As filed with the Securities and Exchange Commission on September 11, 2026

Registration No. 333-

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM S-3

REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

ZENAS BIOPHARMA, INC.

(Exact name of registrant as specified in its charter)

Delaware	**93-2749244**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

852 Winter Street, Suite 250
Waltham, Massachusetts 02451
(857) 271-2954

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

Leon O. Moulder, Jr.
Chief Executive Officer
Zenas BioPharma, Inc.
852 Winter Street, Suite 250
Waltham, Massachusetts 02451
(857) 271-2954

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

With copies to:
Thomas Danielski
Ropes & Gray LLP
Prudential Tower
800 Boylston St.
Boston, Massachusetts 02199
(617) 951-7000

From time to time after the effectiveness of the registration statement.

(Approximate date of commencement of proposed sale to the public)

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, a 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 ☐	Accelerated filer ☐
Non-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. ☐

PROSPECTUS

ZENAS BIOPHARMA, INC.

Up to 7,000,000 Shares of Common Stock

This prospectus relates to the resale or other disposition from time to time of up to 7,000,000 shares (the "Shares") of our common stock, par value $0.0001 per share (the "Common Stock"), by the selling stockholder (the "Selling Stockholder") identified in this prospectus, including its transferees, pledgees, donees or successors.

The Selling Stockholder acquired the Shares pursuant to the terms of a subscription agreement (the "Subscription Agreement") dated October 7, 2025, between us and InnoCare Pharma Inc. ("InnoCare") in a transaction exempt from registration under the Securities Act of 1933, as amended (the "Securities Act"), in reliance on Section 4(a)(2) thereof. We are filing the registration statement on Form S-3ASR to fulfill our contractual obligations with the Selling Stockholder to provide for the resale by the Selling Stockholder of the Shares offered hereby. See "Selling Stockholder" beginning on page 11 for more information about the Selling Stockholder.

The Selling Stockholder may, from time to time, sell, transfer or otherwise dispose of any or all of their shares of Common Stock on any stock exchange, market or trading facility on which the shares 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 13. We do not know when or in what amount the Selling Stockholder may dispose of or offer for sale the shares covered by this prospectus.

We are not offering any shares of Common Stock under this prospectus. We will not receive any of the proceeds from the sale of Common Stock by the Selling Stockholder. All expenses of registration incurred in connection with this offering are being borne by us. The Selling Stockholder 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 Global Select Market under the symbol "ZBIO." On September 10, 2026, the last reported sale price of our Common Stock was $32.29 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 September 11, 2026

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ABOUT THIS PROSPECTUS

This prospectus is part of an automatic shelf registration statement on Form S-3 that we filed with the Securities and Exchange Commission (the "SEC") as a "well-known seasoned issuer" as defined in Rule 405 under the Securities Act, using the "shelf" registration 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, 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. Neither we nor the Selling Stockholder has 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 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."

References in this prospectus to "Zenas," the "Company," "we," "us," "our" or similar terms refer to Zenas BioPharma, Inc. and our subsidiaries on a consolidated basis, as appropriate, unless the context otherwise requires.

Trademarks and Tradenames

The Zenas BioPharma word mark, logo mark, and the "lightning bolt" design are trademarks of Zenas BioPharma, Inc. or its affiliated companies. This prospectus and any applicable prospectus supplement and documents incorporated by reference herein and therein contain references to our trademarks and to trademarks belonging to other entities. Each of the other trademarks, trade names and service marks included in this prospectus belongs to its respective holder. Solely for convenience, trademarks, trade names and service marks referred to in this prospectus, 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, trade names and service marks. We do not intend our use or display of other entities' trade names, trademarks or service marks to imply a relationship with, or endorsement or sponsorship of us by, any other entity.

PROSPECTUS SUMMARY

This summary highlights selected information included or incorporated by reference in this prospectus and does not contain all of the information that may be important to you. You should carefully review this entire prospectus and any supplements to this prospectus, including the risk factors and financial statements included or incorporated by reference herein or therein.

Company Overview

We are a clinical-stage global biopharmaceutical company committed to being a leader in the development and commercialization of transformative immunology-based therapies for patients in need. With the evolving understanding of the pathogenesis of autoimmune diseases, along with the expansion of promising immunology-based pharmacologic targets, we are building an immunology and inflammation ("I&I") focused biopharmaceutical company. Our core business strategy combines disciplined product candidate acquisition with strategic deployment of internal expertise and effective use of external resources. We leverage our experienced executive management team and our established networks throughout the biopharmaceutical industry to identify, acquire and develop product candidates that we believe can provide superior clinical benefits to patients living with autoimmune diseases.

Our lead I&I product candidate, obexelimab, is a bifunctional monoclonal antibody designed to bind both CD19 and FcγRIIb, which are broadly present across B cell lineage, in order to inhibit the activity of cells that are implicated in many autoimmune diseases without depleting them. Based on existing clinical data generated to date, we believe that targeting B cell lineage via CD19 and FcγRIIb can inhibit B cells and has been shown to be well-tolerated.

We are developing obexelimab as a potential I&I franchise for patients in several autoimmune diseases, representing substantial commercial opportunities individually and in the aggregate. We are conducting clinical trials in IgG4-RD through a registration-directed Phase 3 trial which reported topline data in January 2026, relapsing multiple sclerosis ("RMS") through an ongoing Phase 2, double-blind, randomized, placebo-controlled trial which reported topline data in October 2025 and systemic lupus erythematosus ("SLE") through an ongoing Phase 2, double-blind, randomized, placebo-controlled trial, for which we expect to report topline results, including biomarker data, in the fourth quarter of 2026.

In January 2026, we reported positive results from the Phase 3 trial of obexelimab in patients with IgG4-RD. Obexelimab met the primary endpoint, demonstrating a highly statistically significant and clinically meaningful 56% reduction in the risk of IgG4-RD flare compared to placebo (Hazard Ratio 0.44, p=0.0005) and also met and demonstrated highly statistically significant activity compared to placebo on all four key secondary endpoints. Obexelimab was well tolerated with a safety profile consistent with that observed in previously completed clinical trials. Based on these results, we submitted the obexelimab Biologics License Application ("BLA") to the FDA for the treatment of IgG4-RD in May 2026. In August 2026, the FDA accepted the Company's BLA and assigned a Prescription Drug User Fee Act ("PDUFA") target date of May 27, 2027. We intend to submit a Marketing Authorization Application ("MAA") to the European Medicines Agency in the second half of 2026.

In October 2025, we entered into an exclusive license agreement (the "License Agreement") dated October 7, 2025, with InnoCare, pursuant to which we were granted exclusive rights to develop, manufacture, and commercialize orelabrutinib, a Bruton's Tyrosine Kinase inhibitor ("BTK"), for multiple sclerosis ("MS") worldwide, and in all non-oncology indications worldwide excluding mainland China, Hong Kong, Macau and Taiwan ("greater China"), and Brunei, Burma, Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam ("Southeast Asia"), as well as two early-development product candidates: ZB021, an IL-17AA/AF inhibitor, in all fields of use worldwide excluding greater China and Southeast Asia, and ZB022, a TYK2 inhibitor, in all fields of use worldwide. Orelabrutinib is a highly selective and central nervous system ("CNS") penetrant, oral small molecule BTK inhibitor. Orelabrutinib is designed to bind irreversibly to BTK with minimal off-target effects, which may potentially reduce certain side effects. We believe orelabrutinib is designed to efficiently cross the blood-brain barrier, reaching therapeutic levels within the CNS to directly target inflammation in diseases like MS.

In September 2025, the Phase 3 PriMroSe trial of orelabrutinib in patients with primary progressive multiple sclerosis ("PPMS") was initiated. The PriMroSe trial is a global, multicenter, randomized, double-blind, placebo-controlled clinical trial evaluating the safety and efficacy of orelabrutinib dosed 80 mg once

daily ("QD") compared to placebo in patients with PPMS, with a primary endpoint of time to onset of 12-week composite confirmed disability progression. In March of 2026, we initiated a second global, Phase 3, multicenter, randomized, double-blind, placebo-controlled clinical trial evaluating orelabrutinib dosed 80 mg QD compared to placebo in patients with non-active secondary progressive multiple sclerosis, with a primary endpoint of time to onset of 24-week CDP. ZB021 is an oral IL-17AA/AF inhibitor designed to block both IL-17AA homodimer and IL-17AF heterodimer signaling. Preclinical studies for ZB021 have shown favorable PK and ADME properties. ZB021 achieved comparable activity in vivo to a reference anti-IL-17 biologic in a rat CIA model. We, along with our partner, InnoCare, initiated a Phase 1 clinical study in the second quarter of 2026. ZB022 is an oral, brain-penetrant TYK2-JH2 inhibitor, currently in IND-enabling studies. Subject to the results of Investigational New Drug ("IND") enabling studies, we expect to initiate a Phase 1 clinical study in 2027. We are also advancing ZB014, a half-life extended anti-CD-19 and FcγRIIb monoclonal antibody, currently in IND-enabling studies. Subject to the results of IND-enabling studies, we expect to initiate a Phase 1 clinical study in 2027.

Our principal executive offices are located at 852 Winter Street, Suite 250, Waltham, MA 02451, and our telephone number is (857) 271-2954. Our website address is: www.zenasbio.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. See "Item 1A — Risk Factors" in our most recent Annual Report on Form 10-K incorporated by reference in this prospectus and in any subsequent Quarterly Reports on Form 10-Q, as may be updated by subsequent annual, quarterly and other reports that are incorporated by reference into this prospectus for a discussion of the factors you should carefully consider before deciding to purchase our securities. Before making a decision about investing in our securities, you should carefully consider these risks as well as other information we include or incorporate by reference into this prospectus. The risks and uncertainties we have described are not the only ones facing our Company. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also affect our business operations, operating results and financial condition. The occurrence of any of these risks might cause you to lose all or part of your investment in the offered securities. The discussion of risks includes or refers to forward-looking statements; you should read the explanation of the qualifications and limitations on such forward-looking statements discussed elsewhere in this prospectus.

INNOCARE TRANSACTION

On October 7, 2025, the Company entered into the License Agreement with InnoCare, granting the Company global development and commercialization rights to orelabrutinib for MS and across all therapeutic areas other than oncology outside of greater China and Southeast Asia. The Company also secured rights to ZB021, an oral, IL-17AA/AF inhibitor, and ZB022, an oral, brain-penetrant, TYK2 inhibitor.

In connection with the License Agreement, we made upfront cash payments totaling $35.0 million and issued 5,000,000 shares of Common Stock (the "Private Placement") to InnoCare, pursuant to the terms of a Subscription Agreement between the Company and InnoCare (the "Subscription Agreement") in a private placement transaction. The Subscription Agreement provides that InnoCare may not transfer any of the Shares until October 7, 2026, and thereafter may not transfer Shares during any one month in an amount that exceeds the greater of (i) one percent of the outstanding Common Stock as most recently reported by the Company publicly and (ii) the average weekly reported volume of trading in the Common Stock during the four preceding calendar weeks. These restrictions do not apply to transfers to an affiliate of InnoCare, to the Company or in connection with a change of control of the Company approved by the board of directors of the Company. Further, in August 2026, the Company achieved a regulatory milestone and became obligated to make an additional one-time non-refundable cash payment of $25.0 million and issue an additional 2,000,000 shares of Common Stock to InnoCare.

In connection with the Private Placement, the Company and InnoCare also entered into a Registration Rights Agreement, dated October 7, 2025 (the "Registration Rights Agreement"). Pursuant to the Registration Rights Agreement, we agreed to prepare and file a registration statement with the SEC covering the resale of such shares of Common Stock issued to InnoCare under the License Agreement and to use its reasonable best efforts to cause the registration statement to be declared effective by the SEC as soon as practicable thereafter. The registration statement of which this prospectus is a part has been filed in accordance with the License Agreement.

DESCRIPTION OF CAPITAL STOCK

The description of our Common Stock is incorporated by reference to Exhibit 4.3 of our Annual Report on Form 10-K for the year ended December 31, 2024, as filed with the SEC on March 11, 2025, including any amendments or reports filed for the purpose of updating such description.

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.

All statements other than statements of historical facts contained in or incorporated by reference into this prospectus are forward-looking statements. In some cases, forward-looking statements can be identified by terms such as "may," "will," "should," "expect," "plan," "anticipate," "could," "intend," "target," "project," "contemplate," "believe," "estimate," "predict," "potential," or "continue" or the negative of these terms or other similar expressions, although not all forward-looking statements contain these words. Forward-looking statements include, but are not limited to, statements concerning:

- the commercial opportunities stemming from the development of our product candidates for multiple immunology and inflammation diseases;
- our ability to develop and, if approved, ultimately commercialize our lead product candidates and, with partners, our other programs;
- our ability to obtain or maintain orphan drug designation for certain of our product candidates;
- the initiation, timing, progress, results, and cost of our development programs, and our current and future preclinical and clinical studies, including statements regarding the timing of initiation and completion of our clinical trials, and the period during which the results of the trials will become available;
- the success, cost and timing of our clinical development of our product candidates;
- our ability to establish clinical differentiation of our product candidates;
- our ability to develop product candidates that have broad therapeutic potential;
- our ability to utilize our business development strategy and expertise to build a balanced portfolio;
- our ability to identify collaborations and strategic partnerships to maximize the value of our portfolio;
- our ability to build our operational and commercial capabilities for supplying and marketing our products, if approved, in key markets;
- market conditions in the biopharmaceutical sector and issuance of securities analysts' reports or recommendations;
- the trading volume of our Common Stock;
- an inability to obtain additional funding;
- our ability to initiate, recruit and enroll patients in and conduct our clinical trials at the pace that we project;
- our ability to obtain and maintain regulatory approval of our product candidates, and any related restrictions, limitations or warnings in the label of any of our product candidates, if approved;
- our reliance on third parties to manufacture drug substance and drug product for use in our clinical trials;
- our ability to retain and recruit key personnel;
- our ability to obtain and maintain adequate intellectual property rights;
- our expectations regarding government and third-party payor coverage and reimbursement;
- the impact of current and future healthcare reforms, including those affecting the delivery of or payment for healthcare products and services;
- our expectations regarding federal, state and foreign regulatory requirements;
- our estimates of our expenses, ongoing losses, capital requirements and our needs for or ability to obtain additional financing;

- our existing cash and the sufficiency of our existing cash and proceeds from future capital-raising efforts, if any, to fund our future operating expenses and capital expenditure requirements;
- the potential benefits of strategic collaboration agreements;
- our ability to enter into strategic collaborations or arrangements, including potential business development opportunities and potential licensing partnerships, and our ability to attract collaborators with development, regulatory and commercialization expertise;
- sales of our stock by us, our insiders or our stockholders;
- our expectations regarding the time during which we will be an emerging growth company and smaller reporting company under the Jumpstart Our Business Startups Act of 2012, as amended;
- general economic, industry, geopolitical and market conditions, such as military conflict or war, inflation and financial institution instability, tariffs and other trade measures, or pandemic or epidemic disease outbreaks, many of which are beyond our control;
- additions or departures of senior management, directors or key personnel;
- our financial performance;
- developments and projections relating to our competitors or our industry; and
- other risks and uncertainties, including those included under the section heading "Risk Factors" contained in this prospectus.

The forward-looking statements in this prospectus may prove incorrect. These forward-looking statements speak only as of the date of this prospectus and are subject to a number of known and unknown risks, uncertainties and assumptions, including those described under the sections titled "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" contained in our Annual Report on Form 10-K for the year ended December 31, 2025, as filed with the SEC on March 16, 2026, any subsequent Quarterly Report on Form 10-Q, and as described or may be described in any subsequent Annual Report on Form 10-K, each incorporated by reference in this prospectus and any other documents we file with the SEC that are deemed incorporated by reference into this prospectus. In addition, statements that "we believe" and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this prospectus and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain, and should not be unduly relied upon. Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified and some of which are beyond our control, these forward-looking statements should not be relied upon as guarantees of future events. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual future results, levels of activity, performance and events and circumstances could differ materially from those projected in the forward-looking statements. Moreover, we operate in an evolving environment. New risks and uncertainties may emerge from time to time, and management cannot predict all risks and uncertainties. Except as required by applicable law, we do not undertake to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, changed circumstances or otherwise.

USE OF PROCEEDS

All of the shares of Common Stock offered by the Selling Stockholder pursuant to this prospectus will be sold by the Selling Stockholder for its account. We will not receive any of the proceeds from these sales.

The Selling Stockholder 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 Common Stock. We will bear the costs, fees and expenses incurred in effecting the registration of the shares covered by this prospectus, including, without limitation, all registration and filing fees, Nasdaq listing fees and fees and expenses of our counsel and our independent registered public accounting firm.

SELLING STOCKHOLDER

Pursuant to the Registration Rights Agreement, we agreed to (i) file the registration statement, of which this prospectus is a part, to cover the resale of the shares of Common Stock that the Selling Stockholder acquired pursuant to the Subscription Agreement and (ii) use reasonable best efforts to keep such registration statement continuously effective from the date on which the SEC declares the registration statement to be effective until the earlier of (x) the date on which the Selling Stockholder shall have resold all the Registrable Securities (as such term is defined in the Registration Rights Agreement) covered thereby, and (y) the date on which the Registrable Securities may be resold by the Selling Stockholder without registration and without regard to any volume or manner-of-sale limitations by reason of Rule 144 under the Securities Act ("Rule 144") and without current public information pursuant to Rule 144.

We are registering the resale of the above-referenced securities to permit the Selling Stockholder identified below, or its 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, 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). Throughout this prospectus, when we refer to the securities being registered on behalf of the Selling Stockholder, we are referring to the shares of Common Stock issued to the Selling Stockholder pursuant to the License Agreement. When we refer to the "Selling Stockholder" in this prospectus, we mean the Selling Stockholder identified in the table below, as well as its 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 Stockholder may sell some, all or none of their shares of Common Stock. We do not know how long the Selling Stockholder will hold the shares before selling them, and we currently have no agreements, arrangements or understandings with the Selling Stockholder regarding the sale or other disposition of any of the shares. The shares of Common Stock covered hereby may be offered from time to time by the Selling Stockholder.

The information regarding shares beneficially owned after the offering assumes the sale of all shares of Common Stock offered by the Selling Stockholder. To our knowledge, subject to community property laws where applicable, the Selling Stockholder named in the table has sole voting and investment power with respect to the shares of Common Stock set forth opposite the Selling Stockholder's name.

The following table sets forth the name of the Selling Stockholder, the number and percentage of shares of Common Stock beneficially owned by the Selling Stockholder as of September 1, 2026, the number of shares of Common Stock that may be offered under this prospectus, and the number and percentage of Common Stock beneficially owned by the Selling Stockholder assuming all of the shares of Common Stock registered hereunder are sold. Beneficial ownership is determined in accordance with the rules of the SEC and includes voting or investment power with respect to the Common Stock. Generally, a person "beneficially owns" shares of the Common Stock if the person has or shares with others the right to vote those shares or to dispose of them, or if the person has the right to acquire voting or disposition rights within 60 days of September 1, 2026.

The number of shares described under the column "Shares of Common Stock Beneficially Owned Prior to this Offering" for the Selling Stockholder includes all shares of our Common Stock beneficially held by the Selling Stockholder as of September 1, 2026, which includes all shares of our Common Stock issued to the Selling Stockholder pursuant to the License Agreement. Because the Selling Stockholder may dispose of all, none or some portion of its shares of Common Stock, no estimate can be given as to the number of shares of Common Stock that will be beneficially owned by the Selling Stockholder upon termination of this offering.

For purposes of the table below, however, we have assumed that after termination of this offering none of the shares of Common Stock covered by this prospectus will be beneficially owned by the Selling Stockholder and further assumed that the Selling Stockholder will not acquire or dispose of beneficial ownership of any additional shares of Common Stock during the offering. In addition, the Selling Stockholder may have sold, transferred or otherwise disposed of, or may sell, transfer or otherwise dispose of, at any time and from time to time, any or all of their shares of Common Stock or interests in shares of Common

Stock in transactions exempt from the registration requirements of the Securities Act after the date on which the information in the table is presented. See the section titled "Plan of Distribution."

Name[1]	Shares of Common Stock Beneficially Owned Prior to this Offering	Shares of Common Stock Offered	Beneficial Ownership After this Offering	
			Shares	%
InnoCare Pharma Inc.[1]	7,000,000	7,000,000	0	—

(1) The shares reported in the table above consist of 7,000,000 Shares of Common Stock issued to InnoCare pursuant to the Subscription Agreement. InnoCare has sole voting and disposition power over the shares held by InnoCare. The address of InnoCare is 103 Carnegie Center, Suite 209, Princeton, New Jersey, 08540, USA.

PLAN OF DISTRIBUTION

The Selling Stockholder, which as used herein includes donees, pledgees, transferees or other successors-in-interest selling shares of Common Stock 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. 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.

The Selling Stockholder may use any one or more of the following methods when disposing of shares of Common Stock or interests therein:

- distributions to members, partners, stockholders or other equityholders of the Selling Stockholder;
- 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 and settlement of short sales entered into after the effective date of the registration statement of which this prospectus is a part;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- broker-dealers may agree with the Selling Stockholder 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 pursuant to applicable law.

The Selling Stockholder 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 Selling Stockholder to include the pledgee, transferee or other successors in interest as Selling Stockholder under this prospectus. The Selling Stockholder 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 Stockholder for purposes of this prospectus. In connection with the sale of our Common Stock or interests therein, the Selling Stockholder may enter into hedging transactions with broker-dealers or other financial institutions, which may in turn engage in short sales of the Common Stock in the course of hedging the positions they assume. The Selling Stockholder may also sell shares of our Common Stock short and deliver these securities to close out their short positions, or loan or pledge the Common Stock to broker-dealers that in turn may sell these securities. The Selling Stockholder 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 Stockholder from the sale of the Common Stock offered by them will be the purchase price of the Common Stock less discounts or commissions, if any. The Selling Stockholder 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 Stockholder also may resell all or a portion of the shares of Common Stock owned by them 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, or another available exemption from the registration requirements under the Securities Act.

The Selling Stockholder and any underwriters, broker-dealers or agents that participate in the sale of shares of Common Stock or interests therein may be "underwriters" within the meaning of Section 2(a)(11) of the Securities Act (it being understood that the Selling Stockholder shall not be deemed to be underwriters solely as a result of their participation in this offering). Any discounts, commissions, concessions or profit they earn on any resale of the shares covered by this prospectus may be underwriting discounts and commissions under the Securities Act. A selling stockholder who is an "underwriter" within the meaning of Section 2(a)(11) of the Securities Act will be subject to the prospectus delivery requirements of the Securities Act.

To the extent required, the shares of our Common Stock to be sold, the name of the Selling Stockholder, the respective purchase prices and public offering prices, the names of any agent, dealer or underwriter, and 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 Common Stock may be sold in these jurisdictions only through registered or licensed brokers or dealers. In addition, in some states the 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 Stockholder that the anti-manipulation rules of Regulation M under the Securities Exchange Act of 1934 (the "Exchange Act") may apply to sales of shares covered by this prospectus in the market and to the activities of the Selling Stockholder 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 Stockholder for the purpose of satisfying the prospectus delivery requirements of the Securities Act. The Selling Stockholder 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.

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

We have agreed with the Selling Stockholder to use reasonable best efforts to cause the registration statement of which this prospectus constitutes a part to become effective and to remain continuously effective until the earlier of: (i) the date on which the Selling Stockholder shall have resold or otherwise disposed of all the shares covered by this prospectus and (ii) the date on which the shares covered by this prospectus no longer constitute Registrable Securities, such that they may be resold by the Selling Stockholder without registration and without regard to any volume or manner-of-sale limitations and without current public information pursuant to Rule 144 under the Securities Act or any other rule of similar effect.

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 Zenas BioPharma, Inc. appearing in Zenas Biopharma, Inc.'s Annual Report (Form 10-K) for the year ended December 31, 2025, have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report thereon, incorporated by reference 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.zenasbio.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, including all filings made after the date of the filing of the registration statement of which this prospectus is a part and prior to the effectiveness of such registration statement, 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, 2025, as filed with the SEC on March 16, 2026;
- our Quarterly Reports on Form 10-Q for the quarter ended March 31, 2026, as filed with the SEC on May 13, 2026, and for the quarter ended June 30, 2026, as filed with the SEC on August 13, 2026;
- our Current Reports on Form 8-K filed with the SEC on January 5, 2026, February 13, 2026, March 31, 2026, May 13, 2026 and August 13, 2026;
- the information specifically incorporated by reference into our Annual Report on Form 10-K for the year ended December 31, 2025 from our Definitive Proxy Statement on Schedule 14A for the 2026 Annual Meeting of Stockholders, as filed with the SEC on March 16, 2026; and
- the description of our Common Stock, which is contained in the Registration Statement on Form 8-A, dated September 10, 2024, as supplemented by the description of our Common Stock and preferred stock contained in Exhibit 4.3 to our Annual Report on Form 10-K for the fiscal year ended December 31, 2024, filed with the SEC on March 11, 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:

Attention: Investor Relations
Zenas BioPharma, Inc.
852 Winter Street, Suite 250
Waltham, Massachusetts 02451
(857) 271-2954
email address: IR@zenasbio.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.zenasbio.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.

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. Other Expenses of Issuance and Distribution

The following table sets forth an estimate of the fees and expenses relating to the issuance and distribution of the securities being registered hereby, other than underwriting discounts and commissions, all of which shall be borne by the Registrant. All of such fees and expenses, except for the SEC registration fee, are estimated:

SEC registration fee	$ 31,717
Legal fees and expenses	$ 50,000
Accounting fees and expenses	$ 20,000
Miscellaneous fees and expenses	$ 20,000
Total	$121,717

Item 15. Indemnification of Directors and Officers.

As permitted by Section 102(b)(7) of the General Corporation Law of the State of Delaware ("DGCL"), our Second Restated Certificate of Incorporation (our "Restated Charter") includes a provision to eliminate the personal liability of our directors and officers for monetary damages for breach of their fiduciary duties as directors, subject to certain exceptions. In addition, our Restated Charter and Amended and Restated Bylaws provide that we are required to indemnify our officers and directors under certain circumstances, including those circumstances in which indemnification would otherwise be discretionary, and we are required to advance expenses to our officers and directors as incurred in connection with proceedings against them for which they may be indemnified, in each case except to the extent that the DGCL prohibits the elimination or limitation of liability of directors or officers for breaches of fiduciary duty.

Section 145(a) of the DGCL provides that a corporation shall have the power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the corporation) by reason of the fact that the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by him in connection with such action, suit or proceeding if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interest of the corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his conduct was unlawful. The termination of any action, suit or proceeding by judgment, order, settlement, conviction or upon a plea of nolo contendere or its equivalent shall not, of itself, create a presumption that the person did not act in good faith and in a manner which the person reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had reasonable cause to believe that his conduct was unlawful.

Section 145(b) of the DGCL provides that a corporation shall have the power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the corporation to procure a judgment in its favor by reason of the fact that the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against expenses (including attorneys' fees) actually and reasonably incurred by him in connection with the defense or settlement of such action or suit if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation and except that 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 the court in which such action or suit was brought shall determine upon application

that, despite the adjudication of liability but in view of all 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.

We have entered into indemnification agreements with our directors and certain of our officers. These indemnification agreements provide broader indemnity rights than those provided under the DGCL and our Restated Charter. These indemnification agreements are not intended to deny or otherwise limit third-party or derivative suits against us or our directors or officers, but to the extent a director or officer were entitled to indemnity or contribution under the indemnification agreement, the financial burden of a third-party suit would be borne by us, and we would not benefit from derivative recoveries against the director or officer. Such recoveries would accrue to our benefit but would be offset by our obligations to the director or officer under the indemnification agreement.

We maintain directors' and officers' liability insurance for the benefit of our directors and officers.

Also see "Undertakings."

Item 16. Exhibits.

Exhibit	Description
3.1	Second Restated Certificate of Incorporation of Zenas BioPharma, Inc. (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K as filed with the SEC on September 16, 2024, File No. 001-42270)
3.2	Amended and Restated Bylaws of Zenas BioPharma, Inc. (incorporated by reference to Exhibit 3.2 to the Company's Current Report on Form 8-K as filed with the SEC on September 16, 2024, File No. 001-42270)
4.1	Specimen stock certificate evidencing shares of common stock (incorporated by reference to Exhibit 4.1 to the Registration Statement on Form S-1 as filed with the SEC on September 6, 2024, File No. 333-281713)
4.2	Fourth Amended and Restated Shareholders Agreement, among the Registrant and certain of its stockholders, dated May 3, 2024 (incorporated by reference to Exhibit 4.2 to the Registration Statement on Form S-1 as filed with the SEC on September 6, 2024, File No. 333-281713)
4.3	Description of Securities (incorporated by reference to Exhibit 4.3 to the Annual Report on Form 10-K for the year ended December 31, 2024, as filed with the SEC on March 11, 2025, File No. 001-42270)
4.4	Registration Rights Agreement, dated October 7, 2025, by and between the Registrant and InnoCare Pharma Inc. (incorporated by reference to Exhibit 10.2 to the Current Report on Form 8-K, as filed with the SEC on October 8, 2025, File No. 001-42270)
5.1	Opinion of Ropes & Gray LLP
23.1	Consent of Ropes & Gray LLP (included in Exhibit 5.1)
23.2	Consent of Ernst & Young LLP
24.1	Power of Attorney (incorporated by reference to the signature page hereto)
107	Filing Fee Table (filed herewith)

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% change in the maximum aggregate offering price set forth in the "Calculation of Filing Fee Tables" or "Calculation of Registration Fee" table, as applicable, in the effective registration statement;

(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 the undertakings set forth in paragraphs (1)(i), (1)(ii) and (1)(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 this 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:

(A) Each prospectus filed by the registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and

(B) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii), or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act of 1933 shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof. *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 effective date, 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 effective date.

(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.

(6) That, for 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.

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 foregoing provisions or otherwise, the registrant has been advised that in the opinion of the Commission such indemnification is against public policy as expressed in the Securities 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 Securities Act of 1933, and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, 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 on Form S-3 to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Waltham, Commonwealth of Massachusetts on September 11, 2026.

ZENAS BIOPHARMA, INC.

By: /s/ Leon O. Moulder, Jr.
Leon O. Moulder, Jr.
Chief Executive Officer and Director

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Leon O. Moulder, Jr. and Joseph Farmer and each of them, either of whom may act without the joinder of the other, as 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 and supplements thereto (including post-effective amendments and registration statements filed pursuant to Rule 462(b)) to this registration statement, and to file the same, with all exhibits thereto, and other documents in connection therewith with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or either of them, or their or his 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 below by the following persons in the capacities and on the dates indicated.

SIGNATURES	TITLE	DATE
/s/ Leon O. Moulder, Jr. Leon O. Moulder, Jr.	Chief Executive Officer and Director (Principal executive officer)	September 11, 2026
/s/ Jennifer Fox Jennifer Fox	Chief Business Officer and Chief Financial Officer (Principal financial and accounting officer)	September 11, 2026
/s/ Patricia Allen Patricia Allen	Director	September 11, 2026
/s/ James Boylan James Boylan	Director	September 11, 2026
/s/ Patrick Enright Patrick Enright	Director	September 11, 2026
/s/ Hongbo Lu, Ph.D. Hongbo Lu, Ph.D.	Director	September 11, 2026

SIGNATURES	TITLE	DATE
/s/ Jake Nunn Jake Nunn	Director	September 11, 2026
/s/ Christy J. Oliger Christy J. Oliger	Director	September 11, 2026
/s/ John Orloff, M.D. John Orloff, M.D.	Director	September 11, 2026

Exhibit 5.1

ROPES & GRAY LLP
PRUDENTIAL TOWER
800 BOYLSTON STREET
BOSTON, MA 02199-3600
WWW.ROPESGRAY.COM

September 11, 2026

Zenas BioPharma, Inc.
852 Winter Street, Suite 250
Waltham, MA 02451

Re: Registration of Securities by Zenas BioPharma, Inc.

Ladies and Gentlemen:

We have acted as counsel to Zenas BioPharma, Inc., a Delaware corporation (the "Company"), in connection with the registration statement on Form S-3 (the "Registration Statement") filed on the date hereof by the Company with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), relating to the registration under the Securities Act and the proposed offer and sale from time to time pursuant to Rule 415 under the Securities Act, by the selling stockholder identified in the Registration Statement, of up to 7,000,000 shares of common stock, $0.0001 par value per share, of the Company (the "Common Stock").

In connection with this opinion letter, we have examined such certificates, documents and records and have made such investigation of fact and such examination of law as we have deemed appropriate in order to enable us to render the opinions set forth herein. In conducting such investigation, we have relied, without independent verification, upon certificates of officers of the Company, public officials and other appropriate persons.

The opinions expressed below are limited to the Delaware General Corporation Law.

Based upon and subject to the foregoing and the assumptions, qualifications and limitations set forth below, we are of the opinion that the shares of Common Stock have been duly authorized by the Company and are validly issued, fully paid and non-assessable.

In rendering the opinions set forth above, we have assumed that (i) the Registration Statement and any amendments thereto will have become effective under the Securities Act, and no stop order suspending the Registration Statement's effectiveness will have been issued and remain in effect each time the Common Stock is offered and sold as contemplated by the Registration Statement, and (ii) all shares of Common Stock will be offered and sold in compliance with applicable federal and state securities laws and in the manner stated in the Registration Statement and the applicable prospectus supplement.

We hereby consent to the filing of this opinion letter as an exhibit to the Registration Statement and to the use of our name therein and in the related prospectus under the caption "Legal Matters." In giving such consent, we do not thereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission thereunder.

Very truly yours,

/s/ Ropes & Gray LLP

Ropes & Gray LLP

Exhibit 23.2

Consent of Independent Registered Public Accounting Firm

We consent to the reference to our firm under the caption "Experts" in the Registration Statement (Form S-3) and related Prospectus of Zenas BioPharma, Inc. for the registration of 7,000,000 shares of its common stock and to the incorporation by reference therein of our report dated March 16, 2026, with respect to the consolidated financial statements of Zenas BioPharma, Inc. included in its Annual Report (Form 10-K) for the year ended December 31, 2025, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

Boston, Massachusetts
September 11, 2026

Calculation of Filing Fee Tables

S-3

Zenas BioPharma, Inc.

Table 1: Newly Registered and Carry Forward Securities ☐Not Applicable

		Security Type	Security Class Title	Fee Calculation or Carry Forward Rule	Amount Registered	Proposed Maximum Offering Price Per Unit	Maximum Aggregate Offering Price	Fee Rate	Amount of Registration Fee	Carry Forward Form Type	Carry Forward File Number	Carry Forward Initial Effective Date	Filing Fee Previously Paid in Connection with Unsold Securities to be Carried Forward
Newly Registered Securities													
Fees to be Paid	1	Equity	Common Stock, par value $0.0001 per share	457(a)	7,000,000	$ 32.81	$ 229,670,000.00	0.0001381	$ 31,717.43				
Fees Previously Paid													
Carry Forward Securities													
Carry Forward Securities													
				Total Offering Amounts:			$ 229,670,000.00		$ 31,717.43				
				Total Fees Previously Paid:					$ 0.00				
				Total Fee Offsets:					$ 0.00				
				Net Fee Due:					$ 31,717.43				

Offering Note

1

(a) The registration statement to which this exhibit is attached registers the resale from time to time by certain stockholders of up to 7,000,000 shares of common stock, $0.0001 par value per share (the "Common Stock"), that were initially issued pursuant to the Subscription Agreement dated as of October 7, 2025, by and between the Registrant and the selling stockholder named in the registration statement. Pursuant to Rule 416 under the Securities Act of 1933, as amended, the registration statement also covers such additional securities that may be issued as a result of stock splits, stock dividends or similar transactions.

(b) Estimated solely for the purpose of calculating the registration fee in accordance with Rule 457(c) based on the average of the high and low prices of the Registrant's Common Stock as reported on The Nasdaq Global Select Market on September 9, 2026 to be $33.53 and $32.08, respectively.

Table 2: Fee Offset Claims and Sources ☑Not Applicable

		Registrant or Filer Name	Form or Filing Type	File Number	Initial Filing Date	Filing Date	Fee Offset Claimed	Security Type Associated with Fee Offset Claimed	Security Title Associated with Fee Offset Claimed	Unsold Securities Associated with Fee Offset Claimed	Unsold Aggregate Offering Amount Associated with Fee Offset Claimed	Fee Paid with Fee Offset Source
Rules 457(b) and 0-11(a)(2)												
Fee Offset Claims												
Fee Offset Sources												
Rule 457(p)												
Fee Offset Claims												
Fee Offset Sources												

Table 3: Combined Prospectuses ☑Not Applicable

	Security Type	Security Class Title	Amount of Securities Previously Registered	Maximum Aggregate Offering Price of Securities Previously Registered	Form Type	File Number	Initial Effective Date