neither we nor the Selling Stockholders have authorized anyone to provide you with any information or to make any representations other than those contained in this prospectus or any applicable prospectus supplement or any free writing prospectuses prepared by or on behalf of us or to which we have referred you. Neither we nor the Selling Stockholders take responsibility for and can provide no assurance as to the reliability of, any other information that others may give you. Neither we nor the Selling Stockholders will make an offer to sell these securities in any jurisdiction where the offer or sale is not permitted.

For investors outside the United States: neither we nor the Selling Stockholders have done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction outside the United States where action for that purpose is required. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of our securities covered hereby and the distribution of this prospectus outside the United States.

This prospectus contains summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of some of the documents referred to herein have been filed or will be incorporated by reference as exhibits to the registration statement of which this prospectus is a part, and you may obtain copies of those documents as described below under “Where You Can Find More Information” and “Incorporation of Certain Information by Reference.”

We may also provide a prospectus supplement to add information to, or update or change information contained in, this prospectus. You should read both this prospectus and any applicable prospectus supplement together with the additional information to which we refer you in the sections of this prospectus entitled “Where You Can Find More Information” and “Incorporation of Certain Information by Reference.”

This prospectus and the information incorporated by reference herein contain references to trademarks, service marks and trade names owned by us or other companies. Solely for convenience, trademarks, service marks and trade names referred to in this prospectus and the information incorporated by reference herein, including logos, artwork, and other visual displays, may appear without the ® or ® symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensor to these trademarks, service marks and trade names. We do not intend our use or display of other companies’ trade names, service marks or trademarks to imply a relationship with, or endorsement or sponsorship of us by, any other companies. Other trademarks, trade names and service marks appearing in this prospectus and the documents incorporated by reference herein are the property of their respective owners.

## PROSPECTUS SUMMARY

*This summary highlights information contained elsewhere in this prospectus and the documents incorporated by reference herein. This summary does not contain all of the information that you should consider before deciding to invest in our securities. You should read this entire prospectus carefully, including the section entitled “Risk Factors” beginning on page 4, our consolidated financial statements and the related notes and the other information incorporated by reference into this prospectus before making an investment decision.*

### Overview

We are a clinical-stage biopharmaceutical company focused on delivering groundbreaking therapies using our lipid nanocrystal (“LNC”) platform delivery technology (LNC Platform).

Our lead product candidate is MAT2203 (oral amphotericin B), a highly potent antifungal drug which, by virtue of LNC delivery, has been made oral, safe, and well-tolerated for prolonged administration in patients with life-threatening invasive fungal infections. Following the successful EnACT Phase 2 trial in the treatment of cryptococcal meningitis, MAT2203 is now positioned for a single, Phase 3 registration trial (the “ORALTO trial”) in support of a New Drug Application (“NDA”) for the treatment of invasive aspergillosis in patients with limited treatment options.

We had also been seeking to develop an internal pipeline of products utilizing the LNC Platform to successfully encapsulate small molecules and small oligonucleotides and facilitate targeted and extrahepatic delivery to desired cells and tissues without toxicity, with a focus on small molecule oncology applications as well as the formulation and delivery of small oligonucleotides with a primary therapeutic focus on inflammation.

Following an 80% reduction in workforce implemented in late October 2024, we implemented a cost-cutting strategy and paused further clinical development of MAT2203 while continuing to engage in dialogue with prospective partners for the product with the goal of consummating a licensing, sale or other similar transaction as soon as possible to advance the development of MAT2203 into Phase 3. In addition, the Company continues to engage with the FDA to keep the MAT2203 Investigational New Drug Application (“IND”) active and is actively maintaining and prosecuting intellectual property relating to MAT2203 and to the LNC Platform generally as well as maintaining all of its obligations under our license agreement with Rutgers University. We also continue to support the patients in our Expanded/Compassionate Use Access Program with the assistance of outside medical clinician consultants. As a result of the reduction in force, the Company has paused the internal development of a pipeline of products utilizing the LNC Platform as it evaluates strategic alternatives for those early-stage programs in oncology and inflammatory diseases.

We remain engaged in an ongoing partnership process for MAT2203, seeking one or more development and/or commercialization partners. We will require either (i) the consummation of a partnership transaction, or (ii) raising additional capital, prior to commencing the ORALTO trial. In the event a partnership is consummated, the partner may seek to revise the ORALTO trial or could determine a completely new development program and pathway for MAT2203. There can be no assurance that the Company will be successful in consummating a transaction involving MAT2203.

### Corporate Information

We were incorporated in Delaware under the name Matinas BioPharma Holdings, Inc. in May 2013. We have two operating subsidiaries: Matinas BioPharma, Inc., a Delaware corporation originally formed on August 12, 2011, as Nereus BioPharma LLC, and Matinas BioPharma Nanotechnologies, Inc., a Delaware corporation originally formed on January 29, 2015, as Aquarius Biotechnologies, Inc.

Our principal executive offices are located at 1545 Route 206 South, Suite 302, Bedminster, New Jersey 07921, and our telephone number is (908) 484-880-5443. Our website address is [www.matinasbiopharma.com](http://www.matinasbiopharma.com). Our website and the information contained on, or that can be accessed through, our website will not be deemed to be incorporated by reference in, and are not considered part of, this prospectus. You should not rely on our website or any such information in making your decision whether to purchase our securities.

## THE OFFERING

<b>Common Stock to be offered by the Selling Stockholders</b>	Up to 16,894,212 shares of Common Stock, which are comprised of (i) 5,631,404 shares of Common Stock issuable upon the conversion of the Preferred Stock, and (ii) 11,262,808 shares of Common Stock issuable upon the exercise of Warrants.
<b>Common Stock outstanding prior to this Offering</b>	5,086,985 shares of Common Stock (as of April 15, 2025).
<b>Common Stock to be outstanding after this Offering</b>	21,981,197 shares of Common Stock, assuming the full conversion and exercise of the Preferred Stock and Warrants, as applicable.

<b>Use of Proceeds</b>	We will not receive any proceeds from the shares of Common Stock offered by the Selling Stockholders pursuant to this prospectus. However, we will receive the proceeds of any cash exercise of the Warrants. We intend to use the net proceeds from any cash exercise of the Warrants for working capital and other general corporate purposes. Please see the section entitled see “ <i>Use of Proceeds</i> ” on page 9 of this prospectus.
<b>National Securities Exchange Listing</b>	Our Common Stock is currently listed on NYSE American under the symbol “MTNB.”
<b>Risk Factors</b>	An investment in our securities involves a high degree of risk. Please see the section entitled “ <i>Risk Factors</i> ” beginning on page 4 of this prospectus. In addition, before deciding whether to invest in our securities, you should consider carefully the risks and uncertainties described in the section captioned “ <i>Risk Factors</i> ” contained in our Annual Report on Form 10-K for the fiscal year ended December 31, 2024 filed with the Securities and Exchange Commission (the “SEC”) on April 15, 2025, and other filings we make with the SEC from time to time, which are incorporated by reference herein in their entirety, together with other information in this prospectus and the information incorporated by reference herein.

## RISK FACTORS

An investment in our securities involves a high degree of risk. Before deciding whether to invest in our securities, you should consider carefully the risks and uncertainties described in the section captioned “*Risk Factors*” contained in our Annual Report on Form 10-K for the fiscal year ended December 31, 2024 filed with the SEC on April 15, 2025, and our other filings we make with the SEC from time to time, which are incorporated by reference herein in their entirety, together with other information in this prospectus and the information incorporated by reference herein. If any of these risks actually occurs, our business, financial condition, results of operations or cash flow could suffer materially. In such an event, the trading price of our shares of Common Stock could decline, and you might lose all or part of your investment.

## CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

Except for historical information, this prospectus and the documents incorporated herein by reference contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the “Securities Act”) and Section 21E of the Exchange Act of 1934, as amended (the “Exchange Act”). Forward-looking statements include statements with respect to our beliefs, plans, objectives, goals, expectations, anticipations, assumptions, estimates, intentions and future performance, and involve known and unknown risks, uncertainties and other factors, which may be beyond our control, and which may cause our actual results, performance or achievements to be materially different from future results, performance or achievements expressed or implied by such forward-looking statements. All statements other than statements of historical fact are statements that could be forward-looking statements. You can identify these forward-looking statements through our use of words such as “may,” “can,” “anticipate,” “assume,” “should,” “indicate,” “would,” “believe,” “contemplate,” “expect,” “seek,” “estimate,” “continue,” “plan,” “point to,” “project,” “predict,” “could,” “intend,” “target,” “potential” and other similar words and expressions of the future.

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

- our ability to complete one or more strategic transactions that will maximize our asset or otherwise provide value to stockholders;
- our ability to raise capital when needed;
- our history of operating losses in each year since inception and the expectation that we will continue to incur operating losses for the foreseeable future; and
- our ability to maintain or protect the validity of our patents and other intellectual property.

The foregoing does not represent an exhaustive list of matters that may be covered by the forward-looking statements contained herein, or those documents incorporated by reference, or risk factors that we are faced with that may cause our actual results to differ from those anticipated in our forward-looking statements. Please see “*Risk Factors*” for additional risks which could adversely impact our business and financial performance.

All forward-looking statements are expressly qualified in their entirety by this cautionary notice. You are cautioned not to place undue reliance on any forward-looking statements, which speak only as of the date of this prospectus, or the date of the document incorporated by reference into this prospectus. We have no obligation, and expressly disclaim any obligation, to update, revise or correct any of the forward-looking statements, whether as a result of new information, future events or otherwise. We have expressed our expectations, beliefs and projections in good faith, and we believe they have a reasonable basis. However, we cannot assure you that our expectations, beliefs, or projections will result or be achieved or accomplished.

## PRIVATE PLACEMENT

On February 13, 2025, we entered into a Securities Purchase Agreement (the “Purchase Agreement”) with Selling Stockholders for the issuance and sale in the Private Placement of an aggregate of 3,300 shares of Preferred Stock, initially convertible into up to 5,631,404 shares of Common Stock and the Warrants to purchase up to an aggregate of 200% of the shares of Common Stock into which the shares of Preferred Stock are initially convertible, or 11,262,808 shares of Common Stock, for an offering price of \$1,000 per share of Preferred Stock and accompanying Warrants.

On February 13, 2025, we issued and sold in the initial closing of the Private Placement (the “Initial Closing”), 1,650 shares of Preferred Stock, initially convertible into up to 2,815,702 shares of Common Stock, and accompanying Warrants, initially exercisable for up to 5,631,404 shares of Common Stock, for gross proceeds to the Company of \$1.65 million.

Pursuant the Purchase Agreement, we agreed to issue and sell an additional 1,650 shares of Preferred Stock, initially convertible into up to 2,815,702 shares of Common Stock, and accompanying Warrants, initially exercisable for up to 5,631,404 shares of Common Stock upon the obtaining of shareholder approval (“Shareholder Approval”) for the issuance of the Preferred Stock and Warrants, as required by the rules and regulations of NYSE American, including Section 713 of the NYSE American Company Guide. On April 4, 2025, we obtained the Shareholder Approval, and on April 8, 2025, we issued and sold, in the second and final closing of the Private Placement (the “Second Closing”), 1,650 shares of Preferred Stock, initially convertible into up to 2,815,702 shares of Common Stock, and accompanying Warrants, initially exercisable for up to 5,631,404 shares of Common Stock, for gross proceeds to the Company of \$1.65 million.

Pursuant to the Purchase Agreement, we agreed to file a registration statement with the SEC to register for resale the shares of Common Stock underlying the Preferred Stock and Warrants. The registration statement must be filed with the SEC no later than the 15<sup>th</sup> calendar day following the date on which we file our Annual Report on Form 10-K for the fiscal year ended December 31, 2024. We have filed the registration statement of which this prospectus forms a part pursuant to the Purchase Agreement.

Pursuant to the Purchase Agreement, we filed a certificate of designation (the “Certificate of Designation”) on February 13, 2025, with the Delaware Secretary of State designating the rights, preferences and limitations of the shares of Preferred Stock. For a description of the terms of the Preferred Stock, see “Description of Securities.”

The Warrants are exercisable at an exercise price equal to 110% of the Conversion Price, or \$0.6446 per share, and have a term of exercise equal to five years. The exercise price of the Warrants may be adjusted for stock dividends and stock splits, subsequent rights offering, pro rata distributions of dividends or the occurrence of a Fundamental Transaction (as defined in the Form of Warrant). In addition, the exercise price of the Warrants is subject to adjustment for certain dilutive issuances of Common Stock, as more fully described in the Form of Warrant. A holder of Warrants will not have the right to exercise any portion of its Warrants if the holder, together with its affiliates, would beneficially own in excess of 4.99% (or, at the election of the holder, 9.99%) of the number of shares of Common Stock outstanding immediately after giving effect to such exercise. A holder may increase or decrease the beneficial ownership limitation up to 9.99%, provided, however, that any increase in the beneficial ownership limitation shall not be effective until 61 days following notice of such change to us. If the trailing five (5) day VWAP (as defined the Warrants) is 300% higher than the initial exercise price of the Warrants, we shall have the right but not the obligation to redeem any of the unexercised portion of the Warrant (the “Call Amount”). Subject to the terms and conditions of the Warrants, upon such a redemption, the holders of the Warrants shall exercise the Warrants for up to the Call Amount.

Pursuant to the Purchase Agreement, commencing on the date of the Initial Closing until such time as Selling Stockholders no longer own at least 10% of the outstanding shares of Common Stock on a fully diluted, as-converted basis, the Selling Stockholders will be entitled to nominate one director to serve on the Board of Directors of the Company (the “Board”), who was initially Dr. Robin Smith. Commencing on the date of the Second Closing until such time as the Selling Stockholders no longer own at least 30% of the outstanding shares of Common Stock on a fully diluted, as-converted basis, the Selling Stockholders will be entitled to nominate one additional director to serve on the Board.

Under the Purchase Agreement, for a period of nine months from the date of the Initial Closing, we are prohibited from issuing, entering into any agreement to issue, or announcing the issuance or proposed issuance of any shares of Common Stock or Common Stock equivalents, subject to certain exceptions.

## SELLING STOCKHOLDERS

This prospectus covers the resale or other disposition by the Selling Stockholders identified in the table below of up to an aggregate 16,894,212 shares of our Common Stock issuable upon the conversion of the Preferred Stock and the exercise of the Warrants. The Selling Stockholders acquired their securities in the transactions described above under the heading “Private Placement.”

Both the Certificate of Designation of the Preferred Stock and the Warrants held by the Selling Stockholders contain limitations which prevent the holder from converting such Preferred Stock or exercising such Warrants if such exercise would cause the Selling Stockholder, together with certain related parties, to beneficially own a number of shares of Common Stock which would exceed 4.99% (or, at the election of the holder, 9.99%) of our then outstanding shares of Common Stock following such exercise, excluding for purposes of such determination, shares of Common Stock issuable upon conversion of the Preferred Stock which have not been converted or the exercise of the Warrants which have not been exercised.

The table below sets forth, as of April 15, 2025, the following information regarding the Selling Stockholders:

- the names of the Selling Stockholders;
- the number of shares of Common Stock owned by the Selling Stockholders prior to this offering, without regard to any beneficial ownership limitations contained in the Certificate of Designation of the Preferred Stock and the Warrants;
- the number of shares of Common Stock to be offered by the Selling Stockholders in this offering;
- the number of shares of Common Stock to be owned by the Selling Stockholders assuming the sale of all of the shares of Common Stock covered by this prospectus; and
- the percentage of our issued and outstanding shares of Common Stock to be owned by Selling Stockholders assuming the sale of all of the shares of Common Stock covered by this prospectus based on the number of shares of Common Stock issued and outstanding as of April 15, 2025.

Except as described above, the number of shares of Common Stock beneficially owned by the Selling Stockholders has been determined in accordance with Rule 13d-3 under the Exchange Act and includes, for such purpose, shares of Common Stock that the Selling Stockholder has the right to acquire within 60 days of April 15, 2025.

All information with respect to the Common Stock ownership of the Selling Stockholders has been furnished by or on behalf of the Selling Stockholders. We believe, based on information supplied by the Selling Stockholders, that except as may otherwise be indicated in the footnotes to the table below, the Selling Stockholder has sole voting and dispositive power with respect to the shares of Common Stock reported as beneficially owned by the Selling Stockholders. Because the Selling Stockholders identified in the table may sell some or all of the shares of Common Stock beneficially owned by them and covered by this prospectus, and because there are currently no agreements, arrangements or understandings with respect to the sale of any of the shares of Common Stock, no estimate can be given as to the number of shares of Common Stock available for resale hereby that will be held by the Selling Stockholders upon termination of this offering. In addition, the Selling Stockholders may have sold, assigned, transferred or otherwise disposed of, or may sell, transfer or otherwise dispose of, at any time and from time to time, the shares of Common Stock they beneficially own in transactions exempt from the registration requirements of the Securities Act after the date on which they provided the information set forth in the table below. We have, therefore, assumed for the purposes of the following table, that each Selling Stockholders will sell all of the shares of Common Stock owned beneficially by it that are covered by this prospectus, but will not sell any other shares of Common Stock that they presently own. Except as set forth below and for the ownership of the Preferred Stock and Warrants issued pursuant to the Securities Purchase Agreement, neither the Selling Stockholders, nor any persons (entities or natural persons) who have control over the Selling Stockholders, have held any position or office, or have otherwise had any material relationship with us or any of our subsidiaries within the past three years.

Name of Selling Stockholders	Shares Owned prior to Offering	Shares Offered by this Prospectus	Shares Owned after Offering	Percentage of Shares Beneficially Owned after Offering (1)
Sanitam Partners LLC (2)	7,408,641(3)	7,197,954	210,687	*
Pembroke & Partners LLC (4)	5,039,046(5)	5,037,546	1,500	*
Platinum Point Capital LLC(6)	2,098,980(7)	2,098,980	-	-
HEZBAY Holdings LLC(8)	2,559,732(9)	2,559,732	-	-

\* Less than 1 percent

- (1) Percentages are based on 5,086,985 shares of Common Stock outstanding as of April 15, 2025
- (2) Adam K. Stern is the Manager of Sanitam Partners LLC and has voting and investment control over the securities held by Sanitam Partners LLC. The address of Sanitam Partners LLC is 1345 Avenue of the Americas Fl 27, New York, New York 10105.
- (3) Includes (i) 2,399,318 shares of Common Stock issuable upon conversion of Preferred Stock, (ii) 4,798,636 shares of Common Stock issuable upon conversion of Warrants and (iii) 210,687 shares of Common Stock.
- (4) Robert J. Eide is the Sole Manager of Pembroke & Partners LLC and has voting and investment control over the securities held by Pembroke & Partners LLC. The address of Pembroke & Partners LLC is 1345 Avenue of the Americas Fl 27, New York, New York 10105.
- (5) Includes (i) 1,679,182 shares of Common Stock issuable upon conversion of Preferred Stock, (ii) 3,358,364 shares of Common Stock issuable upon conversion of Warrants and (iii) 1,500 shares of Common Stock.
- (6) Brian Freifeld is the Manager of Platinum Point Capital LLC and has voting and investment control over the securities held by Platinum Point Capital LLC. The address of Platinum Point Capital LLC is 353 Lexington Avenue Suite 1501, New York, New York 10016.
- (7) Includes (i) 699,660 shares of Common Stock issuable upon conversion of Preferred Stock and (ii) 1,399,320 shares of Common Stock issuable upon conversion of Warrants.
- (8) Ari Kluger is the Sole Partner of Hezbay Holdings LLC and has voting and investment control over the securities held by Hezbay Holdings LLC. The address of Hezbay Holdings LLC is 23 Tammy Rd., Spring Valley, New York 10977.
- (9) Includes (i) 853,244 shares of Common Stock issuable upon conversion of Preferred Stock and (ii) 1,706,488 shares of Common Stock issuable upon conversion of Warrants.

### USE OF PROCEEDS

The Common Stock to be offered and sold using this prospectus will be offered and sold by the Selling Stockholders named in this prospectus. Accordingly, we will not receive any proceeds from any sale of shares of Common Stock in this offering. However, we will receive the proceeds of any cash exercise of the Warrants. We intend to use the net proceeds from any cash exercise of the Warrants for working capital and other general corporate purposes. We will pay all of the fees and expenses incurred by us in connection with this registration.

### PLAN OF DISTRIBUTION

Each Selling Stockholder of the securities and any of their pledgees, donees, assignees, transferees and successors-in-interest may, from time to time, sell any or all of their securities covered hereby on NYSE American or any other stock exchange, market or trading facility on which the securities are traded or in private transactions. These sales may be at fixed or negotiated prices. A Selling Stockholder may use any one or more of the following methods when selling securities:

- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the securities as agent but may position and resell a portion of the block as principal to facilitate the transaction;
- purchases by a broker-dealer as principal and resale by the broker-dealer for its account;
- an exchange distribution in accordance with the rules of the applicable exchange;
- privately negotiated transactions;
- settlement of short sales;
- in transactions through broker-dealers that agree with the Selling Stockholders to sell a specified number of such securities at a stipulated price per security;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- a combination of any such methods of sale; or
- any other method permitted pursuant to applicable law.

The Selling Stockholders may also sell securities under Rule 144 or any other exemption from registration under the Securities Act, if available, rather than under this prospectus.

Broker-dealers engaged by the Selling Stockholders may arrange for other broker-dealers to participate in sales. Broker-dealers may receive commissions or discounts from the Selling Stockholders (or, if any broker-dealer acts as agent for the purchaser of securities, from the purchaser) in amounts to be negotiated, but, except as set forth in a supplement to this prospectus, in the case of an agency transaction not in excess of a customary brokerage commission in compliance with FINRA Rule 2121; and in the case of a principal transaction a markup or markdown in compliance with FINRA Rule 2121.

In connection with the sale of the securities or interests therein, the Selling Stockholders may enter into hedging transactions with broker-dealers or other financial institutions, which may in turn engage in short sales of the securities in the course of hedging the positions they assume. The Selling Stockholders may also sell securities short and deliver these securities to close out their short positions, or loan or pledge the securities to broker-dealers that in turn may sell these securities. The Selling Stockholders may also enter into option or other transactions with broker-dealers or other financial institutions or create one or more derivative securities which require the delivery to such broker-dealer or other financial institution of securities offered by this prospectus, which securities such broker-dealer or other financial institution may resell pursuant to this prospectus (as supplemented or amended to reflect such transaction).

The Selling Stockholders and any broker-dealers or agents that are involved in selling the securities may be deemed to be “underwriters” within the meaning of the

Securities Act in connection with such sales. In such event, any commissions received by such broker-dealers or agents and any profit on the resale of the securities purchased by them may be deemed to be underwriting commissions or discounts under the Securities Act. Each Selling Stockholder has informed us that it does not have any written or oral agreement or understanding, directly or indirectly, with any person to distribute the securities.

We are required to pay certain fees and expenses incurred by us incident to the registration of the securities. We have agreed to keep the registration statement of which this prospectus forms a part effective at all times until no Selling Stockholder owns any shares of Common Stock issuable upon conversion or exercise of the Preferred Stock and Warrants, as applicable.

Under applicable rules and regulations under the Exchange Act, any person engaged in the distribution of the resale securities may not simultaneously engage in market-making activities with respect to the Common Stock for the applicable restricted period, as defined in Regulation M, prior to the commencement of the distribution. In addition, the Selling Stockholders will be subject to applicable provisions of the Exchange Act and the rules and regulations thereunder, including Regulation M, which may limit the timing of purchases and sales of the Common Stock by the Selling Stockholders or any other person. We will make copies of this prospectus available to the Selling Stockholders and have informed them of the need to deliver a copy of this prospectus to each purchaser at or prior to the time of the sale (including by compliance with Rule 172 under the Securities Act).

Our Common Stock is quoted on NYSE American under the symbol “MTNB.”

## DESCRIPTION OF SECURITIES

The following summary of the rights of our capital stock is not complete and is subject to and qualified in its entirety by reference to our Certificate of Incorporation, as amended (the “Certificate of Incorporation”) and Bylaws (the “Bylaws”), copies of which are filed as exhibits to the registration statement of which this prospectus forms a part.

### General

Our authorized capital stock consists of 250,000,000 shares of Common Stock, par value \$0.0001 per share and 10,000,000 shares of preferred stock, par value \$0.0001 per share.

The additional shares of our authorized stock available for issuance might 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-in-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.

### Common Stock

*Voting.* The holders of our Common Stock are entitled to one vote for each share held of record on all matters on which the holders are entitled to vote (or consent to).

*Dividends.* The holders of our Common Stock are entitled to receive, ratably, dividends only if, when and as declared by our board of directors out of funds legally available therefor and after provision is made for each class of capital stock having preference over the Common Stock (including the Common Stock).

*Liquidation Rights.* In the event of our liquidation, dissolution or winding-up, the holders of our Common Stock are entitled to share, ratably, in all assets remaining available for distribution after payment of all liabilities and after provision is made for each class of capital stock having preference over the Common Stock (including the Common Stock).

*Conversion Rights.* The holders of our Common Stock have no conversion rights.

*Preemptive and Similar Rights.* The holders of our Common Stock have no preemptive or similar rights.

*Redemption/Put Rights.* There are no redemption or sinking fund provisions applicable to the Common Stock. All of the outstanding shares of our Common Stock are fully-paid and nonassessable.

*Transfer Agent and Registrar.* The transfer agent and registrar for our Common Stock is VStock Transfer, LLC.

### Preferred Stock

We are authorized to issue up to 10,000,000 shares of preferred stock, par value \$0.0001 per share, with such designations, rights, and preferences as may be determined from time to time by our board of directors. Accordingly, our board of directors is empowered, without stockholder approval, to issue preferred stock with dividend, liquidation, conversion, voting, or other rights that could adversely affect the voting power or other rights of the holders of our Common Stock. The issuance of preferred stock could have the effect of restricting dividends on our Common Stock, diluting the voting power of our Common Stock, impairing the liquidation rights of our Common Stock, or delaying or preventing a change in control of our company, all without further action by our stockholders.

Our board of directors has the authority, within the limitations and restrictions prescribed by law and without stockholder approval, to provide by resolution for the issuance of shares of preferred stock, and to fix the rights, preferences, privileges and restrictions thereof, including dividend rights, conversion rights, voting rights, terms of redemption, liquidation preference and the number of shares constituting any series of the designation of such series, by delivering an appropriate certificate of amendment to our amended and restated certificate of incorporation to the Delaware Secretary of State pursuant to the Delaware General Corporation Law (the “DGCL”). The issuance of preferred stock could have the effect of decreasing the market price of the Common Stock, impeding or delaying a possible takeover and adversely affecting the voting and other rights of the holders of our Common Stock.

### *Series C Preferred Stock*

We filed the Certificate of Designation on February 13, 2025, with the Delaware Secretary of State designating the rights, preferences and limitations of the shares of Preferred Stock. The following summary of the principal terms of the Preferred Stock as set forth in the Certificate of Designation is qualified in its entirety by reference to, the Certificate of Designation, which is filed as an exhibit to the registration statement of which this prospectus forms a part.

*Voting.* The holders of the Preferred Stock are entitled to vote with the holders of Common Stock on all matters presented to stockholders. In any such vote, each share of Preferred Stock is entitled to a number of votes equal to the Stated Value per share of the Series C Preferred divided by \$0.6393, subject to adjustment for reverse and forward stock splits, stock dividends, stock combinations and other similar transactions of the Common Stock.

*Dividends.* The holders of the Preferred Stock are entitled to receive dividends on an as-if-converted-to-common-stock basis, disregarding for such purpose any conversion limitations stated below, to and in the same form as dividends actually paid on shares of the Common Stock when, as and if such dividends are paid on shares of the Common Stock. No other dividends shall be paid on shares of Preferred Stock.

*Liquidation Rights.* Upon any liquidation, dissolution or winding-up of the Company, whether voluntary or involuntary, the holders of the Preferred Stock are entitled to receive out of the assets available for distribution to stockholders, (i) after and subject to the payment in full of all amounts required to be distributed to the holders of another class or series of stock of the Company ranking on liquidation prior and in preference to the preferred stock, (ii) ratably with any class or series of stock designated as ranking on liquidation on parity with the preferred stock and (iii) in preference and priority to the holders of the shares of junior securities, an amount equal to one hundred percent (100%) of the Stated Value and no more, in proportion to the full and preferential amount that all shares of the Preferred Stock are entitled to receive. If our assets are insufficient to pay in full such amounts, then the entire assets to be distributed to the holders of the Preferred Stock will be ratably distributed among the holders in accordance with the respective amounts that would be payable on such shares if all amounts payable thereon were paid in full.

*Conversion Rights.* Each share of Preferred Stock is convertible at any time at the option of the Series C Holder thereof, into that number of shares of Common Stock, determined by dividing the Stated Value by the then in effect conversion price. A holder of Preferred Stock will not have the right to convert any portion of its Preferred Stock if the holder, together with its affiliates, would beneficially own in excess of 4.99% (or, at the election of the holder, 9.99%) of the number of shares of Common Stock outstanding immediately after giving effect to such exercise. A holder may increase or decrease the beneficial ownership limitation up to 9.99%, provided, however, that any increase in the beneficial ownership limitation shall not be effective until 61 days following notice of such change to the Company.

*Conversion Price.* The conversion price for the Preferred Stock is \$0.586, subject to adjustment. The conversion price may be adjusted pursuant to the Certificate of Designation for stock dividends and stock splits, subsequent rights offering, pro rata distributions of dividends or the occurrence of a Fundamental Transaction (as defined in the Certificate of Designation). In addition, the conversion price is subject to adjustment for certain dilutive issuances of Common Stock, as more fully described in the Certificate of Designation

*Preemptive and Similar Rights.* The holders of the Preferred Stock have no preemptive or similar rights.

*Redemption/Put Rights.* There are no redemption or sinking fund provisions applicable to the Preferred Stock. All of the outstanding shares of the Preferred Stock are fully paid and nonassessable.

*Transfer Agent and Registrar.* The transfer agent and registrar for the Preferred Stock is VStock Transfer, LLC.

## **Anti-Takeover Effects of Delaware law and Our Certificate of Incorporation and Bylaws**

### ***Section 203 of the Delaware General Corporation Law***

We are subject to Section 203 of the Delaware General Corporation Law (the “DGCL”), which prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years after the date that such stockholder became an interested stockholder, with the following exceptions:

- before such date, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction began, excluding for purposes of determining the voting stock outstanding (but not the outstanding voting stock owned by the interested stockholder) those shares owned (i) by persons who are directors and also officers and (ii) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or after such date, the business combination is approved by the board of directors and authorized at an annual or special meeting of the stockholder, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock that is not owned by the interested stockholder.

In general, Section 203 defines business combination to include the following:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, pledge or other disposition of 10% or more of the assets of the corporation involving the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock or any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits by or through the corporation.

In general, Section 203 defines an “interested stockholder” as an entity or person who, together with the person’s affiliates and associates, beneficially owns, or within three years prior to the time of determination of interested stockholder status did own, 15% or more of the outstanding voting stock of the corporation.

## **Certificate of Incorporation and Bylaws**

Our Certificate of Incorporation and Bylaws contain provisions that could have the effect of discouraging potential acquisition proposals or tender offers or delaying or preventing a change of control of our company. These provisions are as follows:

- they provide that special meetings of stockholders may be called only by the board of directors, President or our Chairman of the board of directors, or at the request in writing by stockholders of record owning at least fifty (50%) percent of the issued and outstanding voting shares of Common Stock;
- they do not include a provision for cumulative voting in the election of directors. Under cumulative voting, a minority stockholder holding a sufficient number of shares may be able to ensure the election of one or more directors. The absence of cumulative voting may have the effect of limiting the ability of minority stockholders to effect changes in our board of directors; and
- they allow us to issue “blank check” preferred stock, the terms of which may be established and shares of which may be issued without stockholder approval.



## Potential Effects of Authorized but Unissued Stock

We have shares of Common Stock and preferred stock available for future issuance without stockholder approval. We may utilize these additional shares for a variety of corporate purposes, including future public offerings to raise additional capital, to facilitate corporate acquisitions or payment as a dividend on the capital stock.

The existence of unissued and unreserved Common Stock and preferred stock may enable our board of directors to issue shares to persons friendly to current management or to issue preferred stock with terms that could render more difficult or discourage a third-party attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise, thereby protecting the continuity of our management. In addition, the board of directors has the discretion to determine designations, rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences of each series of preferred stock, all to the fullest extent permissible under the DGCL and subject to any limitations set forth in our Certificate of Incorporation. The purpose of authorizing the board of directors to issue preferred stock and to determine the rights and preferences applicable to such preferred stock is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing desirable flexibility in connection with possible financings, acquisitions 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 acquiring, a majority of our outstanding voting stock.

## National Securities Exchange Listing

Our Common Stock is currently listed on NYSE American under the symbol “MTNB.”

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## LEGAL MATTERS

The validity of the shares of Common Stock offered hereby will be passed upon for us by Lowenstein Sandler LLP, New York, New York.

## EXPERTS

The consolidated balance sheets of Matinas BioPharma Holdings, Inc. and Subsidiaries (the “Company”) as of December 31, 2024 and 2023, and the related consolidated statements of operations and comprehensive loss, stockholders’ equity, and cash flows for each of the years then ended, have been audited by EisnerAmper LLP, an independent registered public accounting firm, as stated in their report which is incorporated herein by reference, which report includes an explanatory paragraph about the existence of substantial doubt concerning the Company’s ability to continue as a going concern. Such financial statements have been incorporated herein by reference in reliance on the report of such firm given upon their authority as experts in accounting and auditing.

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## WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-3 under the Securities Act with respect to the shares of Common Stock offered by this prospectus. This prospectus, which is part of the registration statement, omits certain information, exhibits, schedules and undertakings set forth in the registration statement. For further information pertaining to us and our securities, reference is made to our SEC filings and the registration statement and the exhibits and schedules to the registration statement. Statements contained in this prospectus as to the contents or provisions of any documents referred to in this prospectus are not necessarily complete, and in each instance where a copy of the document has been filed as an exhibit to the registration statement, reference is made to the exhibit for a more complete description of the matters involved.

In addition, registration statements and certain other filings made with the SEC electronically are publicly available through the SEC’s website at <http://www.sec.gov>. The registration statement, including all exhibits and amendments to the registration statement, has been filed electronically with the SEC.

We are subject to the information and periodic reporting requirements of the Exchange Act, as amended, and, in accordance with such requirements, will file periodic reports, proxy statements, and other information with the SEC. These periodic reports, proxy statements, and other information will be available for inspection and copying at the web site of the SEC referred to above. We also maintain a website at [www.matinasbiopharma.com](http://www.matinasbiopharma.com), at which you may access these materials free of charge as soon as reasonably practicable after they are electronically filed with, or furnished to, the SEC. The information contained in, or that can be accessed through, our website is not part of, and is not incorporated into, this prospectus. We have included our website address in this prospectus solely as an inactive textual reference.

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## 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, 2024, as filed with the SEC on [April 15, 2025](#);
- our Current Reports on Form 8-K as filed with the SEC on [January 10, 2025](#), [January 24, 2025](#), [February 7, 2025](#), [February 11, 2025](#), [February 13, 2025](#), [March 11, 2025](#), [March 14, 2025](#), [April 4, 2025](#) and [April 8, 2025](#) (other than any portions thereof deemed furnished and not filed); and
- the description of our Common Stock and warrants contained in our Registration Statement on Form 8-A filed with the SEC on [March 1, 2017](#), including any amendments and reports filed for the purpose of updating such description, including the description of our Common Stock included as [Exhibit 4.2](#) to our Annual Report on Form 10-K for the year ended December 31, 2024, filed with the SEC on April 15, 2025.

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 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 “Where You Can Find More Information,” above.

We will provide you without charge, upon your oral or written request, with a 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 or the registration statement (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:

Investor Relations Department  
Matinas BioPharma Holdings, Inc.  
1545 Route 206 South  
Suite 302  
Bedminster, NJ 07921  
Telephone number: (908) 484-8805

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16,894,212 Shares of Common Stock



## PROSPECTUS

, 2025

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## PART II

### INFORMATION NOT REQUIRED IN PROSPECTUS

#### Item 14. Other Expenses of Issuance and Distribution.

The following table indicates the expenses to be incurred in connection with the offering described in this registration statement, other than underwriting discounts and commissions, all of which will be paid by us. All amounts are estimated except the SEC registration fee.

	Amount
SEC Registration Fee	\$ 1,451
Legal Fees and Expenses	25,000
Accounting Fees and Expenses	25,000
Miscellaneous Expenses	5,000
Total expenses	\$ 56,451

#### Item 15. Indemnification of Directors and Officers.

Section 145 of the DGCL provides that a corporation has the power to indemnify a director, officer, employee, or agent of the corporation, or a person serving at the request of the corporation for another corporation, partnership, joint venture, trust or other enterprise in related capacities against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with an action, suit or proceeding to which he was or is a party or is threatened to be made a party to any threatened, ending or completed action, suit or proceeding by reason of such position, if such person acted in good faith and in a manner he reasonably believed to be in or not opposed to the best interests of the corporation, and, in any criminal action or proceeding, had no reasonable cause to believe his conduct was unlawful, except that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

Our Certificate of Incorporation, as amended, and Bylaws provide that we will indemnify our directors, officers, employees and agents to the extent and in the manner permitted by the provisions of the DGCL, as amended from time to time, subject to any permissible expansion or limitation of such indemnification, as may be set forth in any amendment by stockholders or directors resolution.

Any repeal or modification of these provisions approved by our stockholders will be prospective only and will not adversely affect any limitation on the liability of any of our directors or officers existing as of the time of such repeal or modification.

We have director and officer liability insurance to cover liabilities our directors and officers may incur in connection with their services to us, including matters arising under the Securities Act.

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#### Item 16. Exhibits

Exhibit No.	Description
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2.1	<a href="#"><u>Merger Agreement, dated July 11, 2013, by and among the Company, Matinas Merger Sub, Inc., and Matinas BioPharma, Inc. (incorporated by reference to Exhibit 2.1 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014).</u></a>
2.2	<a href="#"><u>Agreement and Plan of Merger (the "Merger Agreement") with Aquarius Biotechnologies, Inc., a Delaware corporation ("Aquarius"), Saffron Merger Sub, Inc., a Delaware corporation and a wholly-owned subsidiary of the Company ("Merger Sub") and J. Carl Craft, as the stockholder representative (incorporated by reference to Exhibit 2.1 to the Company's Current Report on Form 8-K filed with the SEC on January 30, 2015).</u></a>
3.1	<a href="#"><u>Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014).</u></a>
3.2	<a href="#"><u>Bylaws (incorporated by reference to Exhibit 3.2 to Amendment No. 1 to the Company's Registration Statement on Form S-1 filed with the SEC on February 7, 2014).</u></a>
3.3	<a href="#"><u>Certificate of Amendment, dated October 29, 2015 to Certificate of Incorporation. (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed with the SEC on November 5, 2015).</u></a>
3.4	<a href="#"><u>Certificate of Amendment of Certificate of Incorporation, dated August 30, 2024 (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed with the SEC on September 3, 2024).</u></a>
3.5	<a href="#"><u>Form of Certificate of Designation of Series C Convertible Preferred Stock (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed with the SEC on February 13, 2025).</u></a>
4.1	<a href="#"><u>Form of Warrant (incorporated by reference to Exhibit 4.2 to the Company's the Current Report on Form 8-K filed with the Commission on February 13, 2025).</u></a>
5.1	<a href="#"><u>Opinion of Lowenstein Sandler LLP.*</u></a>
10.1	<a href="#"><u>Form of Securities Purchase Agreement (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K, filed with the Commission on February 13, 2025).</u></a>
23.1	<a href="#"><u>Consent of EisnerAmper LLP.*</u></a>
23.2	<a href="#"><u>Consent of Lowenstein Sandler LLP (Included in Exhibit 5.1).*</u></a>
24.1	<a href="#"><u>Power of Attorney (contained on the signature pages to the Registration Statement).</u></a>
107	<a href="#"><u>Filing Fee Table*</u></a>

\* Filed herewith.

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### Item 17. Undertakings

(a) The undersigned registrant hereby undertakes:

- 1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:
  - i. To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;
  - ii. To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and
  - iii. To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement.

*Provided, however,* That: Paragraphs (a)(1)(i), (ii) and (iii) above do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

- 2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- 3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.
- 4) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser, each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the registration statement as of the date it is first used after effectiveness. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use.
- 5) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:
  - i. Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;
  - ii. Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;
  - iii. The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and
  - iv. Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.
- b) The undersigned registrant hereby undertakes that, for the purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

- c) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the forgoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

### SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Bedminster, State of New Jersey, on April 22, 2025.

#### MATINAS BIOPHARMA HOLDINGS, INC.

By: /s/ Jerome D. Jabbour

Jerome D. Jabbour

Chairman, Chief Executive Officer and President

By: /s/ Keith A. Kucinski

Keith A. Kucinski

Chief Financial Officer

### POWER OF ATTORNEY AND SIGNATURES

Each person whose signature appears below constitutes and appoints Jerome D. Jabbour and Keith A. Kucinski and each of them singly, his or her true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments (including, without limitation, post-effective amendments) to this registration statement and any and all additional registration statements pursuant to Rule 462(b) of the Securities Act and to file the same, with all exhibits thereto and all other documents in connection therewith, with the SEC, granting unto each said attorney-in-fact and agent full power and authority to do and perform each and every act in person, hereby ratifying and confirming all that said attorneys-in-fact and agents or either of them or their, his or her substitute or substitutes may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed by the following persons on behalf of the registrant in the capacities and on the dates indicated.

Signature	Title	Date
<u>/s/ Jerome D. Jabbour</u> Jerome D. Jabbour	Chairman, Chief Executive Officer & President (Principal Executive Officer)	April 22, 2025
<u>/s/ Keith A. Kucinski</u> Keith A. Kucinski	Chief Financial Officer (Principal Financial and Accounting Officer)	April 22, 2025
<u>/s/ Evelyn D'An</u> Evelyn D'An	Director	April 22, 2025
<u>/s/ Keith Murphy</u> Keith Murphy	Director	April 22, 2025
<u>/s/ Edward Neugeboren</u> Edward Neugeboren	Director	April 22, 2025
<u>/s/ Robin L. Smith</u> Robin L. Smith	Director	April 22, 2025



April 22, 2025

Matinas BioPharma Holdings, Inc.  
1545 Route 206 South, Suite 302  
Bedminster, New Jersey 07921

Ladies and Gentlemen:

We have acted as counsel to Matinas BioPharma Holdings, Inc., a Delaware corporation (the “**Company**”), in connection with the preparation and filing of a Registration Statement on Form S-3 (the “**Registration Statement**”), including a related prospectus filed with the Registration Statement (the “**Prospectus**”), with the Securities and Exchange Commission (the “**Commission**”) pursuant to the Securities Act of 1933, as amended (the “**Securities Act**”), relating to the resale or other disposition by certain selling stockholders named therein (the “**Selling Stockholders**”) of 16,894,212 shares of the Company’s common stock, par value \$0.0001 per share (the “**Common Stock**”). Such shares of Common Stock consist of:

(i) 5,631,404 shares of Common Stock (“**Series C Conversion Shares**”) issuable upon the conversion of the Company’s Series C Convertible Preferred Stock, par value \$0.0001 (the “**Preferred Stock**”); and

(ii) 11,262,808 shares of Common Stock (the “**Warrant Shares**”) issuable upon the exercise of warrants (the “**Warrants**”).

In connection with rendering this opinion, we have examined originals or copies (certified or otherwise identified to our satisfaction) of (i) the Company’s Certificate of Incorporation, as amended and as currently in effect, (ii) the Company’s Bylaws, as currently in effect, (iii) the Certificate of Designation of Preferences, Rights and Limitations of the Preferred Stock, (iv) the form of the Warrant, (v) the Registration Statement and related Prospectus and (vi) such corporate records, agreements, documents and other instruments, and such certificates or comparable documents of public officials or of officers and representatives of the Company, and we have made such inquiries of such officers and representatives, as we have deemed relevant and necessary as a basis for the opinion hereinafter set forth.

In such examination, we have assumed the genuineness of all signatures, the legal capacity of all natural persons, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as certified, conformed or photostatic copies, and the authenticity of the originals of such latter documents. As to certain questions of fact material to this opinion, we have relied upon certificates or comparable documents of officers and representatives of the Company and have not sought to independently verify such facts.

Based on the foregoing, and subject to the assumptions, limitations and qualifications stated herein, we are of the opinion that:

1. when issued in accordance with the terms of the Preferred Stock, the Series C Conversion Shares will be duly authorized, validly issued, fully paid and non-assessable; and
2. when issued in accordance with the terms of the Warrants, the Warrant Shares will be duly authorized, validly issued, fully paid and non-assessable.

The opinion expressed herein is limited to the General Corporation Law of the State of Delaware (including reported judicial decisions interpreting the General Corporation Law of the State of Delaware) and we express no opinion as to the effect on the matters covered by this letter of the laws of any other jurisdiction.

We hereby consent to the filing of this letter as an exhibit to the Registration Statement and to the reference to our firm under the caption “Legal Matters” in the Prospectus which is a part of the Registration Statement. In giving such consents, we do not thereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act.

Very truly yours,

/s/ Lowenstein Sandler LLP  
Lowenstein Sandler LLP

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the incorporation by reference in this Registration Statement of Matinas BioPharma Holdings, Inc. on Form S-3 to be filed on or about April 22, 2025 of our report dated April 15, 2025, on our audits of the consolidated financial statements as of December 31, 2024 and 2023 and for each of the years then ended, which report was included in the Annual Report on Form 10-K filed April 15, 2025. Our report includes an explanatory paragraph about the existence of substantial doubt concerning the Company's ability to continue as a going concern. We also consent to the reference to our firm under the caption "Experts" in this Registration Statement.

*/s/ EisnerAmper LLP*

EISNERAMPER LLP  
Iselin, NJ  
April 22, 2025

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## Calculation of Filing Fee Tables

FORM S-3  
(Form Type)MATINAS BIOPHARMA HOLDINGS, INC.  
(Exact Name of Registrant as Specified in its Charter)

Table 1: Newly Registered and Carry Forward Securities

	Security Type	Security Class Title	Fee Calculation or Carry Forward Rule	Amount Registered (1)	Proposed Maximum Offering Price Per Unit (2)	Maximum Aggregate Offering Price(2)	Fee Rate	Amount of Registration Fee
		Common Stock, par value \$0.0001						
<b>Fees to Be Paid</b>	Equity		Other	16,894,212	\$ 0.561	\$ 9,477,652.94	0.0001531	\$ 1,451.03
		<b>Total Offering Amounts</b>				\$ 9,477,652.94		\$ 1,451.03
		<b>Total Fees Previously Paid</b>						\$ 0
		<b>Total Fee Offsets</b>						\$ 0
		<b>Net Fee Due</b>						\$ 1,451.03

(1) Pursuant to Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), the shares of common stock issuable upon the conversion or exercise, of the Preferred Stock and Warrants, as applicable, offered hereby also include indeterminate number of additional shares of common stock as may be issued or issuable because of stock splits, stock dividends stock distributions, and similar transactions.

(2) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(c) under the Securities Act. The proposed maximum offering price per share and maximum aggregate offering price are based upon on a per share price of \$0.561, the average of the high and low prices of the Registrant's Common Stock on the NYSE American LLC on April 15, 2025.