Filed Pursuant to Rule 424(b)(3)
Registration No. 333-285972

PROSPECTUS

VERASTEM, INC.

Up to 1,416,939 Shares of Common Stock

This prospectus relates to the resale or other disposition from time to time of up to 1,416,939 shares of our common stock par value $0.0001 per share (the "Common Stock") by the selling stockholders identified in this prospectus, including their transferees, pledgees, donees or successors.

The selling stockholders may, from time to time, sell, transfer, distribute or otherwise dispose of any or all of their securities from time to time on any stock exchange, market, or trading facility on which the securities 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. See "Plan of Distribution" which begins on page 9.

We are not offering any securities for sale under this prospectus. We will not receive any of the proceeds from the sale of securities by the selling stockholders. All expenses of registration incurred in connection with this offering are being borne by us. The selling stockholders will bear all discounts and commissions, if any, and expenses incurred by them for brokerage, accounting, tax or legal services or any other expenses incurred in their sale of shares of Common Stock.

Our Common Stock is listed on the Nasdaq Capital Market under the symbol "VSTM." On March 27, 2025, the last reported sale price of our Common Stock was $6.73 per share.

We may amend or supplement this prospectus from time to time by filing amendments or supplements as required. You should read the entire prospectus and any amendments or supplements carefully before you make your investment decision.

Investing in our securities involves risks. See "Risk Factors" on page 4, and any applicable prospectus supplement, and under similar headings in the other documents that are incorporated by reference into this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

Prospectus dated March 28, 2025

TABLE OF CONTENTS

ABOUT THIS PROSPECTUS	1
ABOUT THE COMPANY	2
RISK FACTORS	4
DESCRIPTION OF PRIVATE PLACEMENT	5
DESCRIPTION OF CAPITAL STOCK	5
DISCLOSURE REGARDING FORWARD-LOOKING STATEMENTS	6
USE OF PROCEEDS	7
SELLING STOCKHOLDERS	8
PLAN OF DISTRIBUTION	10
LEGAL MATTERS	13
EXPERTS	13
WHERE YOU CAN FIND MORE INFORMATION	13
INCORPORATION OF DOCUMENTS BY REFERENCE	13

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement on Form S-3 that we filed with the Securities and Exchange Commission (the "SEC") using a "shelf" registration or continuous offering process.

You should read this prospectus and the information and documents incorporated by reference carefully. Such documents contain important information you should consider when making your investment decision. See "Where You Can Find More Information" and "Incorporation of Documents by Reference" in this prospectus.

This prospectus may be supplemented from time to time to add, to update or change information in this prospectus. Any statement contained in this prospectus will be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in such prospectus supplement modifies or supersedes such statement. Any statement so modified will be deemed to constitute a part of this prospectus only as so modified, and any statement so superseded will be deemed not to constitute a part of this prospectus. You should rely only on the information contained or incorporated by reference in this prospectus, any applicable prospectus supplement or any related free writing 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 on it. No dealer, salesperson or other person is authorized to give any information or to represent anything not contained in this prospectus, any applicable prospectus supplement or any related free writing prospectus. This prospectus is not an offer to sell securities, and it is not soliciting an offer to buy securities, in any jurisdiction where the offer or sale is not permitted. You should assume that the information appearing in this prospectus or any prospectus supplement, as well as information we have filed with the SEC that is incorporated by reference, is accurate as of the date on the front of those documents only, regardless of the time of delivery of this prospectus or any applicable prospectus supplement, or any sale of a security. Our business, financial condition, results of operations and prospects may have changed since those dates.

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, will be 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."

Unless otherwise stated or the context requires otherwise, references in this prospectus to "Verastem," the "company" or the "Company," "we," "us," or "our" refer to Verastem, Inc. and our subsidiaries on a consolidated basis, as appropriate, unless the context otherwise requires.

ABOUT THE COMPANY

Company Overview

We are a late-stage development biopharmaceutical company committed to the development and commercialization of new medicines to improve the lives of patients diagnosed with ras sarcoma ("RAS")/ mitogen activated pathway kinase ("MAPK") pathway-driven cancers. Our pipeline is focused on novel small molecule drugs that inhibit critical signaling pathways in cancer that promote cancer cell survival and tumor growth, including rapidly accelerated fibrosarcoma ("RAF")/ mitogen-activated protein kinase kinase ("MEK") inhibition, focal adhesion kinase ("FAK") inhibition and Kirsten rat sarcoma viral oncogene homolog ("KRAS") G12D inhibition.

Our most advanced product candidates, avutometinib (RAF/ MEK program) and defactinib (FAK program), are being investigated in both preclinical and clinical studies for the treatment of various solid tumors, including, but not limited to low-grade serous ovarian cancer ("LGSOC"), non-small cell lung cancer and pancreatic cancer. We believe that avutometinib may be beneficial as a therapeutic, both as a single agent or when used together in combination with defactinib, other agents, other pathway inhibitors, or other current and emerging standard of care treatments in cancers that do not adequately respond to currently available therapies.

Avutometinib is an oral RAF/MEK clamp that inhibits MEK1/2 kinase activities and induces inactive complexes of MEK with A-Raf proto-oncogene, serine/threonine kinase, B-Raf proto-oncogene serine/ threonine kinase and C-raf proto-oncogene serine/threonine kinase, potentially creating a more complete and durable anti-tumor response through maximal RAS/MAPK pathway inhibition. In contrast to currently available MEK-only inhibitors, avutometinib blocks both MEK kinase activity and the ability of RAF to phosphorylate MEK. We believe that this unique mechanism allows avutometinib to block MEK signaling without the compensatory activation of MEK that appears to limit the response achieved with the MEK-only inhibitors.

Defactinib is an oral, selective inhibitor of FAK and proline-rich tyrosine kinase ("PYK2"), the two members of the focal adhesion kinase family of non-receptor protein tyrosine kinases. FAK and PYK2 integrate signals from integrin and growth factor receptors to regulate cell proliferation, survival, migration, and invasion. FAK activation has been shown to mediate resistance to multiple anti-cancer agents, including RAF and MEK inhibitors.

The combination of avutometinib and defactinib is clinically active in patients with KRAS mutant ("KRAS mt") and KRAS wild-type recurrent LGSOC and has received breakthrough designation from the United States Food and Drug Administration (the "FDA") for the treatment of all patients with recurrent LGSOC, regardless of KRAS status, after one or more prior lines of therapy including platinum-based chemotherapy. Avutometinib, alone or in combination with defactinib, has received orphan drug designation for the treatment of all patients with LGSOC in the United States. Defactinib has received orphan drug designation in ovarian cancer in the United States, the European Union, and Australia. In addition, the FDA granted orphan drug designation to avutometinib, in combination with defactinib, for the treatment of pancreatic cancer.

On October 31, 2024, we completed our rolling New Drug Application ("NDA") to the FDA for avutometinib and defactinib for treatment of adults with recurrent KRAS mt LGSOC who received at least one prior systemic therapy. On December 30, 2024, the FDA accepted for review our NDA under the accelerated approval pathway and granted priority review for avutometinib and defactinib for treatment of adult patients with recurrent KRAS mt LGSOC who received at least one prior systemic therapy and designated June 30, 2025 as the Prescription Drug User Fee Act action date. In addition, at the time the FDA accepted our NDA for review, the FDA stated that it is not planning to hold an advisory committee meeting to discuss the application. The NDA was based on the positive, mature safety and efficacy data from the RAMP 201 trial as presented at the IGCS 2024 Annual Meeting. The NDA also includes supportive data from the FRAME Phase 1 trial, the first study conducted with the combination therapy in recurrent LGSOC. We intend to initiate discussions with other global regulatory authorities, including those in Europe and Japan, with the objective of ultimately seeking approval for the combination in additional regions.

Our principal executive offices are located at 117 Kendrick Street, Suite 500, Needham, MA 02494, and our telephone number is (781) 292-4200. Our website address is: www.verastem.com. We have included our website address as a factual reference and do not intend it to be an active link to our website. The information that can be accessed through our website is not part of this prospectus, and investors should not rely on any such information in deciding whether to purchase our common stock.

RISK FACTORS

An investment in our Common Stock involves risks. Prior to making a decision about investing in our Common Stock, you should consider carefully the risks together with all of the other information contained or incorporated by reference in this prospectus, including any risks described in the section entitled "Risk Factors" contained in any supplements to this prospectus, in our Annual Report on Form 10-K for the year ended December 31, 2024, and in our subsequent filings with the SEC. Each of the referenced risks and uncertainties could adversely affect our business, prospects, operating results and financial condition, as well as adversely affect the value of an investment in our securities. Additional risks not known to us or that we believe are immaterial may also adversely affect our business, operating results and financial condition and the value of an investment in our securities.

DESCRIPTION OF PRIVATE PLACEMENT

On January 13, 2025, the Company entered into a stock purchase agreement (the "Purchase Agreement") with the selling stockholders named in this prospectus, pursuant to which the Company sold to the selling stockholders an aggregate of 1,416,939 shares of Common Stock at a purchase price of $5.2931 per share, for gross proceeds of approximately $7.5 million, in a private placement (the "Private Placement").

In connection with the Private Placement and pursuant to the Purchase Agreement, the Company granted the selling stockholders certain registration rights for the resale of the shares of the Common Stock. The Company agreed to file a registration statement registering such shares with the SEC no later than May 15, 2025. The Company agreed to keep the registration statement continuously effective from the date on which the SEC declares the registration statement effective until the earlier of (a) the date as of which the registrable shares (as defined in the Purchase Agreement) have been sold pursuant to the registration statement, (b) the date as of which no registrable shares remain outstanding or (c) the closing of a corporate reorganization.

Additionally, pursuant to the Purchase Agreement, the Company granted to the selling stockholders a right to participate in any equity offerings consummated by the Company in an amount up to $2.5 million for a period of three years following closing, subject to certain limitations and exclusions set out in the Purchase Agreement.

DESCRIPTION OF CAPITAL STOCK

The description of our Common Stock and our preferred stock is incorporated by reference to Exhibit 4.2 of our Annual Report on Form 10-K for the year ended December 31, 2024, as filed with the SEC on March 20, 2025.

DISCLOSURE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, any prospectus supplement and the other documents we have filed with the SEC that are incorporated herein by reference, contain forward-looking statements. . These forward-looking statements generally can be identified by the use of words such as "anticipate," "expect," "plan," "could," "may," "will," "believe," "estimate," "forecast," "goal," "potentially," "project," and other words of similar meaning. All statements, other than statements related to present facts or current conditions or historical facts, contained in or incorporated by reference into this prospectus, are forward-looking statements, including statements regarding our strategy, future operations, future financial position, future revenues, projected costs, prospects, plans and objectives of management. Such statements address various matters about, among other things: the development and activity of our programs and product candidates, avutometinib and defactinib; the timing and outcome of the FDA review of our NDA submission for the avutometinib and defactinib combination in low-grade serous ovarian cancer ("LGSOC"); the structure and potential clinical value of our planned and pending clinical trials, including the RAMP 201, RAMP 205 and RAMP 301 trials; the timing of commencing and completing trials, including topline data reports; our interactions with regulators; the timeline and indications for clinical development, regulatory submissions and the potential for and timing of commercialization of our product candidates; the potential for additional development programs involving the Company's lead compound and the potential market opportunities thereof; the expected outcome and benefits of our collaboration with GenFleet Therapeutics (Shanghai), Inc. ("GenFleet"); and the estimated addressable markets for, and anticipated market opportunities of our drug candidates.

Each forward-looking statement is subject to risks and uncertainties that could cause actual results to differ materially from those expressed or implied in such statement. Applicable risks and uncertainties include the risks and uncertainties, among other things, regarding: the success in the development and potential commercialization of our product candidates, including avutometinib in combination with other compounds, including defactinib, LUMAKRAS® and others; the uncertainties inherent in research and development, such as negative or unexpected results of clinical trials; the occurrence or timing of applications for our product candidates that may be filed with regulatory authorities in any jurisdictions; whether and when regulatory authorities in any jurisdictions may approve any such applications that may be filed for our product candidates and, if approved, whether our product candidates will be commercially successful in such jurisdictions; our ability to obtain, maintain and enforce patent and other intellectual property protection for our product candidates; risks associated with preliminary and interim data, which may not be representative of more mature data, including with respect to interim duration of therapy data; that the development and commercialization of our product candidates will take longer or cost more than planned, including as a result of conducting additional studies or our decisions regarding execution of such commercialization; that we may not have sufficient cash to fund our contemplated operations, including certain of our product development programs; that we will not see a return on investment on the payments we have and may continue to make pursuant to the collaboration and option agreement with GenFleet or that GenFleet will fail to fully perform under the agreement; that we may not be able to establish new or expand on existing collaborations or partnerships, including with respect to in-licensing of our product candidates, on favorable terms, or at all; that we may be unable to obtain adequate financing in the future through product licensing; and that our product candidates will not receive regulatory approval, become commercially successful products, or result in new treatment options being offered to patients. Other risks and uncertainties include those identified under the heading "Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2024, as filed with the SEC on March 20, 2025, and in any subsequent filings with the SEC. See "Where You Can Find More Information."

As a result of these and other factors, we may not achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make. The forward-looking statements contained in this prospectus reflect our views as of the date hereof. We do not assume and specifically disclaim any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law. Our business is subject to substantial risks and uncertainties, including those referenced above. Investors, potential investors, and others should give careful consideration to these risks and uncertainties.

USE OF PROCEEDS

All of the shares of Common Stock offered by the selling stockholders pursuant to this prospectus will be sold by the selling stockholders for their respective accounts. We will not receive any of the proceeds from these sales.

The selling stockholders will bear all discounts and commissions, if any, and expenses incurred by them for brokerage, accounting, tax or legal services or any other expenses incurred in disposing of the securities. We will bear the costs, fees and expenses incurred in effecting the registration of the shares covered by this prospectus, including all registration and filing fees, Nasdaq listing fees and fees and expenses of our counsel and our independent registered public accounting firm.

SELLING STOCKHOLDERS

Pursuant to the Purchase Agreement, we agreed to file the registration statement, of which this prospectus is a part, to cover the resale of the shares of Common Stock, which the selling stockholders acquired pursuant to the Purchase Agreement, and to keep such registration statement effective with respect to each selling stockholder until the date on which all of the shares of Common Stock registered for resale under the registration statement have been disposed of in accordance with such registration statement, disposed of pursuant to Rule 144 under the Securities Act, disposed of in certain corporate reorganizations, or can be resold pursuant to Rule 144 without restriction or limitation (including without any limitation as to volume of sales and without the selling stockholder complying with any method of sale requirements or notice requirements under Rule 144).

We are registering the resale of the above-referenced securities to permit each of the selling stockholders identified below, or their permitted transferees or other successors-in-interest that may be identified in a supplement to this prospectus or, if required, a post-effective amendment to the registration statement, of which this prospectus is a part, to resell or otherwise dispose of the securities in the manner contemplated under "Plan of Distribution" in this prospectus (as may be supplemented and amended). This prospectus covers the sale or other disposition by the selling stockholders of up to the total number of shares of Common Stock that were issued to the selling stockholders in the Private Placement. Throughout this prospectus, when we refer to the securities being registered on behalf of the selling stockholders, we are referring to the shares of Common Stock issued in the Private Placement pursuant to the Purchase Agreement. When we refer to "selling stockholders" in this prospectus, we mean those persons listed in the table below, as well as their permitted transferees, pledgees or donees or other successors-in-interest that may be identified in a supplement to this prospectus or, if required, a post-effective amendment to the registration statement, of which this prospectus is a part.

The selling stockholders may sell some, all or none of their securities. We do not know how long the selling stockholders will hold the securities before selling them, and we currently have no agreements, arrangements or understandings with the selling stockholders regarding the sale or other disposition of any of the securities. The securities covered hereby may be offered from time to time by the selling stockholders.

The information regarding securities beneficially owned after the offering assumes the sale of all securities offered by the selling stockholders. To our knowledge, subject to community property laws where applicable, each selling stockholder named in the table has sole voting and investment power with respect to the securities set forth opposite such selling stockholder's name.

The following table sets forth the name of each selling stockholder, the number of shares of our Common Stock beneficially owned by the selling stockholders as of March 20, 2025, the number of shares of our Common Stock that may be offered under this prospectus, and the number and percentage of our Common Stock beneficially owned by the selling stockholders assuming all of the shares of our Common Stock registered hereunder are sold. As of March 19, 2025, a total of 51,486,705 shares of our Common Stock were outstanding. Beneficial ownership is determined in accordance with the rules of the SEC and includes voting or investment power with respect to our Common Stock. Generally, a person "beneficially owns" securities if the person has or shares with others the right to vote those securities or to dispose of them, or if the person has the right to acquire voting or disposition rights within 60 days. The number of shares of our Common Stock in the column "Number of Shares of Common Stock Offered" represents all of the shares of our Common Stock that a selling stockholder may offer and sell from time to time under this prospectus.

Name and Address	Number of Shares of Common Stock Beneficially Owned Prior to Offering	Percentage of Shares of Common Stock Beneficially Owned Prior to Offering	Number of Shares of Common Stock Offered	Number of Shares of Common Stock Beneficially Owned After Offering	Percentage of Shares of Common Stock Beneficially Owned After Offering
Entities affiliated with Oberland Capital Management LLC[(1)]	1,416,939[(1)]	2.75%	1,416,939	—	—

(1) Consists of: (i) 921,010 shares of Common Stock held by TPC Investments Solutions LP; and (ii) 495,929 shares of Common Stock held by TPC Investments Solutions Co-Invest LP. Oberland Capital Management LLC, as the investment manager of each of TPC Investments Solutions LP and TPC Investments Solutions Co-Invest LP, has voting and investment power over these securities. The address of Oberland Capital Management LLC is 1700 Broadway, 37th Floor, New York, New York 10019.

PLAN OF DISTRIBUTION

The selling stockholders, which as used herein includes donees, pledgees, transferees or other successors- in-interest selling shares of Common Stock previously issued or interests in shares of Common Stock received after the date of this prospectus from a selling stockholder as a gift, pledge, partnership distribution or other transfer, may, from time to time, sell, transfer or otherwise dispose of any or all of their shares of Common Stock or interests in shares of Common Stock on any stock exchange, market or trading facility on which the shares are traded or in private transactions. The selling stockholders may sell their shares of Common Stock pursuant to this prospectus 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.

The selling stockholders may use any one or more of the following methods when disposing of shares or interests therein:

- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the shares 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;
- short sales effected after the date the registration statement of which this prospectus is a part is declared effective by the SEC;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- through trading plans entered into by a selling stockholder pursuant to Rule 10b5-1 under the Exchange Act, that are in place at the time of an offering pursuant to this prospectus and any applicable prospectus supplement hereto that provide for periodic sales of their securities on the basis of parameters described in such trading plans;
- to or through underwriters, agents or broker-dealers;
- broker-dealers may agree with the selling stockholders to sell a specified number of such shares at a stipulated price per share;
- a combination of any such methods of sale; and
- any other method permitted by applicable law.

If the selling stockholders effect such transactions by selling shares of Common Stock to or through underwriters, broker-dealers or agents, such underwriters, broker-dealers or agents may receive commissions in the form of discounts, concessions or commissions from the selling stockholders or commissions from purchasers of the shares of Common Stock for whom they may act as agent or to whom they may sell as principal (which discounts, concessions or commissions as to particular underwriters, broker-dealers or agents may be in excess of those customary in the types of transactions involved).

Broker-dealers engaged by the selling stockholders may arrange for other brokers-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.

The selling stockholders may, from time to time, pledge or grant a security interest in some or all of the shares of Common Stock owned by them and, if they default in the performance of their secured obligations, the pledgees or secured parties may offer and sell the shares of Common Stock, from time to time, under this prospectus, or under an amendment to this prospectus under Rule 424(b)(3) or other applicable provision of the Securities Act amending the list of selling stockholders to include the pledgee, transferee or other successors in interest as selling stockholders under this prospectus. The selling stockholders also may transfer

the shares of Common Stock in other circumstances, in which case the transferees, pledgees or other successors in interest will be the selling beneficial owners for purposes of this prospectus.

In connection with the shares of Common Stock 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 our Common Stock in the course of hedging the positions they assume. The selling stockholders may also sell shares of our Common Stock short and deliver these securities to close out their short positions, or loan or pledge shares of our Common Stock 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 the creation of one or more derivative securities which require the delivery to such broker-dealer or other financial institution of shares offered by this prospectus, which shares such broker-dealer or other financial institution may resell pursuant to this prospectus (as supplemented or amended to reflect such transaction).

The aggregate proceeds to the selling stockholders from the sale of the shares of Common Stock offered by them will be the purchase price of the shares of Common Stock less discounts or commissions, if any. Each of the selling stockholders reserves the right to accept and, together with their agents from time to time, to reject, in whole or in part, any proposed purchase of Common Stock to be made directly or through agents. We will not receive any of the proceeds from this offering.

The selling stockholders also may resell all or a portion of the shares of Common Stock in open market transactions in reliance upon Rule 144 under the Securities Act, provided that they meet the criteria and conform to the requirements of that rule. In addition, the selling stockholders may transfer the shares of Common Stock by other means not described in this prospectus.

The selling stockholders and any underwriters, broker-dealers or agents that participate in the sale of the shares of Common Stock or interests therein may be "underwriters" within the meaning of Section 2(11) of the Securities Act. Any discounts, commissions, concessions or profit they earn on any resale of the shares may be underwriting discounts and commissions under the Securities Act. Selling stockholders who are "underwriters" within the meaning of Section 2(11) of the Securities Act will be subject to the prospectus delivery requirements of the Securities Act.

To the extent required, the shares of Common Stock to be sold, the names of the selling stockholders, the respective purchase prices and public offering prices, the names of any agents, dealer or underwriter, any applicable commissions or discounts with respect to a particular offer will be set forth in an accompanying prospectus supplement or, if appropriate, a post-effective amendment to the registration statement that includes this prospectus.

In order to comply with the securities laws of some states, if applicable, the shares of Common Stock may be sold in these jurisdictions only through registered or licensed brokers or dealers. In addition, in some states the shares of Common Stock may not be sold unless it has been registered or qualified for sale or an exemption from registration or qualification requirements is available and is complied with.

We have advised the selling stockholders that the anti-manipulation rules of Regulation M under the Exchange Act may apply to sales of shares in the market and to the activities of the selling stockholders and their affiliates. In addition, to the extent applicable we will make copies of this prospectus (as it may be supplemented or amended from time to time) available to the selling stockholders for the purpose of satisfying the prospectus delivery requirements of the Securities Act. The selling stockholders may indemnify any broker-dealer that participates in transactions involving the sale of the shares against certain liabilities, including liabilities arising under the Securities Act.

Once sold under the registration statement of which this prospectus forms a part, the shares of Common Stock will be freely tradable in the hands of persons other than our affiliates.

We have agreed to indemnify the selling stockholders against liabilities, including liabilities under the Securities Act and state securities laws, relating to the registration of the shares offered by this prospectus.

We will pay all expenses of the registration of the shares of Common Stock, including, without limitation, SEC filing fees. We have agreed with the selling stockholders to keep the registration statement

of which this prospectus constitutes a part effective until such time as the shares offered by the selling stockholders have been effectively registered under the Securities Act and disposed of in accordance with such registration statement, the shares offered by the selling stockholders have been disposed of pursuant to Rule 144 under the Securities Act, the shares offered by the selling stockholders may be resold pursuant to Rule 144 without restriction or limitation (including without any limitation as to volume of sales and without the selling stockholder complying with any method of sale requirements or notice requirements under Rule 144), or the closing of certain corporate reorganizations.

LEGAL MATTERS

The validity of the issuance of the securities offered hereby will be passed upon for us by Ropes & Gray LLP, Boston, Massachusetts.

EXPERTS

The consolidated financial statements of Verastem, Inc. appearing in Verastem, Inc.'s Annual Report (Form 10-K) for the year ended December 31, 2024 have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report therein, and incorporated herein by reference. Such consolidated financial statements are incorporated herein by reference in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus is part of a registration statement we filed with the SEC. This prospectus does not contain all of the information set forth in the registration statement and the exhibits to the registration statement. For further information with respect to us and the shares of Common Stock being offered under this prospectus, we refer you to the registration statement and the exhibits and schedules filed as a part of the registration statement. Neither we nor any agent, underwriter or dealer has authorized any person to provide you with different information. We are not making an offer of Common Stock in any state where the offer is not permitted. You should not assume that the information in this prospectus is accurate as of any date other than the date on the front page of this prospectus, regardless of the time of delivery of this prospectus or any sale of Common Stock offered by this prospectus.

We file annual, quarterly and current reports, proxy statements and other information with the SEC. The SEC maintains a website that contains reports, proxy statements and other information regarding issuers that file electronically with the SEC, including us. The address of the SEC website is www.sec.gov.

We maintain a website at www.verastem.com. Information contained in, or accessible through, our website is not a part of, and is not incorporated into, this prospectus, and you should not consider it part of this prospectus.

INCORPORATION OF DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" into this prospectus the information we file with it, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus, and information in documents that we file later with the SEC will automatically update and supersede information in this prospectus. We incorporate by reference into this prospectus the documents listed below and any future filings made by us with the SEC under Section 13(a), 13(c), 14 or 15(d) of the Exchange Act, except for information "furnished" under Items 2.02, 7.01 or 9.01 on Form 8-K or other information "furnished" to the SEC which is not deemed filed and not incorporated in this prospectus, until the termination of the offering of securities described in the applicable prospectus supplement. We hereby incorporate by reference the following documents:

- our Annual Report on Form 10-K for the year ended December 31, 2024, as filed with the SEC on March 20, 2025;
- our Current Reports on Form 8-K filed with the SEC on January 13, 2025, January 21, 2025 and January 23, 2025;
- the information specifically incorporated by reference into our Annual Report on Form 10-K for the year ended December 31, 2023 from our Definitive Proxy Statement on Schedule 14A for the 2024 Annual Meeting of Stockholders, as filed with the SEC on April 12, 2024; and
- the description of our Common Stock, which is contained in the Registration Statement on Form 8-A, as filed with the SEC on January 23, 2012, as supplemented by the description of our Common Stock and preferred stock contained in Exhibit 4.2 to our Annual Report on Form 10-K for the fiscal year ended December 31, 2024, filed with the SEC on March 20, 2025.

Any statement contained in a document incorporated or deemed to be incorporated by reference in this prospectus will be deemed modified, superseded or replaced for purposes of this prospectus to the extent that a statement contained in this prospectus modifies, supersedes or replaces such statement.

You may request a copy of these filings, at no cost, by writing or telephoning us at the following address:

Investor Relations
117 Kendrick Street, Suite 500
Needham, Massachusetts 02494
(781) 292-4279
email address: investors@verastem.com

Copies of these filings are also available, without charge, on the SEC's website at www.sec.gov and on our website at www.verastem.com as soon as reasonably practicable after they are filed electronically with the SEC. The information contained on our website is not a part of this prospectus.

VERASTEM, INC.
Up to 1,416,939 Shares of Common Stock

Prospectus

March 28, 2025