

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

AMENDMENT NO. 1  
TO  
FORM S-3  
REGISTRATION STATEMENT

*UNDER  
THE SECURITIES ACT OF 1933*

Enzo Biochem, Inc.  
(Exact name of registrant as specified in its charter)

New York  
(State or other jurisdiction of  
incorporation or organization)

13-2866202  
(I.R.S. Employer  
Identification No.)

81 Executive Blvd., Suite 3  
Farmingdale, New York 11735  
(631) 755-5500  
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Hamid Erfanian  
Enzo Biochem, Inc.  
81 Executive Blvd., Suite 3  
Farmingdale, New York 11735  
(631) 755-5500  
(Name, address, including zip code, and telephone number, including area code, of agent for service)

*Copies to:*

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

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

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

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

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

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

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

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

Large accelerated filer ☐  
Non-accelerated filer ☐

Accelerated filer ☒  
Smaller reporting company ☒  
Emerging growth company ☐

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

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

This registration statement contains two prospectuses:

- a base prospectus which covers the offering, issuance and sale of such indeterminate number of shares of common stock, preferred stock, depositary shares, debt securities, warrants, and units, which together shall have an aggregate initial offering price not to exceed \$150,000,000; and
- a sales agreement prospectus covering the offering, issuance and sale of shares of the Registrant's common stock that, may be issued and sold under a sales agreement, between the Registrant and B. Riley Securities, Inc. in an aggregate amount of up to \$30,000,000.

The base prospectus immediately follows this explanatory note. The specific terms of any securities to be offered pursuant to the base prospectus will be specified in a prospectus supplement to the base prospectus. The sales agreement prospectus immediately follows the base prospectus. The common stock that may be offered, issued and sold under the sales agreement prospectus is included in the \$150,000,000 of securities that may be offered, issued and sold by the Registrant under the base prospectus.

The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

**PROSPECTUS, SUBJECT TO COMPLETION, DATED MAY 25, 2023**



**ENZO BIOCHEM, INC.**

**\$150,000,000**

**Common Stock  
Preferred Stock  
Depositary Shares  
Debt Securities  
Warrants  
Units**

We may from time to time offer and sell common stock, preferred stock, depositary shares, debt securities, warrants, and units, having an aggregate offering price of up to \$150,000,000. We may offer and sell these securities separately or together in any combination. We may offer and sell these securities to or through underwriters, directly to investors or through agents. We will specify the terms of the securities, and the names of any underwriters or agents and their respective compensation, in supplements to this prospectus. Our common stock is listed on the New York Stock Exchange under the symbol "ENZ". On May 24, 2023, the last reported sale price of our common stock on the New York Stock Exchange was \$2.34 per share.

You should read this prospectus and any prospectus supplement carefully before you invest in any of our securities.

**Investing in our securities involves a high degree of risk. You should carefully consider the risk factors described in the applicable prospectus supplement and certain of our filings with the Securities and Exchange Commission, as described under "Risk Factors" on page S-4.**

This prospectus may not be used to offer or sell any securities unless accompanied by a prospectus supplement.

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

The date of this prospectus is , 2023.

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## ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission (the “SEC”) using a “shelf” registration process. Under this shelf process, we may sell any combination of the securities described in this prospectus in one or more offerings up to a total dollar amount of \$150,000,000. We have provided to you in this prospectus a general description of the securities we may offer. Each time we sell securities under this shelf registration process, we will provide a prospectus supplement that will contain specific information about the terms of the offering. We may also add, update or change in the prospectus supplement or any “free writing prospectus” we may authorize to be delivered to you any of the information contained in this prospectus. To the extent there is a conflict between the information contained in this prospectus and the prospectus supplement or any free writing prospectus we may authorize to be delivered to you, you should rely on the information in the prospectus supplement or free writing prospectus, as the case may be, provided that if any statement in one of these documents is inconsistent with a statement in another document having a later date—for example, a document incorporated by reference in this prospectus or any prospectus supplement—the statement in the document having the later date modifies or supersedes the earlier statement.

An investment in our securities involves certain risks that should be carefully considered by prospective investors. See “Risk Factors.”

We incorporate by reference important business and financial information about us into this prospectus and any prospectus supplement or any free writing prospectus we may authorize to be delivered to you. You may obtain the information incorporated by reference into this prospectus without charge by following the instructions under “Where You Can Find More Information.” You should carefully read this prospectus and any prospectus supplement and any free writing prospectus we may authorize to be delivered to you as well as additional information described under “Incorporation of Certain Information by Reference.” All references in this prospectus to “Enzo Biochem,” “Enzo,” the “Company,” “we,” “us” or “our” mean Enzo Biochem, Inc., unless we state otherwise or the context otherwise requires.

You should rely only on the information contained in, or incorporated by reference into, this prospectus. We have not authorized anyone to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. We are not making an offer to sell these securities in any jurisdiction where the offer is not permitted. The information contained in this prospectus is accurate only as of the date of this prospectus and the information in the documents incorporated by reference in this prospectus is accurate only as of the date the documents were filed with the SEC, regardless of the time of delivery of this prospectus or the time of issuance or resale of any securities. Our business, financial condition, results of operations and prospects may have changed since those dates.

## SUMMARY

*The following summary provides an overview of certain information about our company and the offering and may not contain all the information that may be important to you. This summary is qualified in its entirety by and should be read together with the information contained in other parts of this prospectus. You should carefully read this entire prospectus before making a decision about whether to invest in any of our securities.*

### Enzo Biochem, Inc.

#### Overview

Enzo Biochem, Inc. (the “Company”, “we”, “our”, or “Enzo”) is an integrated diagnostics, clinical lab, and life sciences company focused on delivering and applying advanced technology capabilities to produce affordable reliable products and services that enable our customers to meet their clinical needs. Through a connection with the market, we provide advanced biotechnology solutions to the global community as affordable and flexible quality products and services. We develop, manufacture and sell our proprietary technology solutions and platforms to clinical laboratories, specialty clinics, researchers and physicians globally. Enzo’s structure and business strategy represent the culmination of years of extensive planning and work. The Company has the ability to offer low cost, high performance products and services for diagnostic testing, which ideally positions us to capitalize on the reimbursement pressures facing diagnostic labs. Our pioneering work in genomic analysis coupled with our extensive patent estate and enabling platforms have positioned the Company to continue to play an important role in the rapidly growing molecular medicine marketplaces.

Enzo develops low cost diagnostic platform products and related services. Our platform development includes automation-compatible reagent systems and associated products for sample collection and processing through analysis. We develop affordable products and services to improve healthcare, one of the greatest challenges today. Enzo combines over 40 years of expertise in technology development with assay development capabilities and diagnostic testing services to create high performance, cost-effective, and open assay solutions. The ability to combine these assets in one company is uncommon. With our strong intellectual property portfolio integrated with assay development know-how, production, distribution, validation and services capabilities, we have enabled sustainable products and services for a market that is facing increasing pressure in costs and reimbursement.

Enzo technology solutions and platforms and unique operational structure are designed to reduce overall healthcare costs for both government and private insurers. Our proprietary technology platforms reduce our customers’ need for multiple, specialized instruments, and offer a variety of high throughput capabilities together with a demonstrated high level of accuracy and reproducibility. Our genetic test panels are focused on large and growing markets primarily in the areas of personalized medicine, women’s health, infectious diseases and genetic disorders.

In the course of our research and development activities, we have built a substantial portfolio of intellectual property assets, comprised of approximately 472 issued patents worldwide and over 64 pending patent applications, along with extensive enabling technologies and platforms.

#### Operating Segments

Below are brief descriptions of our two operating segments. For a more detailed description, see Note 11 – Segment Reporting in the Notes to Consolidated Financial Statements in our Form 10-Q filed March 20, 2023:

**Enzo Clinical Services** is a clinical reference laboratory providing a wide range of clinical services to physicians, medical centers, other clinical labs and pharmaceutical companies. The Company believes having a Clinical Laboratory Improvement Amendments of 1988 (“CLIA”) certified and College of American Pathologists (“CAP”) accredited medical laboratory located in New York provides us the opportunity to more rapidly introduce cutting edge products and services to the clinical marketplace. Enzo Clinical Labs offers an extensive menu of molecular and other clinical laboratory tests and procedures used in patient care by physicians to establish or support a diagnosis, monitor treatment or medication, and search for an otherwise undiagnosed condition. Our laboratory is equipped with state-of-the-art communication and connectivity solutions enabling the rapid transmission, analysis and interpretation of generated data. We operate a full service clinical laboratory in

Farmingdale, New York, a network of over 30 patient service centers throughout New York, New Jersey and Connecticut, two free standing “STAT” or rapid response laboratories in New York City and Connecticut, an in-house logistics department, and an information technology department. Under our license in New York State, we are able to offer testing services to clinical laboratories and physicians nationwide.

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The Clinical Laboratory Services reporting unit is impacted by various risk factors, including among others, loss of a substantial portion of revenues from COVID-19 testing, reduced reimbursements from third party payers for testing performed and from recent health care legislation.

On March 16, 2023, the Company entered into an Asset Purchase Agreement with respect to the sale of assets and assignment of certain liabilities of the Clinical Labs division.

**Enzo Products** manufactures, develops and markets products and tools for clinical research, drug development and bioscience research customers worldwide. Underpinned by broad technological capabilities, Enzo Life Sciences has developed proprietary products used in the identification of genomic information by laboratories around the world. Information regarding our technologies can be found in the “Core Technologies” section of our most recently filed Form 10-K. We are internationally recognized and acknowledged as a leader in the development, manufacturing validation and commercialization of numerous products serving not only the clinical research market, but also the life sciences markets in the fields of cellular analysis and drug discovery, among others. Our operations are supported by global operations allowing for the efficient marketing and delivery of our products around the world.

## Recent Developments

### *Clinical Labs Purchase Agreement*

On March 16, 2023, the Company filed a Form 8-K indicating that it and Enzo Clinical Labs, Inc. (the “Subsidiary” and, together with the Company, the “Seller”) entered into an Asset Purchase Agreement (the “Purchase Agreement”) with Laboratory Corporation of America Holdings, a Delaware corporation (the “Buyer”). Pursuant to the Purchase Agreement, the Seller has agreed to sell substantially all operating assets and assign certain liabilities of its clinical labs business (the “Business”) to the Buyer which are necessary to operate the Business in exchange for approximately \$146,000,000 in cash (subject to certain adjustments), on and subject to the terms and conditions set forth therein (such transaction, the “Transaction”).

The Purchase Agreement contains customary representations, warranties, covenants and termination rights for a transaction of this nature, including, among other things, customary covenants: (i) relating to the conduct of the Business between the signing of the Purchase Agreement and the closing of the Transaction and (ii) regarding the efforts of the parties to cause the Transaction to be consummated, including obtaining certain consents and approvals. The consummation of the Transaction is subject to the satisfaction or waiver of customary closing conditions, including the expiration or termination of any required waiting periods under the Hart-Scott-Rodino Antitrust Improvements Act of 1976 (“HSR”). The parties to the Purchase Agreement made the filings required under the HSR on March 30, 2023, and the waiting period under the HSR expired on May 1, 2023 at 11:59 p.m. Eastern time.

The Purchase Agreement also includes customary termination provisions for both the Company and Buyer and provides that, in connection with the termination of the Purchase Agreement under specified circumstances, including termination by the Company to accept and enter into a definitive agreement with respect to an unsolicited Superior Proposal, the Company will be required to pay Buyer a termination fee of \$5,000,000 or reimbursement of Buyer’s expenses of up to \$5,000,000.

Subject to the terms and conditions stated in the Purchase Agreement, Buyer will be obligated to pay a fee to the Company for each day until the closing of the Transaction. At the closing of the Transaction, such fee will be wholly or partially credited against the purchase price.

On April 13, 2023, the Company filed a preliminary proxy statement (the “Preliminary Proxy Statement”) and, on April 24, 2023, the Company filed a definitive proxy statement (the “Definitive Proxy Statement”) and, together with the Preliminary Proxy Statement, the “Proxy Statement”) with the SEC and commenced mailing of the Proxy Statement to the Company’s shareholders to solicit the approval of the Transaction and adopt the Purchase Agreement at a special meeting of shareholders held on May 22, 2023 (the “Special Meeting”). At the Special Meeting, the Company’s shareholders approved the Transaction and adopted the Purchase Agreement.

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There can be no assurances that the Purchase Agreement will close and if it does close, the exact proceeds to be received by the Company.

### *Credit Facility*

On March 31, 2023, the Company entered into a Revolving Loan and Security Agreement (the “Credit Facility”) among the Subsidiary and Enzo Life Sciences, Inc., as borrowers (the “Borrowers”), the Company and certain of its domestic subsidiaries, as guarantors (the “Guarantors”), and Gemino Healthcare Finance, LLC (d/b/a SLR Healthcare ABL), as lender.

The Credit Facility provides for a maximum \$8 million revolving line of credit. The commitment under the Credit Facility will expire after one year and all outstanding borrowings under the Credit Facility will become due and payable at that time. Prior to its expiration, the Borrowers will prepay and terminate the Credit Facility upon closing of the Purchase Agreement, and a standard termination fee will be payable.

The Credit Facility is secured by a first priority perfected security interest in the collateral. The collateral includes substantially all the U.S. assets of the Borrowers and the Guarantors, including among other assets, cash, receivables, inventory and fixed assets.

Borrowings under the Credit Facility accrue interest at the rate per annum equal to Term SOFR (Secured Overnight Financing Rate) for a three-month tenor plus 5.50%. Other fees, such as an unused line fee and a collateral monitoring fee, also apply. The Borrowers borrowed \$5.5 million under the Credit Facility upon the closing thereof.

The Credit Facility includes customary affirmative and negative covenants for revolving credit facilities of this nature, including certain limitations on the incurrence of additional indebtedness and liens. In addition, the Credit Facility requires the Borrowers to maintain certain minimum liquidity levels as of the last day of each calendar month. The levels decline over time, starting at \$4 million as of April 30, 2023, then \$3 million as of May 31, 2023 and \$2 million as of the end of each month thereafter.

The Credit Facility includes customary events of default for revolving credit facilities of this nature, including failure to pay outstanding principal or interest, failure

of applicable representations or warranties to be correct in any material respects, failure to perform any other term, covenant or agreement, certain defaults upon obligations under the Employee Retirement Income Security Act, bankruptcy or a change in control. Such events of default would require the repayment of any outstanding borrowings and the termination of the right to borrow additional funds under the Credit Facility.

#### *JGB Purchase Agreement*

On May 19, 2023, the Company entered into a Securities Purchase Agreement (the “JBG Purchase Agreement”) with each of the purchasers that are parties thereto (each, including its successors and assigns, a “Purchaser” and collectively, the “Purchasers”) and JGB Collateral, LLC, a Delaware limited liability company, as collateral agent for the Purchasers (the “Agent”). Pursuant to the JBG Purchase Agreement, the Company agreed to sell to the Purchasers (i) 10% Original Issue Discount Secured Convertible Debentures with an aggregate principal amount of \$7,608,696 and (ii) warrants to purchase up to 1,000,000 shares of the Company’s common stock, par value \$0.01 per share, for an exercise price of \$2.31 per share, the average of the three (3) daily volume weighted average prices of the Company’s common stock as defined in the JBG Purchase Agreement prior to the closing date (the “JBG Warrants”), subject to adjustments as set forth in the JBG Warrants, for a total purchase price of \$7,000,000. The JBG Purchase Agreement contains customary representations, warranties and covenants. In connection with the JBG Purchase Agreement, the Company and the Purchasers entered into a Registration Rights Agreement and the Company, certain of the Company’s domestic subsidiaries, the Purchasers and the Agent entered into a Security Agreement. The transactions contemplated by the JBG Purchase Agreement were consummated on May 19, 2023.

#### **Corporate Information**

Our offices are located at 81 Executive Blvd., Suite 3, Farmingdale, New York 11735, and our telephone number is (631) 755-5500. We maintain a website at [www.enzo.com](http://www.enzo.com). Our website and the information contained therein or connected thereto are not incorporated by reference and are not a part of this prospectus.

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### **RISK FACTORS**

Before you invest in our securities, in addition to the other information, documents or reports included or incorporated by reference in this prospectus and in any prospectus supplement, you should carefully consider the risk factors set forth in the section entitled “Risk Factors” in any prospectus supplement as well as in “Part I, Item 1A. Risk Factors” in our most recent annual report on Form 10-K and in “Part II, Item 1A. Risk Factors” in our quarterly reports on Form 10-Q filed subsequent to such Form 10-K, which are incorporated by reference into this prospectus and any prospectus supplement in their entirety, as the same may be updated from time to time by our future filings under the Securities Exchange Act of 1934, as amended (the “Exchange Act”). Each of the risks described in these sections and documents could materially and adversely affect our business, financial condition, results of operations and prospects and the market price of our shares and any other securities we may issue. Moreover, the risks and uncertainties discussed in the foregoing documents are not the only risks and uncertainties that we face, and our business, financial condition, results of operations and prospects and the market price of our shares and any other securities we may issue could be materially adversely affected by other matters that are not known to us or that we currently do not consider to be material risks to our business.

#### **Risks Related to the Company and its Recently Announced Asset Purchase Agreement**

##### *The Company may not be able to continue as a going concern.*

During the six months ended January 31, 2023, the Company incurred a net loss of \$21,955,000 and used cash in operating activities of \$14,891,000. The Company believes that based on its fiscal 2023 forecast, its current cash and cash equivalents level is not sufficient for its foreseeable liquidity and capital resource needs over at least the next twelve (12) months, which conditions raise substantial doubt about the Company’s ability to continue as a going concern for one year after the date that the unaudited interim financial statements are issued.

In response to these conditions, the Company is evaluating various financing strategies to obtain sufficient additional liquidity to meet its operating and capital requirements for the next twelve months following the date of issuance of the unaudited interim consolidated financial statements. Specifically, the Company is exploring various strategic alternatives including the sale of segment operating assets. On March 16, 2023, the Company entered into an Asset Purchase Agreement with respect to the sale to Labcorp of substantially all the operating assets and assignment of certain liabilities which are necessary for Labcorp to operate the business of the Clinical Labs division, which was approved by the Company’s shareholders on May 22, 2023. See “Prospectus Summary – Recent Developments”. However, there can be no assurance that either of these capital raising strategies will be successful, and the Company may need to raise additional capital during the current fiscal year. The Company also believes it has the ability to raise additional funds, either through additional debt secured by real property owned, private debt, selling preferred stock, utilizing at-the-market sales agreement facility, or through other sources, but there can be no assurances that the Company will be able to raise capital pursuant to the foregoing on favorable terms or at all. Our liquidity plans are subject to a number of risks and uncertainties, some of which are outside our control. Macroeconomic conditions could limit our ability to successfully execute our business plans and therefore adversely affect our liquidity plans. Our most recent unaudited interim financial statements incorporated by reference into this prospectus do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classifications of liabilities that may result should the Company be unable to continue as a going concern.

##### *There can be no guarantee that the asset sale will be completed and, if not completed, we may have to file for bankruptcy and liquidation.*

The consummation of the asset sale is subject to the satisfaction or waiver of various conditions. We cannot guarantee that the closing conditions set forth in the Asset Purchase Agreement will be satisfied. If we are unable to satisfy the closing conditions in Buyer’s favor or if other mutual closing conditions are not satisfied, Buyer will not be obligated to complete the asset sale. If the asset sale is not completed, our board of directors, in discharging its fiduciary obligations to our shareholders, will evaluate other strategic alternatives that may be available, which alternatives may not be as favorable to our shareholders as the asset sale and may include a bankruptcy and liquidation of the Company.

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##### *The Company has incurred and will continue to incur substantial expenses, including transaction-related costs, pending the asset sale.*

Claims, liabilities and expenses from operations, such as operating costs, salaries, directors’ and officers’ insurance, payroll and local taxes, legal, accounting and consulting fees and office expenses will continue to be incurred by us during the pendency of the asset sale. Further, Enzo has incurred, and expects to continue to incur, a number of non-recurring transaction-related costs in initiating and completing the asset sale. Non-recurring transaction costs include, but are not limited to, fees paid to Enzo’s financial, legal and accounting advisors, filing fees and printing costs. These fees and costs have been, and will continue to be, substantial. We cannot estimate what the aggregate of these expenses will be and these costs may be higher than expected. There can be no assurance of the exact amount of net cash proceeds Enzo will receive from the asset sale or the exact timing at which it will receive such proceeds. Therefore, it is uncertain the extent to which our financial condition and operations will benefit from or improve as a result of or after the asset sale.

The Purchase Agreement also includes customary termination provisions for both the Company and Buyer and provides that, in connection with the termination of the

Purchase Agreement under specified circumstances, including termination by the Company to accept and enter into a definitive agreement with respect to an unsolicited Superior Proposal, the Company will be required to pay Buyer a termination fee of \$5,000,000, or reimbursement of Buyer's expenses of up to \$5,000,000.

Subject to the terms and conditions stated in the Purchase Agreement, following shareholder approval of the Transaction, Buyer is obligated to pay a fee to the Company for each day until the closing of the Transaction. At the closing of the Transaction, such fee will be wholly or partially credited against the purchase price.

There can be no assurance that the Purchase Agreement will close and that if it does close, the exact proceeds to be received by the Company.

#### **Risks Related to our Common Stock**

***Our stock price has been volatile, which could result in substantial losses for investors.***

Our common stock is quoted on the New York Stock Exchange, and there has been historical volatility in the market price of our common stock. The trading price of our common stock has been, and is likely to continue to be, subject to significant fluctuations due to a variety of factors, including:

- fluctuations in our quarterly operating and earnings per share results;;
- the gain or loss of significant contracts;
- the carrying value of our goodwill and intangible assets;
- announcements of technological innovations or new commercial products by our competitors or us;
- loss of key personnel;
- delays in the development and introduction of new products;
- legislative or regulatory changes;
- general trends in the industries we operate;
- recommendations and/or changes in estimates by equity and market research analysts;
- biological or medical discoveries;
- disputes and/or developments concerning intellectual property, including patents and litigation matters;
- public concern as to the safety of new technologies;
- sales of common stock of existing holders;
- securities class action or other litigation;
- developments in our relationships with current or future customers and suppliers; and
- general economic conditions, both in the United States and worldwide.

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In addition, the stock market in general has experienced extreme price and volume fluctuations that have affected the market price of our common stock, as well as the stock of many companies in our industries. Often, price fluctuations are unrelated to operating performance of the specific companies whose stock is affected.

In the past, following periods of volatility in the market price of a company's stock, securities class action litigation has occurred against the issuing company. If we were subject to this type of litigation in the future, we could incur substantial costs and a diversion of our management's attention and resources, each of which could have a material adverse effect on our revenue and earnings. Any adverse determination in this type of litigation could also subject us to significant liabilities.

***Because we do not intend to pay cash dividends on our common stock, an investor in our common stock will benefit only if it appreciates in value.***

We currently intend to retain our retained earnings and future earnings, if any, to finance the expansion of our business and do not expect to pay any cash dividends on our common stock in the foreseeable future. As a result, the success of an investment in our common stock will depend entirely upon any future appreciation. There is no guarantee that our common stock will appreciate in value or even maintain the price at which investors purchased their shares.

***Adverse capital and credit market conditions could affect our liquidity.***

Adverse capital and credit market conditions could affect our ability to meet liquidity needs, as well as our access to capital and cost of capital. The capital and credit markets have experienced extreme volatility and disruption in recent years. Our results of operations, financial condition, cash flows and capital position could be materially adversely affected by continued disruptions in the capital and credit markets.

***It may be difficult for a third party to acquire us, which could inhibit shareholders from realizing a premium on their stock price.***

We are subject to the New York anti-takeover laws regulating corporate takeovers. These anti-takeover laws prohibit certain business combinations between a New York corporation and any "interested shareholder" (generally, the beneficial owner of 20% or more of the corporation's voting shares) for five years following the time that the shareholder became an interested shareholder, unless the corporation's board of directors approved the transaction prior to the interested shareholder becoming interested.

Our certificate of incorporation, as amended, and by-laws contain provisions that could have the effect of delaying, deferring or preventing a change in control of us that shareholders may consider favorable or beneficial. These provisions could discourage proxy contests and make it more difficult for shareholders to elect directors and take other corporate actions. These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock. These provisions include advance notice requirements for the submission by shareholders of nominations for election to the board of directors and for proposing matters that can be acted upon by shareholders at a meeting.

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## FORWARD-LOOKING STATEMENTS

This prospectus, the documents we have filed with the SEC that are incorporated by reference herein and any related free writing prospectus may contain forward-looking statements within the meaning of Section 27A of the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended. These statements are based on our current expectations, assumptions, estimates and projections about our business and our industry, and involve known and unknown risks, uncertainties and other factors that may cause our results, levels of activity, performance or achievement to be materially different from any future results, levels of activity, performance or achievements expressed or implied by the forward-looking statements.

In some cases, you can identify forward-looking statements by terms such as “anticipate,” “believe,” “could,” “estimate,” “expect,” “intend,” “may,” “plan,” “potential,” “predict,” “project,” “should,” “will,” “would” and similar expressions intended to identify forward-looking statements. Forward-looking statements include information concerning possible or assumed future results of operations of our business, the expected completion and timing of the Transaction and other information relating to the Transaction, including pro forma information regarding the Company assuming the Transaction is consummated, including our pro forma results of operations and financial condition as reflected in our unaudited pro forma condensed consolidated financial information incorporated by reference in this prospectus, and may involve known and unknown risks over which we have no control, including, without limitation: (i) the satisfaction of the conditions to consummate the Transaction; (ii) the occurrence of any event, change or other circumstance that could give rise to the termination of the Purchase Agreement; (iii) the outcome of any legal proceedings that may be instituted against us and others following the announcement of the Purchase Agreement; (iv) the amount of the costs, fees, expenses and charges related to the Transaction; (v) the effect of the announcement of the Transaction on our customer relationships, operating results and business generally, including the ability to retain key employees; and (vi) the amount of cash we will hold after the Transaction or our net proceeds from the Transaction. While we believe that we have a reasonable basis for each forward-looking statement, we caution you that these statements are based on a combination of facts and factors currently known by us and our projections of the future, about which we cannot be certain. We discuss many of these risks, uncertainties and other factors in greater detail under the heading “Risk Factors” contained in this prospectus. Given these risks, uncertainties and other factors, you should not place undue reliance on these forward-looking statements. Also, these forward-looking statements represent our estimates and assumptions only as of the date such forward-looking statements are made. You should read carefully this prospectus, together with the documents we have filed with the SEC that are incorporated by reference herein and any related free writing prospectus, completely and with the understanding that our actual future results may be materially different from what we expect. We hereby qualify all of our forward-looking statements by these cautionary statements.

Except as required by law, we assume no obligation to update these forward-looking statements, or to update the reasons actual results could differ materially from those anticipated in these forward-looking statements, even if new information becomes available in the future.

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## USE OF PROCEEDS

Unless otherwise specified in the applicable prospectus supplement, we intend to use the net proceeds from the sale of securities offered by this prospectus for general corporate purposes, including without limitation, the funding of capital expenditures and working capital needs. We will set forth in the prospectus supplement our intended use for the net proceeds received from the sale of any securities.

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## THE SECURITIES WE MAY OFFER

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

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

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

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

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

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

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## DESCRIPTION OF CAPITAL STOCK

### General Matters

Pursuant to our Certificate of Incorporation, as amended, the total amount of our authorized capital stock is 100,000,000 shares, which consists of 75,000,000 shares of authorized common stock, par value \$0.01 per share, and 25,000,000 shares of authorized preferred stock, par value \$0.01 per share. As of May 24, 2023, we had outstanding 49,728,084 shares of common stock and no shares of preferred stock. As of May 24, 2023, we had approximately 741 holders of record of our common stock.

The following summary of our capital stock does not purport to be complete and is subject to and qualified in its entirety by, our Certificate of Incorporation, as amended, and our Amended and Restated By-laws, which are filed as exhibits to the registration statement of which this prospectus forms a part.

### **Common Stock**

The holders of shares of common stock are entitled to one vote for each share held of record on all matters submitted to a vote of the shareholders. All shares of our common stock are entitled to share equally in any dividends our board of directors may declare from legally available sources. Our common stock is traded on the New York Stock Exchange under the symbol “ENZ”. The section below entitled “Certain Provisions of New York Law and of the Company’s Charter and By-laws” contains additional information regarding the rights and preferences of our common stock. The transfer agent and registrar for our common stock is Equiniti.

### **Preferred Stock**

Our board of directors has the authority, without further action by the shareholders, to issue shares of preferred stock in one or more series and to fix and determine the following terms of the preferred stock by resolution: variations in the designations, preferences, and relative, participating, optional or other special rights (including, without limitation, special voting rights, of conversion in common stock or other securities, redemption provisions or sinking fund provisions) as between series and between the preferred stock and any series thereof and the common stock, and the qualifications, limitations or restrictions of such rights, all as shall be stated in a resolution of the board of directors. Shares of preferred stock or any series thereof may have full or limited voting powers, or be without voting powers, all as shall be stated in a resolution of the board of directors.

Any or all of these rights may be greater than the rights of our common stock. We currently have no issued and outstanding preferred stock.

Our board of directors, without shareholder approval, can issue preferred stock with voting, conversion or other rights that could negatively affect the voting power and other rights of the holders of our common stock. Preferred stock could thus be issued quickly with terms calculated to delay or prevent a change in control of the Company or to make it more difficult to remove the Company’s management. Additionally, the issuance of preferred stock may have the effect of decreasing the market price of our common stock.

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## **DESCRIPTION OF DEPOSITARY SHARES**

The following description, together with the additional information we include in any applicable prospectus supplement, summarizes the material terms and provisions of the depositary shares that we may offer under this prospectus. The following statements with respect to the depositary shares and depositary receipts are summaries of, and subject to, the detailed provisions of a deposit agreement to be entered into by Enzo Biochem and a depositary to be selected at the time of issue (the “depositary”) and the form of depositary receipt. The form of deposit agreement and the form of depositary receipt will be filed with the SEC.

### **General**

We may, at our option, elect to issue fractional shares of preferred stock, rather than full shares of preferred stock. In the event such option is exercised, we may elect to have a depositary issue receipts for depositary shares, each receipt representing a fraction, to be set forth in the prospectus supplement relating to a particular series of preferred stock, of a share of a particular series of preferred stock as described below.

The shares of any series of preferred stock represented by depositary shares will be deposited under a deposit agreement between us and a bank or trust company that we select. Subject to the terms of the deposit agreement, each owner of a depositary share will be entitled, in proportion to the applicable fraction of a share of preferred stock represented by such depositary share, to all the rights and preferences of the preferred stock represented by the depositary share, including dividend, voting, redemption and liquidation rights.

### **Depositary Receipts**

The depositary shares will be evidenced by depositary receipts issued pursuant to the deposit agreement. Depositary receipts will be distributed to those persons purchasing the fractional shares of preferred stock in accordance with the terms of an offering of the preferred stock.

### **Withdrawal of Preferred Stock**

Upon surrender of depositary receipts at the office of the depositary and upon payment of the charges provided in the deposit agreement, a holder of depositary receipts may have the depositary deliver to the holder the whole shares of preferred stock relating to the surrendered depositary receipts. Holders of depositary shares may receive whole shares of the related series of preferred stock on the basis set forth in the related prospectus supplement for such series of preferred stock, but holders of such whole shares will not after the exchange be entitled to receive depositary shares for their whole shares. If the depositary receipts delivered by the holder evidence a number of depositary shares in excess of the number of depositary shares representing the number of whole shares of the related series of preferred stock to be withdrawn, the depositary will deliver to the holder at the same time a new depositary receipt evidencing such excess number of depositary shares.

### **Dividends and Other Distributions**

The depositary will distribute all cash dividends or other cash distributions received for the preferred stock to the record holders of depositary shares relating to the preferred stock in proportion to the numbers of such depositary shares owned by such holders.

In the event of a distribution other than in cash, the depositary will distribute property received by it to the record holders of depositary shares entitled thereto, unless the depositary determines that it is not feasible to make distribution of the property. In that case the depositary may, with our approval, sell such property and distribute the net proceeds from the sale to such holders.

### **Redemption of Depositary Shares**

If a series of preferred stock represented by depositary shares is subject to redemption, the depositary shares will be redeemed from the proceeds received by the depositary resulting from the redemption, in whole or in part, of the series of preferred stock held by the depositary. The redemption price per depositary share will be equal to the applicable fraction of the redemption price per share payable with respect to the series of the preferred stock. Whenever we redeem shares of preferred stock held by the depositary, the depositary will redeem as of the same redemption date the number of depositary shares representing shares of preferred stock redeemed by us. If less than all the depositary shares are to be redeemed, the depositary shares to be redeemed will be selected by lot or pro rata as may be determined by the depositary.



### **Voting the Preferred Stock**

Upon receipt of notice of any meeting at which the holders of the preferred stock are entitled to vote, the depositary will mail the information contained in such notice of meeting to the record holders of the depositary shares relating to such preferred stock. Each record holder of such depositary shares on the record date, which will be the same date as the record date for the preferred stock, will be entitled to instruct the depositary as to the exercise of the voting rights pertaining to the amount of the preferred stock represented by such holder's depositary shares. The depositary will endeavor, insofar as practicable, to vote the amount of the preferred stock represented by such depositary shares in accordance with such instructions, and we will agree to take all action which may be deemed necessary by the depositary in order to enable the depositary to do so. The depositary will not vote the preferred stock to the extent it does not receive specific instructions from the holders of depositary shares representing such preferred stock.

### **Amendment and Termination of the Deposit Agreement**

We and the depositary at any time may amend the form of depositary receipt evidencing the depositary shares and any provision of the deposit agreement. However, any amendment which materially and adversely alters the rights of the holders of depositary shares will not be effective unless such amendment has been approved by the holders of at least a majority of the depositary shares then outstanding. We or the depositary may terminate the deposit agreement only if all outstanding depositary shares have been redeemed, or there has been a final distribution in respect of the preferred stock in connection with any liquidation, dissolution or winding up of Enzo Biochem and such distribution has been distributed to the holders of depositary receipts.

### **Charges of Depositary**

We will pay all transfer and other taxes and governmental charges arising solely from the existence of the depositary arrangements. We will pay charges of the depositary in connection with the initial deposit of the preferred stock and any redemption of the preferred stock. Holders of depositary receipts will pay other transfer and other taxes and governmental charges and such other charges as are expressly provided in the deposit agreement to be for their accounts.

### **Miscellaneous**

The depositary will forward to the record holders of the depositary shares relating to such preferred stock all reports and communications from us which are delivered to the depositary.

Neither we nor the depositary will be liable if either one is prevented or delayed by law or any circumstance beyond their control in performing the obligations under the deposit agreement. The obligations of Enzo Biochem and the depositary under the deposit agreement will be limited to performance in good faith of their duties thereunder, and they will not be obligated to prosecute or defend any legal proceeding in respect of any depositary shares or preferred stock unless satisfactory indemnity is furnished. The depositary may rely upon written advice of counsel or accountants, or information provided by persons presenting preferred stock for deposit, holders of depositary receipts or other persons believed to be competent and on documents believed to be genuine.

### **Resignation and Removal of Depositary**

The depositary may resign at any time by delivering to us notice of its election to do so, and we may at any time remove the depositary, any such resignation or removal to take effect upon the appointment of a successor depositary and its acceptance of such appointment. Such successor depositary must be appointed within sixty (60) days after delivery of the notice of resignation or removal.

## **DESCRIPTION OF DEBT SECURITIES**

The following description, together with the additional information we include in any applicable prospectus supplement, summarizes the material terms and provisions of the debt securities that we may offer under this prospectus and the related indenture. While the terms we have summarized below will apply generally to any future debt securities we may offer pursuant to this prospectus, we will describe the particular terms of any debt securities that we may offer in more detail in the applicable prospectus supplement. If we indicate in a prospectus supplement, the terms of any debt securities we offer under that prospectus supplement may differ from the terms we describe below.

We may offer debt securities from time to time in one or more offerings under this prospectus. We will issue any such debt securities under an indenture that we will enter into with a trustee to be named in the indenture. We have filed a form of indenture as an exhibit to the registration statement of which this prospectus is a part. The indenture will be qualified under the Trust Indenture Act of 1939, as in effect on the date of the indenture. We use the term "debenture trustee" to refer to the trustee under the indenture.

The following summaries of material provisions of the debt securities and the indenture are subject to, and qualified in their entirety by reference to, all the provisions of the indenture applicable to a particular series of debt securities.

### **General**

The indenture will provide that debt securities may be issued from time to time in one or more series. The indenture will not limit the amount of debt securities that may be issued thereunder, and the indenture provides that the specific terms of any series of debt securities shall be set forth in, or determined pursuant to, an authorizing resolution, an officers' certificate and/or a supplemental indenture, if any, relating to such series.

We will describe in each prospectus supplement the following terms relating to a series of debt securities:

- the title or designation of the debt securities;
- whether the debt securities will be secured or unsecured, and the terms of any secured debt;
- the terms of the subordination of any series of subordinated debt securities;
- any limit upon the aggregate principal amount of the debt securities;
- the date or dates on which the debt securities may be issued and on which we will pay the principal on the debt securities;
- the interest rate, which may be fixed or variable, or the method for determining the rate and the date interest will begin to accrue, the date or dates interest will be payable and the record dates for interest payment dates or the method for determining such dates;

- the manner in which the amounts of payment of principal of, premium or interest on the debt securities will be determined, if these amounts may be determined by reference to an index based on a currency or currencies other than that in which the debt securities are denominated or designated to be payable or by reference to a commodity, commodity index, stock exchange index or financial index;
- the currency of denomination of the debt securities;
- if payments of principal of, premium or interest on the debt securities will be made in one or more currencies or currency units other than that or those in which the debt securities are denominated, the manner in which the exchange rate with respect to these payments will be determined;

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- the place or places where the principal of, premium, and interest on the debt securities will be payable, where debt securities of any series may be presented for registration of transfer, exchange or conversion, and where notices and demands to or upon the Company in respect of the debt securities may be made;
- the form of consideration in which principal of, premium or interest on the debt securities will be paid;
- the terms and conditions upon which we may redeem the debt securities;
- any obligation we have to redeem or purchase the debt securities pursuant to any sinking fund, amortization or analogous provisions or at the option of a holder of debt securities;
- the dates on which and the price or prices at which we will repurchase the debt securities at the option of the holders of debt securities and other detailed terms and provisions of these repurchase obligations;
- the denominations in which the debt securities will be issued, if other than denominations of \$1,000 and any integral multiple thereof;
- the portion of principal amount of the debt securities payable upon declaration of acceleration of the maturity date, if other than the principal amount;
- whether the debt securities are to be issued at any original issuance discount and the amount of discount with which such debt securities may be issued;
- whether the debt securities will be issued in the form of certificated debt securities or global debt securities and, in such case, the depository for such global security or securities and the terms and conditions, if any, upon which interests in such global security or securities may be exchanged in whole or in part for the individual securities represented thereby;
- provisions, if any, for the defeasance of the debt securities of a series in whole or in part and any addition or change in the provisions related to satisfaction and discharge;
- the form of the debt securities;
- the terms and conditions upon which the debt securities will be so convertible or exchangeable into securities or property of another person, if at all, and any additions or changes, if any, to permit or facilitate such conversion or exchange;
- whether the debt securities will be subject to subordination and the terms of such subordination;
- provisions, if any, granting special rights to holders of the debt securities upon the occurrence of specified events;
- any restriction or condition on the transferability of the debt securities;
- any addition or change in the provisions related to compensation and reimbursement of the trustee which applies to securities of such series;
- any addition to or change in the events of default described in this prospectus or in the indenture with respect to the debt securities and any change in the acceleration provisions described in this prospectus or in the indenture with respect to the debt securities;
- any addition to or change in the covenants described in this prospectus or in the indenture with respect to the debt securities; and
- any other terms of the debt securities, which may modify or delete any provision of the indenture.

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We may issue debt securities that provide for an amount less than their stated principal amount to be due and payable upon declaration of acceleration of their maturity pursuant to the terms of the indenture. We will provide you with information on the federal income tax considerations and other special considerations applicable to any of these debt securities in the applicable prospectus supplement.

#### **Conversion or Exchange Rights**

We will set forth in the prospectus supplement the terms, if any, on which a series of debt securities may be convertible into or exchangeable for our common stock or our other securities. We will include provisions as to whether conversion or exchange is mandatory, at the option of the holder or at our option. We may include provisions pursuant to which the number of shares of our common stock or our other securities that the holders of the series of debt securities receive would be subject to adjustment.

#### **Consolidation, Merger or Sale; No Protection in Event of a Change of Control or Highly Leveraged Transaction**

The indenture will provide that we may not merge or consolidate with or into another entity, or sell other than for cash or lease all or substantially all our assets to another entity, or purchase all or substantially all the assets of another entity unless we are the surviving entity or, if we are not the surviving entity, the successor, transferee or lessee entity expressly assumes all of our obligations under the indenture or the debt securities, as appropriate.

Unless we state otherwise in the applicable prospectus supplement, the debt securities will not contain any provisions that may afford holders of the debt securities additional protection in the event we have a change of control or in the event of a highly leveraged transaction (whether or not such transaction results in a change of control), which could adversely affect holders of debt securities.

## Events of Default Under the Indenture

The following are events of default under the indenture with respect to any series of debt securities that we may issue:

- if we fail to pay interest when due and our failure continues for 90 days and the time for payment has not been extended or deferred;
- if we fail to pay the principal, or premium, if any for 30 days, when due whether by maturity or called for redemption;
- if we fail to pay a sinking fund installment, if any, when due and our failure continues for 30 days;
- if we fail to observe or perform any other covenant relating to such series contained in the debt securities of such series or the indenture, other than a covenant specifically relating to and for the benefit of holders of another series of debt securities, and our failure continues for 90 days after we receive written notice from the debenture trustee or holders of not less than a majority in aggregate principal amount of the outstanding debt securities of the applicable series; and
- if specified events of bankruptcy, insolvency or reorganization occur as to us.

No event of default with respect to a particular series of debt securities (except as to certain events of bankruptcy, insolvency or reorganization) necessarily constitutes an event of default with respect to any other series of debt securities. The occurrence of an event of default may constitute an event of default under any bank credit agreements we may have in existence from time to time. In addition, the occurrence of certain events of default or an acceleration under the indenture may constitute an event of default under certain of our other indebtedness outstanding from time to time.

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If an event of default with respect to debt securities of any series at the time outstanding occurs and is continuing, then the trustee or the holders of not less than a majority in principal amount of the outstanding debt securities of that series may, by a notice in writing to us (and to the debenture trustee if given by the holders), declare to be due and payable immediately the principal (or, if the debt securities of that series are discount securities, that portion of the principal amount as may be specified in the terms of that series) of and premium and accrued and unpaid interest, if any, on all debt securities of that series. Before a judgment or decree for payment of the money due has been obtained with respect to debt securities of any series, the holders of a majority in principal amount of the outstanding debt securities of that series (or, at a meeting of holders of such series at which a quorum is present, the holders of a majority in principal amount of the debt securities of such series represented at such meeting) the acceleration shall be deemed to have been waived, rescinded and annulled if all events of default, other than the non-payment of accelerated principal, premium, if any, and interest, if any, with respect to debt securities of that series, have been cured or waived as provided in the applicable indenture (including payments or deposits in respect of principal, premium or interest that had become due other than as a result of such acceleration) and the Company has deposited with the indenture trustee or paying agent a sum sufficient to pay all amounts owed to the indenture trustee under the indenture, all arrears of interest, if any, on the debt securities, and the principal and premium, if any, on the debt securities that have become due other than by such acceleration. We refer you to the prospectus supplement relating to any series of debt securities that are discount securities for the particular provisions relating to acceleration of a portion of the principal amount of such discount securities upon the occurrence of an event of default.

Subject to the terms of the indenture, if an event of default under the indenture shall occur and be continuing, the debenture trustee will be under no obligation to exercise any of its rights or powers under such indenture at the request or direction of any of the holders of the applicable series of debt securities, unless such holders have offered the debenture trustee reasonable indemnity. The holders of a majority in principal amount of the outstanding debt securities of any series will have the right to direct the time, method and place of conducting any proceeding for any remedy available to the debenture trustee, or exercising any trust or power conferred on the debenture trustee, with respect to the debt securities of that series, provided that, subject to the terms of the indenture, the debenture trustee need not take any action that it believes, upon the advice of counsel, might involve it in personal liability or might be unduly prejudicial to the holders not involved in the proceeding.

A holder of the debt securities of any series will only have the right to institute a proceeding under the indenture or to appoint a receiver or trustee, or to seek other remedies if:

- the holder previously has given written notice to the debenture trustee of a continuing event of default with respect to that series;
- the holders of at least a majority in aggregate principal amount of the outstanding debt securities of that series have made written request, and such holders have offered reasonable indemnity to the debenture trustee to institute the proceeding as trustee; and
- the debenture trustee does not institute the proceeding, and does not receive from the holders of a majority in aggregate principal amount of the outstanding debt securities of that series (or at a meeting of holders of such series at which a quorum is present, the holders of a majority in principal amount of the debt securities of such series represented at such meeting) other conflicting directions within 60 days after the notice, request and offer.

These limitations do not apply to a suit instituted by a holder of debt securities if we default in the payment of the principal, premium, if any, or interest on, the debt securities.

We will periodically file statements with the applicable debenture trustee regarding our compliance with specified covenants in the applicable indenture.

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## Modification of Indenture; Waiver

The debenture trustee and we may, without the consent of any holders, execute a supplemental indenture to change the applicable indenture with respect to specific matters, including, among other things:

- to surrender any right or power conferred upon the Company;
- to provide, change or eliminate any restrictions on the payment of principal or premium, if any, on the debt securities; provided that any such action shall not adversely affect the interests of the holders of debt securities of any series in any material respect;
- to change or eliminate any of the provisions of the indenture; provided that any such change or elimination shall become effective only when there is no outstanding debt security of any series created prior to the execution of such supplemental indenture that is entitled to the benefit of such provision and as to which such supplemental indenture would apply;
- to evidence the succession of another corporation to the Company;

- to evidence and provide for the acceptance of appointment by a successor trustee with respect to one or more series of debt securities and to add or change provisions of the indenture to facilitate the administration of the trusts thereunder by more than one trustee;
- to cure any ambiguity, mistake, manifest error, omission, defect or inconsistency in the indenture or to conform the text of any provision in the indenture or in any supplemental indenture to any description thereof in the applicable section of a prospectus, prospectus supplement or other offering document that was intended to be a verbatim recitation of a provision of the indenture or of any supplemental indenture;
- to add to or change or eliminate any provision of the indenture as shall be necessary or desirable in accordance with any amendments to the Trust Indenture Act;
- to make any change in any series of debt securities that does not adversely affect in any material respect the interests of the holders of such debt securities; and
- to supplement any of the provisions of the indenture to such extent as shall be necessary to permit or facilitate the defeasance and discharge of any series of debt securities; provided that any such action shall not adversely affect the interests of the holders of debt securities of such series or any other series of debt securities.

In addition, under the indenture, the rights of holders of a series of debt securities may be changed by us and the debenture trustee with the written consent of the holders of at least a majority in aggregate principal amount of the outstanding debt securities of each series (or, at a meeting of holders of such series at which a quorum is present, the holders of a majority in principal amount of the debt securities of such series represented at such meeting) that is affected. However, the debenture trustee and we may make the following changes only with the consent of each holder of any outstanding debt securities affected:

- extending the fixed maturity of the series of debt securities;
- reducing the principal amount, reducing the rate of or extending the time of payment of
- interest, or any premium payable upon the redemption of any debt securities;
- reducing the principal amount of discount securities payable upon acceleration of maturity;
- making the principal of or premium or interest on any debt security payable in currency other than that stated in the debt security;
- impairing the right to institute suit for the enforcement of any payment on or after the fixed maturity date of any series of debt securities;
- materially adversely affecting the economic terms of any right to convert or exchange any debt securities; and
- reducing the percentage of debt securities, the holders of which are required to consent to any amendment or waiver; or modifying, without the written consent of the trustee, the rights, duties or immunities of the trustee.

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Except for certain specified provisions, the holders of at least a majority in principal amount of the outstanding debt securities of any series (or, at a meeting of holders of such series at which a quorum is present, the holders of a majority in principal amount of the debt securities of such series represented at such meeting) may, on behalf of the holders of all debt securities of that series, waive our compliance with provisions of the indenture. The holders of a majority in principal amount of the outstanding debt securities of any series may, on behalf of the holders of all the debt securities of such series, waive any past default under the indenture with respect to that series and its consequences, other than a default in the payment of the principal of, premium or any interest on any debt security of that series; provided, however, that the holders of a majority in principal amount of the outstanding debt securities of any series may rescind an acceleration and its consequences, including any related payment default that resulted from the acceleration.

#### **Discharge**

The indenture will provide that we can elect to be discharged from our obligations with respect to one or more series of debt securities. In order to exercise our rights to be discharged with respect to a series, we must deposit with the trustee money or government obligations sufficient to pay all the principal of, the premium, if any, and interest on, the debt securities of the series on the dates payments are due.

#### **Form, Exchange and Transfer**

We will issue the debt securities of each series only in fully registered form without coupons and, unless we otherwise specify in the applicable prospectus supplement, in denominations of \$1,000 and any integral multiple thereof. The indenture provides that we may issue debt securities of a series in temporary or permanent global form and as book-entry securities that will be deposited with a depository named by us and identified in a prospectus supplement with respect to that series.

At the option of the holder, subject to the terms of the indenture and the limitations applicable to global securities described in the applicable prospectus supplement, the holder of the debt securities of any series can exchange the debt securities for other debt securities of the same series, in any authorized denomination and of like tenor and aggregate principal amount.

Subject to the terms of the indenture and the limitations applicable to global securities set forth in the applicable prospectus supplement, holders of the debt securities may present the debt securities for exchange or for registration of transfer, duly endorsed or with the form of transfer endorsed thereon duly executed if so required by us or the security registrar, at the office of the security registrar or at the office of any transfer agent designated by us for this purpose. Unless otherwise provided in the debt securities that the holder presents for transfer or exchange or in the indenture, we will make no service charge for any registration of transfer or exchange, but we may require payment of any taxes or other governmental charges.

We will name in the applicable prospectus supplement the security registrar, and any transfer agent in addition to the security registrar, that we initially designate for any debt securities. We may at any time designate additional transfer agents or rescind the designation of any transfer agent or approve a change in the office through which any transfer agent acts, except that we will be required to maintain a transfer agent in each place of payment for the debt securities of each series.

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If we elect to redeem the debt securities of any series, we will not be required to:

- issue, register the transfer of, or exchange any debt securities of that series during a period beginning at the opening of business 15 days before the day of mailing of a notice of redemption of any debt securities that may be selected for redemption and ending at the close of business on the day of the mailing; or

- register the transfer of or exchange any debt securities so selected for redemption, in whole or in part, except the unredeemed portion of any debt securities we are redeeming in part.

### **Information Concerning the Debenture Trustee**

The debenture trustee, other than during the occurrence and continuance of an event of default under the indenture, undertakes to perform only those duties as are specifically set forth in the indenture. Upon an event of default under the indenture, the debenture trustee must use the same degree of care as a prudent person would exercise or use in the conduct of his or her own affairs. Subject to this provision, the debenture trustee is under no obligation to exercise any of the powers given it by the indenture at the request of any holder of debt securities unless it is offered reasonable security and indemnity against the costs, expenses and liabilities that it might incur.

### **Payment and Paying Agents**

Unless we otherwise indicate in the applicable prospectus supplement, we will make payment of the interest on any debt securities on any interest payment date to the person in whose name the debt securities, or one or more predecessor securities, are registered at the close of business on the regular record date for the interest.

Unless we otherwise indicate in the applicable prospectus supplement, we will pay principal of and any premium and interest on the debt securities of a particular series at the office of the indenture trustee or, at the option of the Company, by wire or check payable to the holder. Unless we otherwise indicate in a prospectus supplement, we will designate the corporate trust office of the debenture trustee our sole paying agent for payments with respect to debt securities of each series. We will name in the applicable prospectus supplement any other paying agents that we initially designate for the debt securities of a particular series. We will maintain a paying agent in each place of payment for the debt securities of a particular series. All money we pay to a paying agent or the debenture trustee for the payment of the principal of or any premium or interest on any debt securities which remains unclaimed at the end of two years after such principal, premium or interest has become due and payable will be repaid to us, and the holder of the security thereafter may look only to us for payment thereof.

### **Governing Law**

The indenture and the debt securities will be governed and construed in accordance with the laws of the State of New York.

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## **DESCRIPTION OF WARRANTS**

The following description, together with the additional information we may include in any applicable prospectus supplements, summarizes the material terms and provisions of the warrants that we may offer under this prospectus and the related warrant agreements and warrant certificates. While the terms summarized below will apply generally to any warrants that we may offer, we will describe the particular terms of any series of warrants in more detail in the applicable prospectus supplement. If we indicate in the prospectus supplement, the terms of any warrants offered under that prospectus supplement may differ from the terms described below. Specific warrant agreements will contain additional important terms and provisions and will be incorporated by reference as an exhibit to the registration statement that includes this prospectus.

### **General**

We may issue warrants for the purchase of common stock, preferred stock or debt securities in one or more series. We may issue warrants independently or together with common stock, preferred stock and debt securities, and the warrants may be attached to or separate from these securities.

We will evidence each series of warrants by warrant certificates that we will issue under a separate agreement. We may enter into a warrant agreement with a warrant agent. If we engage a warrant agent, each warrant agent will be a bank that we select which has its principal office in the United States. We will indicate the name and address of the warrant agent in the applicable prospectus supplement relating to a particular series of warrants.

Before exercising their warrants, holders of warrants will not have any of the rights of holders of the securities purchasable upon such exercise, including:

- in the case of warrants to purchase debt securities, the right to receive payments of principal of, or premium, if any, or interest on, the debt securities purchasable upon exercise or to enforce covenants in the applicable indenture; or
- in the case of warrants to purchase common stock or preferred stock, the right to receive dividends, if any, or, payments upon our liquidation, dissolution or winding up or to exercise voting rights, if any.

### **Additional Information**

We will describe in the applicable prospectus supplement the terms of the series of warrants, including:

- the offering price and aggregate number of warrants offered;
- the currency for which the warrants may be purchased;
- if applicable, the designation and terms of the securities with which the warrants are issued and the number of warrants issued with each such security or each principal amount of such security;
- if applicable, the date on and after which the warrants and the related securities will be separately transferable;
- in the case of warrants to purchase debt securities, the principal amount of debt securities purchasable upon exercise of one warrant and the price at, and currency in which, this principal amount of debt securities may be purchased upon such exercise;
- in the case of warrants to purchase common stock or preferred stock, the number of shares of common stock or preferred stock, as the case may be, purchasable upon the exercise of one warrant and the price at which these shares may be purchased upon such exercise;
- the effect of any merger, consolidation, sale or other disposition of our business on the warrant agreement and the warrants;

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- the terms of any rights to redeem or call the warrants;

- any provisions for changes to or adjustments in the exercise price or number of securities issuable upon exercise of the warrants;
- the dates on which the right to exercise the warrants will commence and expire;
- the manner in which the warrant agreement and warrants may be modified;
- a discussion on any material or special United States federal income tax consequences of holding or exercising the warrants;
- the terms of the securities issuable upon exercise of the warrants; and
- any other specific terms, preferences, rights or limitations of or restrictions on the warrants.

#### **Exercise of Warrants**

Each warrant will entitle the holder to purchase the securities that we specify in the applicable prospectus supplement at the exercise price that we describe in the applicable prospectus supplement. Unless we otherwise specify in the applicable prospectus supplement, holders of the warrants may exercise the warrants at any time up to 5 p.m., Eastern time, on the expiration date that we set forth in the applicable prospectus supplement. After the close of business on the expiration date, unexercised warrants will become void.

Holders of the warrants may exercise the warrants by delivering the warrant certificate representing the warrants to be exercised together with specified information, and paying the required amount to the warrant agent in immediately available funds, as provided in the applicable prospectus supplement. We will set forth on the reverse side of the warrant certificate and in the applicable prospectus supplement the information that the holder of the warrant will be required to deliver to the warrant agent.

Upon receipt of the required payment and the warrant certificate properly completed and duly executed at the corporate trust office of the warrant agent or any other office indicated in the applicable prospectus supplement, we will issue and deliver the securities purchasable upon such exercise. If fewer than all of the warrants represented by the warrant certificate are exercised, then we will issue a new warrant certificate for the remaining amount of warrants. If we so indicate in the applicable prospectus supplement, holders of the warrants may surrender securities as all or part of the exercise price for warrants.

#### **Enforceability of Rights by Holders of Warrants**

Each warrant agent will act solely as our agent under the applicable warrant agreement and will not assume any obligation or relationship of agency or trust with any holder of any warrant. A single bank or trust company may act as warrant agent for more than one issue of warrants. A warrant agent will have no duty or responsibility in case of any default by us under the applicable warrant agreement or warrant, including any duty or responsibility to initiate any proceedings at law or otherwise, or to make any demand upon us. Any holder of a warrant may, without the consent of the related warrant agent or the holder of any other warrant, enforce by appropriate legal action its right to exercise, and receive the securities purchasable upon exercise of, its warrants.

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### **DESCRIPTION OF UNITS**

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

- the designation and terms of the units and of the securities comprising the units, including whether and under what circumstances those securities may be held or transferred separately;
- any provisions for the issuance, payment, settlement, transfer or exchange of the units or of the securities comprising the units;
- the terms of the unit agreement governing the units;
- United States federal income tax considerations relevant to the units; and
- whether the units will be issued in fully registered global form.

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

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### **PLAN OF DISTRIBUTION**

We may sell the securities through underwriters or dealers, through agents, or directly to one or more purchasers. The accompanying prospectus supplement will describe the terms of the offering of the securities, including:

- the name or names of any underwriters;
- the purchase price of the securities being offered and the proceeds we will receive from the sale;
- any over-allotment options pursuant to which underwriters may purchase additional securities from us;
- any agency fees or underwriting discounts and other items constituting agents' or underwriters' compensation;
- any public offering price;
- any discounts or concessions allowed or reallocated or paid to dealers; and

- any securities exchange or market on which the securities may be listed.

If underwriters are used in the sale, they will acquire the securities for their own account and may resell the securities from time to time in one or more transactions at a fixed public offering price or at varying prices determined at the time of the sale. The obligations of the underwriters to purchase the securities will be subject to the conditions set forth in the applicable underwriting agreement. We may offer the securities to the public through underwriting syndicates represented by managing underwriters or by underwriters without a syndicate. Subject to certain conditions, the underwriters will be obligated to purchase all the securities offered by the prospectus supplement. We may change from time to time the public offering price and any discounts or concessions allowed or reallocated or paid to dealers. We may use underwriters with whom we have a material relationship. We will describe such relationships in the prospectus supplement naming the underwriter and the nature of any such relationship.

We may sell securities directly or through agents we designate from time to time. We will name any agent involved in the offering and sale of the securities, and we will describe any commissions we will pay the agent in the prospectus supplement. Unless the prospectus supplement states otherwise, our agent will act on a best efforts basis for the period of its appointment.

We may engage in “at the market offerings” of our common stock, which are offerings into an existing trading market, at other than a fixed price, on or through the facilities of a national securities exchange or to or through a market maker otherwise than on an exchange.

We may enter into derivative transactions with third parties, or sell securities not covered by this prospectus to third parties in privately negotiated transactions. If the applicable prospectus supplement indicates, in connection with those derivatives, the third parties may sell securities covered by this prospectus and the applicable prospectus supplement, including short sale transactions. If so, the third party may use securities pledged by us or borrowed from us or others to settle those sales or to close out any related open borrowings of common shares, and may use securities received from us in settlement of those derivatives to close out any related open borrowings of common shares. The third party in such sale transactions will be an underwriter and, if not identified in this prospectus, will be identified in the applicable prospectus supplement or a post-effective amendment to this registration statement.

Our common stock is listed on the New York Stock Exchange. All securities we offer other than common stock will be new issues of securities with no established trading market. Any underwriters may make a market in these securities, but will not be obligated to do so and may discontinue any market making at any time without notice. We cannot guarantee the liquidity of the trading markets for any securities.

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We may provide agents and underwriters with indemnification against civil liabilities related to this offering, including liabilities under the Securities Act, or contribution with respect to payments that the agents or underwriters may make with respect to these liabilities. Agents and underwriters may engage in transactions with, or perform services for, us in the ordinary course of business.

Rules of the SEC may limit the ability of any underwriters to bid for or purchase securities before the distribution of the securities is completed. However, underwriters may engage in the following activities in accordance with the rules:

- Stabilizing transactions — Underwriters may make bids or purchases for the purpose of pegging, fixing or maintaining the price of the shares, so long as stabilizing bids do not exceed a specified maximum.
- Over-allotments and syndicate covering transactions — Underwriters may sell more shares of our common stock than the number of shares that they have committed to purchase in any underwritten offering. This over-allotment creates a short position for the underwriters. This short position may involve either “covered” short sales or “naked” short sales. Covered short sales are short sales made in an amount not greater than the underwriters’ over-allotment option to purchase additional shares in any underwritten offering. The underwriters may close out any covered short position either by exercising their over-allotment option or by purchasing shares in the open market. To determine how they will close the covered short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market, as compared to the price at which they may purchase shares through the over-allotment option. Naked short sales are short sales in excess of the over-allotment option. The underwriters must close out any naked position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that, in the open market after pricing, there may be downward pressure on the price of the shares that could adversely affect investors who purchase shares in the offering.
- Penalty bids — If underwriters purchase shares in the open market in a stabilizing transaction or syndicate covering transaction, they may reclaim a selling concession from other underwriters and selling group members who sold those shares as part of the offering.

Similar to other purchase transactions, an underwriter’s purchases to cover the syndicate short sales or to stabilize the market price of our securities may have the effect of raising or maintaining the market price of our securities or preventing or mitigating a decline in the market price of our securities. As a result, the price of the securities may be higher than the price that might otherwise exist in the open market. The imposition of a penalty bid might also have an effect on the price of shares if it discourages resales of the securities.

If commenced, the underwriters may discontinue any of the activities at any time.

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### CERTAIN PROVISIONS OF NEW YORK LAW AND OF THE COMPANY’S CHARTER AND BY-LAWS

*The following paragraphs summarize certain provisions of the New York Business Corporation Law (“NYBCL”), and our Certificate of Incorporation, as amended, and our Amended and Restated By-laws. The summary does not purport to be complete and is subject to and qualified in its entirety by reference to the NYBCL and to our bylaws, copies of which are on file with the SEC as exhibits to the registration statement of which this prospectus forms a part. See “Where You Can Find More Information.”*

*General.* Certain provisions of our Certificate of Incorporation, as amended, and our Amended and Restated By-laws and New York law could make our acquisition by a third party, a change in our incumbent management, or a similar change of control more difficult, including:

- an acquisition of us by means of a tender or exchange offer;
- an acquisition of us by means of a proxy contest or otherwise; or
- the removal of a majority or all of our incumbent officers and directors.

These provisions, which are summarized below, are likely to discourage certain types of coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors. We believe that these provisions help to protect our

potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us, and that this benefit outweighs the potential disadvantages of discouraging such a proposal because our ability to negotiate with the proponent could result in an improvement of the terms of the proposal.

*Election and removal of directors.* Our bylaws provide that the size of the board of directors shall be fixed at five (5) directors. The directors are to be elected at the annual meeting of the shareholders, with a term expiring at the annual meeting of shareholders held in the year following the year of their election or until his successor is elected and qualified. Any director or the entire board of directors may be removed, with cause, by the affirmative vote of (i) the holders of 80% of the combined voting power of the then outstanding shares of stock entitled to vote generally in the election of directors, voting together as a single class and (ii) a majority of such shares beneficially owned by the persons not affiliated with an interested shareholder. Additionally, our bylaws provide that any incumbent director nominee who fails to receive a majority of the votes cast in an election that is not a contested election shall promptly tender his or her resignation to the board of directors for their consideration.

*Shareholder meetings.* Our bylaws provide that the shareholders may not call a special meeting of the shareholders of our company. Instead, special meetings of the shareholders may be called by the Board of Directors pursuant to a resolution approved by a majority of the entire board of directors.

*Requirements for advance notification of shareholder nominations and proposals.* Our bylaws establish advance notice procedures with respect to shareholder proposals and the nomination of candidates for election as directors, other than nominations made by or at the direction of the board of directors or a committee of the board.

*New York anti-takeover law.* We are subject to certain “business combination” provisions of Section 912 of the NYBCL and expect to continue to be so subject if and for so long as we have a class of securities registered under Section 12 of the Securities Exchange Act of 1934. Section 912 provides, with certain exceptions (which include, among others, transactions with shareholders who became interested prior to the effective date of an amendment to our Certificate of Incorporation providing that we would be subject to Section 912 if such corporation did not then have a class of stock registered pursuant to Section 12 of the Exchange Act), that a New York corporation may not engage in a “business combination” (e.g., merger, consolidation, recapitalization or disposition of stock) with any “interested shareholder” for a period of five years from the date that such person first became an interested shareholder unless:

(i) the transaction resulting in a person becoming an interested shareholder was approved by the board of directors of the corporation prior to that person becoming an interested shareholder; or

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(ii) the business combination is approved by the holders of a majority of the outstanding voting stock not beneficially owned by such interested shareholder; or

(iii) the business combination is approved by the disinterested shareholders at a meeting called no earlier than five years after the interested shareholder’s stock acquisition date; or

(iv) the business combination meets certain valuation requirements for the stock of a New York corporation.

An “interested shareholder” is defined as any person who (a) is the beneficial owner of 20% or more of the outstanding voting stock of a New York corporation or (b) is an affiliate or associate of a corporation that at any time during the prior five years was the beneficial owner, directly or indirectly, of 20% or more of the then outstanding voting stock.

A “business combination” includes mergers, asset sales and other transactions resulting in a financial benefit to the interested shareholder.

The “stock acquisition date”, with respect to any person and any New York corporation, means the date that such person first becomes an interested shareholder of such corporation.

*No cumulative voting.* Our Certificate of Incorporation, as amended, and our Amended and Restated By-laws do not provide for cumulative voting in the election of directors.

*Limitation of liability.* As permitted by the NYBCL, our Certificate of Incorporation, as amended provides that a director will not be personally liable to us or our shareholders for damages for any breach of duty in his or her capacity as a director unless a judgment or other final adjudication adverse to such director establishes that (i) his or her acts or omissions were in bad faith or involved intentional misconduct or a knowing violation of law, (ii) such director personally gained in fact a financial profit or other advantage to which he or she was not legally entitled or (iii) his or her acts violated Section 719 of the NYBCL. As a result of this provision, we and our shareholders may be unable to obtain monetary damages from a director for breach of his or her duty of care.

Our Certificate of Incorporation, as amended, and our Amended and Restated By-laws also provide for the indemnification of our directors and officers to the fullest extent authorized by the NYBCL. Insofar as indemnification for liabilities under the Securities Act may be permitted to directors, officers or controlling persons of our company pursuant to our Certificate of Incorporation, as amended, our Amended and Restated By-laws and the NYBCL, we have been informed that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

We have the power to purchase and maintain insurance on behalf of any person who is or was one of our directors or officers, or is or was serving at our request as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other business against any liability asserted against the person or incurred by the person in any of these capacities, or arising out of the person’s fulfilling one of these capacities, and related expenses, whether or not we would have the power to indemnify the person against the claim under the provisions of the NYBCL. We intend to maintain director and officer liability insurance on behalf of our directors and officers.

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## LEGAL MATTERS

The validity of the issuance of the securities described herein has been passed upon for us by McDermott Will & Emery LLP, New York, New York. Additional legal matters may be passed upon for us or any underwriters, dealers or agents, by counsel that we will name in the applicable prospectus supplement.

## EXPERTS

The consolidated balance sheets of Enzo Biochem, Inc. and subsidiaries as of July 31, 2022 and 2021 and the related consolidated statements of operations, comprehensive income (loss), shareholders’ equity, and cash flows for each of the years in the three-year period ended July 31, 2022, and financial statement schedule for each of the years in the three-year period ended July 31, 2022 have been audited by EisnerAmper LLP, independent registered public accounting firm, as stated in their reports, which are incorporated herein by reference, which reports (1) express an unqualified opinion on the financial statements and financial statement schedule, and (2) express an unqualified opinion on the effectiveness of internal control over financial reporting as of July 31, 2022. Such financial statements and financial statement schedule have been incorporated herein by reference in reliance on the reports of such firm given upon their authority as experts in accounting and auditing.



## INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to “incorporate by reference” the information we file with them, which means that we can disclose important information to you by referring you to those documents instead of having to repeat the information in this prospectus. The information incorporated by reference is considered to be part of this prospectus, and information that we file later with the SEC will automatically update and supersede information contained in this prospectus and any accompanying prospectus supplement. We incorporate by reference the documents listed below that we have previously filed with the SEC (excluding any portions of any Form 8-K that are not deemed “filed” pursuant to the General Instructions of Form 8-K):

- our Annual Report on Form 10-K for the fiscal year ended July 31, 2022 (including the information specifically incorporated by reference into our Annual Report on Form 10-K from our revised definitive proxy statement on Schedule 14A filed with the SEC on December 21, 2022) filed with the SEC on [October 14, 2022](#) and as amended on [November 25, 2022](#);
- our Quarterly Reports on Form 10-Q for the fiscal quarters ended October 31, 2022 and January 31, 2023 filed with the SEC on [December 12, 2022](#) and [March 20, 2023](#), respectively;
- our Current Reports on Form 8-K (other than the information furnished pursuant to Item 2.02 or 7.01 thereof or related exhibits furnished pursuant to Item 9.01 thereof) filed with the SEC on [October 20, 2022](#), [November 4, 2022](#), [February 3, 2023](#), [March 16, 2023](#), [April 5, 2023](#), [April 13, 2023](#), [May 22, 2023](#) and [May 22, 2023](#);

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- the description of our common stock contained in our registration statement on Form 8-A filed with the SEC on December 8, 1999, including any amendment or report filed for the purpose of updating such description; and
- the Company’s unaudited pro forma condensed consolidated financial information as of and for the six months ended January 31, 2023 and for the years ended July 31, 2022 and July 31, 2021 and the notes thereto included in our Definitive Proxy Statement on [Schedule 14A](#) filed with the SEC on April 24, 2023.

We also incorporate by reference additional documents that we may file with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the completion or termination of the offering of the securities contemplated by this prospectus, including all such documents we may file with the SEC after the date of the initial registration statement and prior to the effectiveness of the registration statement, but excluding any information deemed furnished and not filed with the SEC. Any statements contained in a previously filed document incorporated by reference into this prospectus is deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus, or in a subsequently filed document also incorporated by reference herein, modifies or supersedes that statement.

This prospectus may contain information that updates, modifies or is contrary to information in one or more of the documents incorporated by reference in this prospectus. You should rely only on the information incorporated by reference or provided in this prospectus. We have not authorized anyone else to provide you with different information. You should not assume that the information in this prospectus is accurate as of any date other than the date of this prospectus or the date of the documents incorporated by reference in this prospectus.

We will provide without charge to each person, including any beneficial owners, to whom this prospectus is delivered, upon his or her written or oral request, a copy of any or all documents referred to above which have been or may be incorporated by reference into this prospectus but not delivered with this prospectus. You may request a copy of these documents by writing or telephoning us at the following address:

Enzo Biochem, Inc.  
81 Executive Blvd., Suite 3  
Farmingdale, New York 11735  
(631) 755-5500

You may also access certain of the documents incorporated by reference in this prospectus through our website at [www.enzo.com](http://www.enzo.com). Except for the specific incorporated documents listed above, no information available on or through our website shall be deemed to be incorporated in this prospectus or the registration statement of which it forms a part.

## WHERE YOU CAN FIND MORE INFORMATION

Statements contained in this prospectus as to the contents of any contract or any other document referred to are not necessarily complete, and in each instance, we refer you to the copy of the contract or other document filed as an exhibit to the registration statement. Each of these statements is qualified in all respects by this reference. We are subject to the information and periodic reporting requirements of the Exchange Act and we file annual, quarterly and current reports, proxy statements and other information with the SEC. Our filings with the SEC are also available to the public at the SEC’s website at <http://www.sec.gov>. Our website is located at [www.enzo.com](http://www.enzo.com). The contents of our website are not incorporated by reference, are not part of this prospectus and should not be relied upon with respect thereto.

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**The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.**

**PROSPECTUS, SUBJECT TO COMPLETION, DATED MAY 25, 2023**



ENZO BIOCHEM, INC.

Up to \$30,000,000

## Common Stock

We have entered into a sales agreement with B. Riley Securities, Inc. relating to shares of our common stock offered by this prospectus. In accordance with the terms of the sales agreement, we may offer and sell shares of our common stock having an aggregate offering price of up to \$30,000,000 from time to time through B. Riley Securities, Inc., acting as agent. Under the terms of the sales agreement, we may also sell shares to B. Riley Securities, Inc. as principal for its own account.

Our common stock is listed on The New York Stock Exchange under the symbol “ENZ”. On May 24, 2023, the last reported sale price of our common stock on The New York Stock Exchange was \$2.34 per share.

Sales of our common stock, if any, under this prospectus may be made in sales deemed to be an “at the market offering” as defined in Rule 415(a)(4) promulgated under the Securities Act of 1933, as amended (the “Securities Act”). B. Riley Securities, Inc. is not required to sell any specific number or dollar amount of shares of our common stock, but will act as sales agent using its commercially reasonable efforts, consistent with its normal trading and sales practices, on mutually agreed terms between B. Riley Securities, Inc. and us. There is no arrangement for funds to be received in any escrow, trust or similar arrangement. We provide more information about how the shares of common stock will be sold in the section titled “Plan of Distribution.”

B. Riley Securities, Inc. will be entitled to compensation at a fixed commission rate of 3.0% of the gross sales price per share sold. A different amount of compensation may be paid by us when B. Riley Securities, Inc. purchases shares as principal at a price agreed to by us and B. Riley Securities, Inc. In connection with the sale of our common stock on our behalf, B. Riley Securities, Inc. will be deemed to be an “underwriter” within the meaning of the Securities Act and the compensation of B. Riley Securities, Inc. will be deemed to be underwriting commissions or discounts. We have also agreed to provide indemnification and contribution to B. Riley Securities, Inc. with respect to certain liabilities, including liabilities under the Securities Act. See the section titled “Plan of Distribution” beginning on page 11 of this prospectus.

**Investing in our securities involves a high degree of risk. Before making an investment decision, please read “Risk Factors” beginning on page 5 of this prospectus and in the documents 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 determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.**

### B. Riley Securities

The date of this prospectus is , 2023.

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## ABOUT THIS PROSPECTUS

This prospectus is part of a “shelf” registration statement on Form S-3/A that we filed with the Securities and Exchange Commission (the “SEC”). Under the shelf registration process, we may offer shares of our common stock having an aggregate offering price of up to \$30,000,000 from time to time under this prospectus at prices and on terms to be determined by market conditions at the time of offering.

We provide information to you about this offering of shares of our common stock in two separate documents that are bound together: (1) this sales agreement prospectus, which describes the specific details regarding this offering, and (2) the accompanying base prospectus, which provides general information, some of which may not apply to this offering. Generally, when we refer to this “prospectus,” we are referring to both documents combined. If information in this sales agreement prospectus is inconsistent with the accompanying base prospectus, you should rely on this sales agreement prospectus.

You should read this prospectus, the base prospectus, the documents incorporated by reference in this prospectus and the base prospectus and any free writing prospectus that we have authorized for use in connection with this offering before making an investment decision. You should also read and consider the information in the documents referred to in the sections of this prospectus entitled “Where You Can Find More Information” and “Incorporation of Certain Information by Reference.”

You should rely only on the information contained or incorporated by reference in this prospectus, the base prospectus and any free writing prospectus that we have authorized for use in connection with this offering. We have not authorized anyone to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it.

We are not making an offer to sell the securities covered by this prospectus in any jurisdiction where the offer or sale is not permitted.

The information appearing in this prospectus, the base prospectus, the documents incorporated by reference in this prospectus and the base prospectus and any free writing prospectus that we have authorized for use in connection with this offering is accurate only as of its respective date, regardless of the time of delivery of the respective document or of any sale of securities covered by this prospectus. You should not assume that the information contained in or incorporated by reference in this prospectus or the base prospectus or in any free writing prospectus that we have authorized for use in connection with this offering, is accurate as of any date other than the respective dates thereof. Any statement made in this prospectus, the base prospectus or in any document incorporated by reference in this prospectus or the base prospectus will be deemed to be modified or superseded to the extent that a statement in this prospectus or in any other subsequently filed document that is also incorporated by reference in this prospectus

modifies or supersedes that statement.

In this prospectus, the terms “Enzo Biochem,” “Enzo,” “Company,” “we,” “us,” “our” and similar terms refer to Enzo Biochem, Inc., a New York corporation, unless the context otherwise requires.

## PROSPECTUS SUMMARY

*This summary highlights certain information about us, this offering and selected information contained elsewhere in or incorporated by reference into this prospectus. This summary is not complete and does not contain all of the information that you should consider before deciding whether to invest in the securities covered by this prospectus. For a more complete understanding of Enzo Biochem and this offering, we encourage you to read and consider carefully the more detailed information in this prospectus, including the information incorporated by reference in this prospectus, the corresponding base prospectus and the information included in any free writing prospectus that we have authorized for use in connection with this offering, including the information referred to under the heading “Risk Factors” in this prospectus beginning on page 5.*

### Enzo Biochem, Inc.

#### Overview

Enzo Biochem, Inc. (the “Company”, “we”, “our”, or “Enzo”) is an integrated diagnostics, clinical lab, and life sciences company focused on delivering and applying advanced technology capabilities to produce affordable reliable products and services that enable our customers to meet their clinical needs. Through a connection with the market, we provide advanced biotechnology solutions to the global community as affordable and flexible quality products and services. We develop, manufacture and sell our proprietary technology solutions and platforms to clinical laboratories, specialty clinics, researchers and physicians globally. Enzo’s structure and business strategy represent the culmination of years of extensive planning and work. The Company has the ability to offer low cost, high performance products and services for diagnostic testing, which ideally positions us to capitalize on the reimbursement pressures facing diagnostic labs. Our pioneering work in genomic analysis coupled with our extensive patent estate and enabling platforms have positioned the Company to continue to play an important role in the rapidly growing molecular medicine marketplaces.

Enzo develops low cost diagnostic platform products and related services. Our platform development includes automation-compatible reagent systems and associated products for sample collection and processing through analysis. We develop affordable products and services to improve healthcare, one of the greatest challenges today. Enzo combines over 40 years of expertise in technology development with assay development capabilities and diagnostic testing services to create high performance, cost-effective, and open assay solutions. The ability to combine these assets in one company is uncommon. With our strong intellectual property portfolio integrated with assay development know-how, production, distribution, validation and services capabilities, we have enabled sustainable products and services for a market that is facing increasing pressure in costs and reimbursement.

Enzo technology solutions and platforms and unique operational structure are designed to reduce overall healthcare costs for both government and private insurers. Our proprietary technology platforms reduce our customers’ need for multiple, specialized instruments, and offer a variety of high throughput capabilities together with a demonstrated high level of accuracy and reproducibility. Our genetic test panels are focused on large and growing markets primarily in the areas of personalized medicine, women’s health, infectious diseases and genetic disorders.

In the course of our research and development activities, we have built a substantial portfolio of intellectual property assets, comprised of approximately 472 issued patents worldwide and over 64 pending patent applications, along with extensive enabling technologies and platforms.

#### Operating Segments

Below are brief descriptions of our two operating segments. For a more detailed description, see Note 11 – Segment Reporting in the Notes to Consolidated Financial Statements in our Form 10-Q filed March 20, 2023.

**Enzo Clinical Services** is a clinical reference laboratory providing a wide range of clinical services to physicians, medical centers, other clinical labs and pharmaceutical companies. The Company believes having a Clinical Laboratory Improvement Amendments of 1988 (“CLIA”) certified and College of American Pathologists (“CAP”) accredited medical laboratory located in New York provides us the opportunity to more rapidly introduce cutting edge products and services to the clinical marketplace. Enzo Clinical Labs offers an extensive menu of molecular and other clinical laboratory tests and procedures used in patient care by physicians to establish or support a diagnosis, monitor treatment or medication, and search for an otherwise undiagnosed condition. Our laboratory is equipped with state-of-the-art communication and connectivity solutions enabling the rapid transmission, analysis and interpretation of generated data. We operate a full service clinical laboratory in Farmingdale, New York, a network of over 30 patient service centers throughout New York, New Jersey and Connecticut, two free standing “STAT” or rapid response laboratories in New York City and Connecticut, an in-house logistics department, and an information technology department. Under our license in New York State, we are able to offer testing services to clinical laboratories and physicians nationwide.

The Clinical Laboratory Services reporting unit is impacted by various risk factors, including among others, loss of a substantial portion of revenues from COVID-19 testing, reduced reimbursements from third party payers for testing performed and from recent health care legislation.

On March 16, 2023, the Company entered into an Asset Purchase Agreement with respect to the sale of assets and assignment of certain liabilities of the Clinical Labs division. See “Recent Developments” below.

**Enzo Products** manufactures, develops and markets products and tools for clinical research, drug development and bioscience research customers worldwide. Underpinned by broad technological capabilities, Enzo Life Sciences has developed proprietary products used in the identification of genomic information by laboratories around the world. Information regarding our technologies can be found in the “Core Technologies” section of our most recently filed Form 10-K. We are internationally recognized and acknowledged as a leader in the development, manufacturing validation and commercialization of numerous products serving not only the clinical research market, but also the life sciences markets in the fields of cellular analysis and drug discovery, among others. Our operations are supported by global operations allowing for the efficient marketing and delivery of our products around the world.

#### Recent Developments

##### *Clinical Labs Purchase Agreement*

On March 16, 2023, the Company filed a Form 8-K indicating that it and Enzo Clinical Labs, Inc. (the “Subsidiary” and, together with the Company, the “Seller”) entered into an Asset Purchase Agreement (the “Purchase Agreement”) with Laboratory Corporation of America Holdings, a Delaware corporation (the “Buyer”). Pursuant to the Purchase Agreement, the Seller has agreed to sell substantially all operating assets and assign certain liabilities of its clinical labs business (the “Business”) to the Buyer which are necessary to operate the Business in exchange for approximately \$146,000,000 in cash (subject to certain adjustments), on and subject to the terms and conditions set forth therein (such transaction, the “Transaction”).

The Purchase Agreement contains customary representations, warranties, covenants and termination rights for a transaction of this nature, including, among other things, customary covenants: (i) relating to the conduct of the Business between the signing of the Purchase Agreement and the closing of the Transaction and (ii) regarding the efforts of the parties to cause the Transaction to be consummated, including obtaining certain consents and approvals. The consummation of the Transaction is subject to the satisfaction or waiver of customary closing conditions, including the expiration or termination of any required waiting periods under the Hart-Scott-Rodino Antitrust Improvements Act of 1976 (“HSR”). The parties to the Purchase Agreement made the filings required under the HSR on March 30, 2023, and the waiting period under the HSR expired on May 1, 2023 at 11:59 p.m. Eastern time.

The Purchase Agreement also includes customary termination provisions for both the Company and Buyer and provides that, in connection with the termination of the Purchase Agreement under specified circumstances, including termination by the Company to accept and enter into a definitive agreement with respect to an unsolicited Superior Proposal, the Company will be required to pay Buyer a termination fee of \$5,000,000 or reimbursement of Buyer’s expenses of up to \$5,000,000.

Subject to the terms and conditions stated in the Purchase Agreement, Buyer will be obligated to pay a fee to the Company for each day until the closing of the Transaction. At the closing of the Transaction, such fee will be wholly or partially credited against the purchase price.

On April 13, 2023, the Company filed a preliminary proxy statement (the “Preliminary Proxy Statement”) and, on April 24, 2023, the Company filed a definitive proxy statement (the “Definitive Proxy Statement”) and, together with the Preliminary Proxy Statement, the “Proxy Statement”) with the SEC and commenced mailing of the Proxy Statement to the Company’s shareholders to solicit the approval of the Transaction and adopt the Purchase Agreement at a special meeting of shareholders held on May 22, 2023 (the “Special Meeting”). At the Special Meeting, the Company’s shareholders approved the Transaction and adopted the Purchase Agreement.

There can be no assurances that the Purchase Agreement will close and if it does close, the exact proceeds to be received by the Company.

#### *Credit Facility*

On March 31, 2023, the Company entered into a Revolving Loan and Security Agreement (the “Credit Facility”) among the Subsidiary and Enzo Life Sciences, Inc., as borrowers (the “Borrowers”), the Company and certain of its domestic subsidiaries, as guarantors (the “Guarantors”), and Gemino Healthcare Finance, LLC (d/b/a SLR Healthcare ABL), as lender.

The Credit Facility provides for a maximum \$8 million revolving line of credit. The commitment under the Credit Facility will expire after one year and all outstanding borrowings under the Credit Facility will become due and payable at that time. Prior to its expiration, the Borrowers will prepay and terminate the Credit Facility upon closing of the Purchase Agreement, and a standard termination fee will be payable.

The Credit Facility is secured by a first priority perfected security interest in the collateral. The collateral includes substantially all the U.S. assets of the Borrowers and the Guarantors, including among other assets, cash, receivables, inventory and fixed assets.

Borrowings under the Credit Facility accrue interest at the rate per annum equal to Term SOFR (Secured Overnight Financing Rate) for a three-month tenor plus 5.50%. Other fees, such as an unused line fee and a collateral monitoring fee, also apply. The Borrowers borrowed \$5.5 million under the Credit Facility upon the closing thereof.

The Credit Facility includes customary affirmative and negative covenants for revolving credit facilities of this nature, including certain limitations on the incurrence of additional indebtedness and liens. In addition, the Credit Facility requires the Borrowers to maintain certain minimum liquidity levels as of the last day of each calendar month. The levels decline over time, starting at \$4 million as of April 30, 2023, then \$3 million as of May 31, 2023 and \$2 million as of the end of each month thereafter.

The Credit Facility includes customary events of default for revolving credit facilities of this nature, including failure to pay outstanding principal or interest, failure of applicable representations or warranties to be correct in any material respects, failure to perform any other term, covenant or agreement, certain defaults upon obligations under the Employee Retirement Income Security Act, bankruptcy or a change in control. Such events of default would require the repayment of any outstanding borrowings and the termination of the right to borrow additional funds under the Credit Facility.

#### *JGB Purchase Agreement*

On May 19, 2023, the Company entered into a Securities Purchase Agreement (the “JGB Purchase Agreement”) with each of the purchasers that are parties thereto (each, including its successors and assigns, a “Purchaser” and collectively, the “Purchasers”) and JGB Collateral, LLC, a Delaware limited liability company, as collateral agent for the Purchasers (the “Agent”). Pursuant to the JGB Purchase Agreement, the Company agreed to sell to the Purchasers (i) 10% Original Issue Discount Secured Convertible Debentures with an aggregate principal amount of \$7,608,696 and (ii) warrants to purchase up to 1,000,000 shares of the Company’s common stock, par value \$0.01 per share, for an exercise price of \$2.31 per share, the average of the three (3) daily volume weighted average prices of the Company’s common stock as defined in the JGB Purchase Agreement prior to the closing date (the “JGB Warrants”), subject to adjustments as set forth in the JGB Warrants, for a total purchase price of \$7,000,000. The JGB Purchase Agreement contains customary representations, warranties and covenants. In connection with the JGB Purchase Agreement, the Company and the Purchasers entered into a Registration Rights Agreement and the Company, certain of the Company’s domestic subsidiaries, the Purchasers and the Agent entered into a Security Agreement. The transactions contemplated by the JGB Purchase Agreement were consummated on May 19, 2023.

#### **Corporate Information**

Our offices are located at 81 Executive Blvd., Suite 3, Farmingdale, New York 11735, and our telephone number is (631) 755-5500. We maintain a website at [www.enzo.com](http://www.enzo.com). Our website and the information contained therein or connected thereto are not incorporated by reference and are not a part of this prospectus.

## THE OFFERING

<b>Common stock offered by us...</b>	Shares of our common stock having an aggregate offering price of up to \$30,000,000.
<b>Common stock to be outstanding immediately after this offering...</b>	Up to 62,548,597 shares (as more fully described in the notes following this table), assuming sales of 12,820,513 shares of our common stock in this offering at an offering price of \$2.34 per share, which was the last reported sale price of our common stock on The New York Stock Exchange on May 24, 2023. The actual number of shares issued will vary depending on the sales price under this offering.
<b>Plan of Distribution...</b>	"At the market offering" that may be made from time to time through our sales agent, B. Riley Securities, Inc. See "Plan of Distribution" on page 11 of this prospectus.
<b>Use of Proceeds...</b>	We currently intend to use the net proceeds from this offering, if any, for general corporate purposes, including without limitation, the funding of capital expenditures and working capital needs. See "Use of Proceeds" on page 10 of this prospectus.
<b>Risk Factors...</b>	Investing in our securities involves a high degree of risk. See "Risk Factors" beginning on page 5 of this prospectus.
<b>New York Stock Exchange symbol...</b>	"ENZ"

The number of shares of our common stock shown above to be outstanding immediately after this offering is based on 49,728,084 shares outstanding as of May 24, 2023 and excludes as of such date:

- 4,126,500 shares of our common stock subject to outstanding options having a weighted average exercise price of \$2.74 per share;
- 682,488 shares of unvested restricted stock awards outstanding;
- 58,300 shares of unvested performance stock units outstanding; and
- approximately 3,704,000 shares of our common stock reserved for future issuance pursuant to our existing stock incentive plan.

## RISK FACTORS

*Investing in our common stock involves a high degree of risk. Before purchasing our common stock, you should carefully consider the following risk factors as well as those discussed under the section entitled "Risk Factors" in our Annual Report on Form 10-K for the year ended July 31, 2022, and any subsequent Quarterly Report on Form 10-Q or Annual Report on Form 10-K, together with the other information contained in this prospectus, the documents incorporated by reference and in any free writing prospectus we have authorized for use in connection with this offering. Each of these risk factors, either alone or taken together, could adversely affect our business, operating results and financial condition, as well as adversely affect the value of an investment in our common stock. There may be additional risks that we do not presently know of or that we currently believe are immaterial which could also impair our business and financial position. If any of the events described below were to occur, our financial condition, our ability to access capital resources, our results of operations and/or our future growth prospects could be materially and adversely affected and the market price of our common stock could decline. As a result you could lose some or all of any investment you may have made or may make in our common stock.*

### **Risks Related to the Company and its Recently Announced Asset Purchase Agreement**

#### ***The Company may not be able to continue as a going concern.***

During the six months ended January 31, 2023, the Company incurred a net loss of \$21,955,000 and used cash in operating activities of \$14,891,000. The Company believes that based on its fiscal 2023 forecast, its current cash and cash equivalents level is not sufficient for its foreseeable liquidity and capital resource needs over at least the next twelve (12) months, which conditions raise substantial doubt about the Company's ability to continue as a going concern for one year after the date that the unaudited interim financial statements are issued.

In response to these conditions, the Company is evaluating various financing strategies to obtain sufficient additional liquidity to meet its operating and capital requirements for the next twelve months following the date of issuance of the unaudited interim consolidated financial statements. Specifically, the Company is exploring various strategic alternatives including the sale of segment operating assets. On March 16, 2023, the Company entered into an Asset Purchase Agreement with respect to the sale to Labcorp of substantially all the operating assets and assignment of certain liabilities which are necessary for Labcorp to operate the business of the Clinical Labs division, which was approved by the Company's shareholders on May 22, 2023. See "Prospectus Summary – Recent Developments". However, there can be no assurance that either of these capital raising strategies will be successful, and the Company may need to raise additional capital during the current fiscal year. The Company also believes it has the ability to raise additional funds, either through additional debt secured by real property owned, private debt, selling preferred stock, utilizing at-the-market sales agreement facility, or through other sources, but there can be no assurances that the Company will be able to raise capital pursuant to the foregoing on favorable terms or at all. Our liquidity plans are subject to a number of risks and uncertainties, some of which are outside our control. Macroeconomic conditions could limit our ability to successfully execute our business plans and therefore adversely affect our liquidity plans. Our most recent unaudited interim financial statements incorporated by reference into this prospectus do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classifications of liabilities that may result should the Company be unable to continue as a going concern.

#### ***There can be no guarantee that the asset sale will be completed and, if not completed, we may have to file for bankruptcy and liquidation.***

The consummation of the asset sale is subject to the satisfaction or waiver of various conditions. We cannot guarantee that the closing conditions set forth in the Asset Purchase Agreement will be satisfied. If we are unable to satisfy the closing conditions in Buyer's favor or if other mutual closing conditions are not satisfied, Buyer will not be obligated to complete the asset sale. If the asset sale is not completed, our board of directors, in discharging its fiduciary obligations to our shareholders, will evaluate other strategic alternatives that may be available, which alternatives may not be as favorable to our shareholders as the asset sale and may include a bankruptcy and liquidation of the Company.

***The Company has incurred and will continue to incur substantial expenses, including transaction-related costs, pending the asset sale.***

Claims, liabilities and expenses from operations, such as operating costs, salaries, directors' and officers' insurance, payroll and local taxes, legal, accounting and consulting fees and office expenses will continue to be incurred by us during the pendency of the asset sale. Further, Enzo has incurred, and expects to continue to incur, a number of non-recurring transaction-related costs in initiating and completing the asset sale. Non-recurring transaction costs include, but are not limited to, fees paid to Enzo's financial, legal and accounting advisors, filing fees and printing costs. These fees and costs have been, and will continue to be, substantial. We cannot estimate what the aggregate of these expenses will be and these costs may be higher than expected. There can be no assurance of the exact amount of net cash proceeds Enzo will receive from the asset sale or the exact timing at which it will receive such proceeds. Therefore, it is uncertain the extent to which our financial condition and operations will benefit from or improve as a result of or after the asset sale.

The Purchase Agreement also includes customary termination provisions for both the Company and Buyer and provides that, in connection with the termination of the Purchase Agreement under specified circumstances, including termination by the Company to accept and enter into a definitive agreement with respect to an unsolicited Superior Proposal, the Company will be required to pay Buyer a termination fee of \$5,000,000, or reimbursement of Buyer's expenses of up to \$5,000,000.

Subject to the terms and conditions stated in the Purchase Agreement, following shareholder approval of the Transaction, Buyer is obligated to pay a fee to the Company for each day until the closing of the Transaction. At the closing of the Transaction, such fee will be wholly or partially credited against the purchase price.

There can be no assurance that the Purchase Agreement will close and that if it does close, the exact proceeds to be received by the Company.

#### **Risks Related to this Offering and our Common Stock**

*Our stock price has been volatile, which could result in substantial losses for investors.*

Our common stock is quoted on the New York Stock Exchange, and there has been historical volatility in the market price of our common stock. The trading price of our common stock has been, and is likely to continue to be, subject to significant fluctuations due to a variety of factors, including:

- fluctuations in our quarterly operating and earnings per share results;;
- the gain or loss of significant contracts;
- the carrying value of our goodwill and intangible assets;
- announcements of technological innovations or new commercial products by our competitors or us;
- loss of key personnel;
- delays in the development and introduction of new products;
- legislative or regulatory changes;

- general trends in the industries we operate;
- recommendations and/or changes in estimates by equity and market research analysts;
- biological or medical discoveries;
- disputes and/or developments concerning intellectual property, including patents and litigation matters;
- public concern as to the safety of new technologies;
- sales of common stock of existing holders;
- securities class action or other litigation;
- developments in our relationships with current or future customers and suppliers; and
- general economic conditions, both in the United States and worldwide.

In addition, the stock market in general has experienced extreme price and volume fluctuations that have affected the market price of our common stock, as well as the stock of many companies in our industries. Often, price fluctuations are unrelated to operating performance of the specific companies whose stock is affected.

In the past, following periods of volatility in the market price of a company's stock, securities class action litigation has occurred against the issuing company. If we were subject to this type of litigation in the future, we could incur substantial costs and a diversion of our management's attention and resources, each of which could have a material adverse effect on our revenue and earnings. Any adverse determination in this type of litigation could also subject us to significant liabilities.

*Because we do not intend to pay cash dividends on our common stock, an investor in our common stock will benefit only if it appreciates in value.*

We currently intend to retain our retained earnings and future earnings, if any, to finance the expansion of our business and do not expect to pay any cash dividends on our common stock in the foreseeable future. As a result, the success of an investment in our common stock will depend entirely upon any future appreciation. There is no guarantee that our common stock will appreciate in value or even maintain the price at which investors purchased their shares.

*The actual number of shares we will issue under the sales agreement, and the amount of proceeds that we will receive, at any one time or in total, is uncertain.*

Subject to certain limitations in the sales agreement and compliance with applicable law, we have the discretion to deliver sales notices to B. Riley Securities, Inc. at any time throughout the term of the sales agreement. The number of shares that are sold by the sales agent after delivery of a sales notice will fluctuate based on the market price of our common stock during the sales period and limits we set with B. Riley Securities, Inc. In addition, we are not obligated to issue any shares under the sales agreement. Accordingly, and because the price per share of each share of our common stock that is sold will fluctuate based on the market price of our common stock during the sales period, it is not possible at this stage to predict the number of shares, if any, that will ultimately be issued, or the resulting proceeds to us.

*Our common stock offered hereby will be sold in "at-the-market" offerings, and investors who buy shares at different times will likely pay different prices.*

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

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***Investors in this offering will experience immediate and substantial dilution in the net tangible book value per share of the common stock they purchase.***

Since the price per share of our common stock being offered is higher than the net tangible book value per share of our common stock, you will suffer substantial dilution in the net tangible book value of the common stock you purchase in this offering. See the section entitled “Dilution” in this prospectus for a more detailed discussion of the dilution you will incur if you purchase common stock in this offering. In addition, we have a significant number of options outstanding. As of May 24, 2023, approximately 3,704,000 shares of common stock were reserved for future issuance under our stock incentive plan. As of that date, there were also 4,126,500 options to purchase shares of our common stock, 682,488 shares of unvested restricted stock unit awards outstanding, and 58,300 shares of unvested performance stock unit awards outstanding. The exercise of outstanding options and warrants having an exercise price per share that is less than the offering price per share in this offering will increase dilution to investors in this offering.

***Future sales of shares of our common stock or the issuance of securities senior to our common stock could adversely affect the trading price of our common stock and our ability to raise funds in new equity offerings.***

We are not restricted from issuing additional common stock, preferred stock or securities convertible into or exchangeable for common stock. Future sales of a substantial number of our shares of common stock or equity-related securities in the public market or privately, or the perception that such sales could occur, could adversely affect prevailing trading prices of our common stock, and could impair our ability to raise capital through future offerings of equity or equity-related securities. No prediction can be made as to the effect, if any, that future sales of shares of common stock or the availability of shares of common stock for future sale will have on the trading price of our common stock. You may experience significant dilution as a result of future equity offerings.

***We have broad discretion in the use of the net proceeds from this offering.***

Our management will have broad discretion in the application of the net proceeds from this offering and could spend the proceeds in ways with which you may not agree. Accordingly, you will be relying on the judgment of our management with regard to the use of the net proceeds, and you will not have the opportunity, as part of your investment decision, to assess whether the proceeds are being used appropriately. It is possible that the net proceeds will be invested or otherwise used in a way that does not yield a favorable, or any, return for the Company.

***Adverse capital and credit market conditions could affect our liquidity.***

Adverse capital and credit market conditions could affect our ability to meet liquidity needs, as well as our access to capital and cost of capital. The capital and credit markets have experienced extreme volatility and disruption in recent years. Our results of operations, financial condition, cash flows and capital position could be materially adversely affected by continued disruptions in the capital and credit markets.

***It may be difficult for a third party to acquire us, which could inhibit shareholders from realizing a premium on their stock price.***

We are subject to the New York anti-takeover laws regulating corporate takeovers. These anti-takeover laws prohibit certain business combinations between a New York corporation and any “interested shareholder” (generally, the beneficial owner of 20% or more of the corporation’s voting shares) for five years following the time that the shareholder became an interested shareholder, unless the corporation’s board of directors approved the transaction prior to the interested shareholder becoming interested.

Our certificate of incorporation, as amended, and by-laws contain provisions that could have the effect of delaying, deferring or preventing a change in control of us that shareholders may consider favorable or beneficial. These provisions could discourage proxy contests and make it more difficult for shareholders to elect directors and take other corporate actions. These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock. These provisions include advance notice requirements for the submission by shareholders of nominations for election to the board of directors and for proposing matters that can be acted upon by shareholders at a meeting.

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**SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS**

This prospectus, the documents we have filed with the SEC that are incorporated herein and therein by reference and any related free writing prospectus may contain forward-looking statements within the meaning of Section 27A of the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended. These statements are based on our current expectations, assumptions, estimates and projections about our business and our industry, and involve known and unknown risks, uncertainties and other factors that may cause our results, levels of activity, performance or achievement to be materially different from any future results, levels of activity, performance or achievements expressed or implied by the forward-looking statements.

In some cases, you can identify forward-looking statements by terms such as “anticipate,” “believe,” “could,” “estimate,” “expect,” “intend,” “may,” “plan,” “potential,” “predict,” “project,” “should,” “will,” “would” and similar expressions intended to identify forward-looking statements. Forward-looking statements include information concerning possible or assumed future results of operations of our business, the expected completion and timing of the Transaction and other information relating to the Transaction, including pro forma information regarding the Company assuming the Transaction is consummated, including our pro forma results of operations and financial condition as reflected in our unaudited pro forma condensed consolidated financial information incorporated by reference in this prospectus, and may involve known and unknown risks over which we have no control, including, without limitation: (i) the satisfaction of the conditions to consummate the Transaction; (ii) the occurrence of any event, change or other circumstance that could give rise to the termination of the Purchase Agreement; (iii) the outcome of any legal proceedings that may be instituted against us and others following the announcement of the Purchase Agreement; (iv) the amount of the costs, fees, expenses and charges related to the Transaction; (v) the effect of the announcement of the Transaction on our customer relationships, operating results and business generally, including the ability to retain key employees; and (vi) the amount of cash we will hold after the Transaction or our net proceeds from the Transaction. While we believe that we have a reasonable basis for each forward-looking statement, we caution you that these statements are based on a combination of facts and factors currently known by us and our projections of the future, about which we cannot be certain. We discuss many of these risks, uncertainties and other factors in greater detail under the heading “Risk Factors” contained in this prospectus and the accompanying base prospectus. Given these risks, uncertainties and other factors, you should not place undue reliance on these forward-looking statements. Also, these forward-looking statements represent our estimates and assumptions only as of the date such forward-looking statements are made. You should read carefully this prospectus and the accompanying base prospectus, together with the documents we have filed with the SEC that are incorporated by reference herein and therein and any related free writing prospectus, completely and with the understanding that our actual future results may be materially different from what we expect. We hereby qualify all of our forward-looking statements by these cautionary statements.

Except as required by law, we assume no obligation to update these forward-looking statements publicly, or to update the reasons actual results could differ materially

## USE OF PROCEEDS

We may issue and sell shares of our common stock having aggregate gross sales proceeds of up to \$30,000,000 from time to time. Because there is no minimum offering amount required as a condition to close this offering, the actual total public offering amount, commissions, and proceeds to us, if any, are not determinable at this time.

We currently intend to use the net proceeds from this offering, if any, for general corporate purposes, including without limitation, the funding of capital expenditures and working capital needs.

As of the date of this prospectus, we cannot specify with certainty all of the particular uses for the net proceeds to us from this offering, if any. As a result, our management will have broad discretion regarding the timing and application of the net proceeds from this offering, if any. Additionally, the amounts and timing of our actual expenditures will depend on numerous factors, including the factors described under “Risk Factors” in this prospectus and in the documents incorporated by reference herein, as well as the amount of cash used in our operations.

## DILUTION

If you invest in our common stock, you will experience dilution to the extent of the difference between the price per share you pay in this offering and the net tangible book value per share of our common stock immediately after this offering. Our net tangible book value as of January 31, 2023 was approximately \$25,378,000, or \$0.52 per share of our common stock. Net tangible book value per share as of January 31, 2023 is equal to our total tangible assets minus total liabilities, all divided by the number of shares of common stock outstanding as of January 31, 2023.

After giving effect to the sale of our common stock in the aggregate amount of \$30,000,000 in this offering at an assumed offering price of \$2.34 per share, representing the last reported sale price of our common stock on The New York Stock Exchange on May 24, 2023, and after deducting estimated offering commissions and expenses payable by us, our as adjusted net tangible book value would have been approximately \$54,393,000, or approximately \$0.88 per share of common stock, as of January 31, 2023. This represents an immediate increase in net tangible book value of approximately \$0.36 per share to existing shareholders and an immediate dilution of approximately \$1.46 per share to investors in this offering. The following table illustrates this calculation on a per share basis to investors participating in this offering:

Assumed public offering price per share	\$	\$	2.34
Net tangible book value per share as of January 31, 2023	\$	0.52	
Increase in net tangible book value per share attributable to this offering	\$	0.36	
As adjusted net tangible book value per share as of January 31, 2023, after giving effect to this offering		\$	0.88
Dilution per share to new investors purchasing shares in this offering		\$	1.46

The table above assumes for illustrative purposes that an aggregate of 12,820,513 shares of our common stock are sold at a price of \$2.34 per share, representing the last reported sale price of our common stock on The New York Stock Exchange on May 24, 2023, for aggregate gross proceeds of \$30,000,000. The shares sold in this offering, if any, will be sold from time to time at various prices. An increase of \$0.23 per share in the price at which the shares are sold from the assumed offering price of \$2.34 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$30,000,000 is sold at that price, would increase our adjusted net tangible book value per share after the offering to \$0.90 per share and would increase the dilution in net tangible book value per share to new investors in this offering to \$1.67 per share, after deducting commissions and estimated aggregate offering expenses payable by us. A decrease of \$0.23 per share in the price at which the shares are sold from the assumed offering price of \$2.34 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$30,000,000 is sold at that price, would decrease our adjusted net tangible book value per share after the offering to \$0.86 per share and would decrease the dilution in net tangible book value per share to new investors in this offering to \$1.24 per share, after deducting commissions and estimated aggregate offering expenses payable by us. This information is supplied for illustrative purposes only.

The above illustration of dilution per share to investors participating in this offering assumes no exercise of outstanding options to purchase our common stock. The exercise of outstanding options having an exercise price per share that is less than the offering price per share in this offering will increase dilution to investors in this offering.

## PLAN OF DISTRIBUTION

We have entered into a sales agreement with B. Riley Securities, Inc. under which we may issue and sell shares of our common stock having an aggregate gross sales price of up to \$30,000,000 from time to time through B. Riley Securities, Inc., acting as agent. Under the terms of the sales agreement, we may also sell shares to B. Riley Securities, Inc. as principal for its own account. The sales agreement has been filed as an exhibit to the Registration Statement on Form S-3 of which this prospectus forms a part and is incorporated by reference in this prospectus. See the “Where You Can Find More Information” section of this prospectus.

Upon delivery of a placement notice and subject to the terms and conditions of the sales agreement, B. Riley Securities, Inc. may offer and sell our common stock by any method permitted by law deemed to be an “at the market offering” as defined in Rule 415(a)(4) promulgated under the Securities Act. We may instruct B. Riley Securities, Inc. not to sell common stock if the sales cannot be effected at or above the price designated by us from time to time. We or B. Riley Securities, Inc. may suspend the offering of common stock upon notice and subject to other conditions.

We will pay B. Riley Securities, Inc. commissions, in cash, for its services in acting as sales agent in the sale of our common stock. B. Riley Securities, Inc. will be entitled to compensation at a fixed commission rate of 3.0% of the gross sales price per share sold. In addition, we have agreed to reimburse B. Riley Securities, Inc. for the fees and disbursements of its counsel, payable upon execution of the sales agreement, in an amount not to exceed \$75,000, plus up to \$5,000 quarterly for ongoing diligence requirements, including legal fees, following the execution date. We have also agreed to indemnify B. Riley Securities, Inc. against certain civil liabilities, including liabilities under the Securities Act. We have also agreed to contribute to payments B. Riley Securities, Inc. may be required to make in respect of such liabilities. Because there is no minimum offering amount required as a condition to close this offering, the actual total public offering amount, commissions and proceeds to us, if any, are not determinable at this time. We estimate that the total expenses for the offering, excluding the aforementioned compensation payable to B. Riley Securities, Inc. under the terms of the sales agreement will be approximately \$85,000. The remaining sale proceeds, after deducting any other transaction fees, will equal our net proceeds from the sale of such shares.

Settlement for sales of common stock will occur on the second trading day following the date on which any sales are made, or on some other date that is agreed upon by us and B. Riley Securities, Inc. in connection with a particular transaction, in return for payment of the net proceeds to us. Sales of our common stock as contemplated in this



prospectus will be settled through the facilities of The Depository Trust Company or by such other means as we and B. Riley Securities, Inc. may agree upon. There is no arrangement for funds to be received in an escrow, trust or similar arrangement.

B. Riley Securities, Inc. will use its commercially reasonable efforts, consistent with its normal trading and sales practices, to solicit offers to purchase the common stock shares under the terms and subject to the conditions set forth in the sales agreement. In connection with the sale of the common stock on our behalf, B. Riley Securities, Inc. will be deemed to be an “underwriter” within the meaning of the Securities Act and the compensation of B. Riley Securities, Inc. will be deemed to be underwriting commissions or discounts. We have agreed to provide indemnification and contribution to B. Riley Securities, Inc. against certain civil liabilities, including liabilities under the Securities Act.

The offering of our common stock pursuant to the sales agreement will terminate upon the earlier of (1) the sale of all shares of our common stock subject to the sales agreement or (2) termination of the sales agreement as permitted therein. We and B. Riley Securities, Inc. may each terminate the sales agreement at any time upon five days prior notice.

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

This prospectus in electronic format may be made available on a website maintained by B. Riley Securities, Inc. and B. Riley Securities, Inc. may distribute this prospectus and the accompanying base prospectus electronically.

## LEGAL MATTERS

Certain legal matters in connection with the securities offered hereby will be passed upon for us by McDermott Will & Emery LLP, New York, New York. B. Riley Securities, Inc. is being represented in connection with this offering by Morrison & Foerster LLP, Washington, D.C.

## EXPERTS

The consolidated balance sheets of Enzo Biochem, Inc. and subsidiaries as of July 31, 2022 and 2021 and the related consolidated statements of operations, comprehensive income (loss), shareholders’ equity, and cash flows for each of the years in the three-year period ended July 31, 2022, and financial statement schedule for each of the years in the three-year period ended July 31, 2022 have been audited by EisnerAmper LLP, independent registered public accounting firm, as stated in their reports, which are incorporated herein by reference, which reports (1) express an unqualified opinion on the financial statements and financial statement schedule, and (2) express an unqualified opinion on the effectiveness of internal control over financial reporting as of July 31, 2022. Such financial statements and financial statement schedule have been incorporated herein by reference in reliance on the reports of such firm given upon their authority as experts in accounting and auditing.

## WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-3/A, of which this prospectus is a part, under the Securities Act, to register the sale of shares of common stock offered by this prospectus. However, this prospectus does not contain all of the information contained in the registration statement and the exhibits and schedules to the registration statement. Statements in this prospectus concerning any document we filed as an exhibit to the registration statement or that we otherwise filed with the SEC are not intended to be comprehensive and are qualified in their entirety by reference to those filings. We encourage you to carefully read the registration statement and the exhibits and schedules to the registration statement.

We are subject to the information and periodic reporting requirements of the Exchange Act, and we file annual, quarterly and current reports, proxy statements and other information with the SEC. Our filings with the SEC are also available to the public at the SEC’s website at <http://www.sec.gov>. Our website is located at [www.enzo.com](http://www.enzo.com). The contents of our website are not part of this prospectus and should not be relied upon with respect thereto.

## INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

SEC rules allow us to “incorporate by reference” into this prospectus much of the information we file with the SEC, which means that we can disclose important information to you by referring you to those publicly available documents. The information that we incorporate by reference into this prospectus is considered to be part of this prospectus, and information that we file later with the SEC will automatically update and supersede information contained in this prospectus and any accompanying prospectus supplement. We incorporate by reference the documents listed below that we have previously filed with the SEC (excluding any portions of any Form 8-K that are not deemed “filed” pursuant to the General Instructions of Form 8-K):

- our Annual Report on Form 10-K for the fiscal year ended July 31, 2022 (including the information specifically incorporated by reference into our Annual Report on Form 10-K from our revised definitive proxy statement on Schedule 14A filed with the SEC on December 12, 2022) filed with the SEC on [October 14, 2022](#) and as amended on [November 25, 2022](#);
- our Quarterly Reports on Form 10-Q for the fiscal quarters ended October 31, 2022 and January 31, 2023 filed with the SEC on [December 12, 2022](#) and [March 20, 2023](#), respectively;
- our Current Reports on Form 8-K (other than the information furnished pursuant to Item 2.02 or 7.01 thereof or related exhibits furnished pursuant to Item 9.01 thereof) filed with the SEC on [October 20, 2022](#), [November 4, 2022](#), [February 3, 2023](#), [March 16, 2023](#), [April 5, 2023](#), [April 13, 2023](#), [May 22, 2023](#) and [May 22, 2023](#);
- the description of our common stock contained in our registration statement on Form 8-A filed with the SEC on December 8, 1999, including any amendment or report filed for the purpose of updating such description; and
- the Company’s unaudited pro forma condensed consolidated financial information as of and for the six months ended January 31, 2023 and for the years ended July 31, 2022 and July 31, 2021 and the notes thereto included in our Definitive Proxy Statement on [Schedule 14A](#) filed with the SEC on April 24, 2023.

We also incorporate by reference additional documents that we may file with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the completion or termination of the offering of the securities contemplated by this prospectus, including all such documents we may file with the SEC after the date of the initial registration statement and prior to the effectiveness of the registration statement, but excluding any information deemed furnished and not filed with the SEC. Any statements contained in a previously filed document incorporated by reference into this prospectus is deemed to be modified or superseded for purposes of this prospectus to the extent that

a statement contained in this prospectus, or in a subsequently filed document also incorporated by reference herein, modifies or supersedes that statement.

This prospectus may contain information that updates, modifies or is contrary to information in one or more of the documents incorporated by reference in this prospectus. You should rely only on the information incorporated by reference or provided in this prospectus. We have not authorized anyone else to provide you with different information. You should not assume that the information in this prospectus is accurate as of any date other than the date of this prospectus or the date of the documents incorporated by reference in this prospectus.

We will provide without charge to each person, including any beneficial owners, to whom this prospectus is delivered, upon his or her written or oral request, a copy of any or all documents referred to above which have been or may be incorporated by reference into this prospectus but not delivered with this prospectus. You may request a copy of these documents by writing or telephoning us at the following address:

Enzo Biochem, Inc.  
81 Executive Blvd., Suite 3  
Farmingdale, New York 11735  
(631) 755-5500

You may also access certain of the documents incorporated by reference in this prospectus through our website at [www.enzo.com](http://www.enzo.com). Except for the specific incorporated documents listed above, no information available on or through our website shall be deemed to be incorporated in this prospectus or the registration statement of which it forms a part.



ENZO BIOCHEM, INC.

Up to \$30,000,000

Common Stock

PROSPECTUS

B. Riley Securities

, 2023

## PART II INFORMATION NOT REQUIRED IN PROSPECTUS

### Item 14. *Other Expenses of Distribution*

The following table lists the costs and expenses payable by the registrant in connection with the sale of the common stock covered by this prospectus other than any sales commissions or discounts, which expenses will be paid by us. All amounts shown are estimates except the SEC registration fee.

SEC registration fee	\$	16,530
Legal fees and expenses	\$	*
Accounting fees and expenses	\$	*
Printing fees and miscellaneous expenses	\$	*
Total	\$	

\* These fees are calculated on the securities offered and the number of issuances and accordingly cannot be estimated at this time.

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

Enzo Biochem, Inc. is incorporated under the laws of the State of New York. Reference is made to Section 721 of the NYBCL, which enables a corporation in its original certificate of incorporation or an amendment thereto to eliminate or limit the personal liability of a director for violations of the director's fiduciary duty, except if (1) his or her acts or omissions were in bad faith or involved intentional misconduct or a knowing violation of law or (2) such director personally gained in fact a financial profit or

other advantage to which or she was not legally entitled.

Reference is also made to Section 722 of the NYBCL, which provides that a corporation may indemnify any person, including an officer or director, who is, or is threatened to be made, party to any threatened, pending or completed legal action or proceeding, whether civil or criminal, other than an action by or in the right of such corporation, by reason of the fact that such person was an officer, director, employee or agent of such corporation or is or was serving at the request of such corporation as a director, officer, employee or agent of another corporation or enterprise. The indemnity may include expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding, provided such officer, director, employee or agent acted in good faith and in a manner he reasonably believed to be in, or not opposed to, the corporation's best interest and, for criminal proceedings, had no reasonable cause to believe that his conduct was unlawful. A New York corporation may indemnify any officer or director in an action by or in the right of the corporation under the same conditions, except that no indemnification is permitted without judicial approval if the officer or director is adjudged to be liable to the corporation. Where an officer or director is successful on the merits or otherwise in the defense of any action referred to above, the corporation must indemnify him against the expenses that such officer or director actually and reasonably incurred.

Article 8 of the Company's Certificate of Incorporation, as amended, provides that the Company shall, to the fullest extent permitted by the provisions of Article 7 of the NYBCL, as the same may be amended and supplemented, indemnify any and all persons whom it shall have power to indemnify under said section from and against any and all of the expenses, liabilities or other matters referred to in or covered by said section, and the indemnification provided for therein shall not be deemed exclusive of any other rights to which those indemnified may be entitled under any bylaw, agreement, vote of shareholders or disinterested directors or otherwise, both as to action in his official capacity and as to action in another capacity while holding such office, and shall continue as to a person who has ceased to be a director, officer, employee or agent and shall inure to the benefit of the heirs, executors and administrators of such person.

#### Liability Insurance

We have also obtained directors' and officers' liability insurance, which insures against liabilities that our directors or officers may incur in such capacities.

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#### Item 16. Exhibits and Financial Statement Schedules.

(a) *Exhibits.* The following exhibits are included herein or incorporated herein by reference.

Exhibit Number	
1.1*	Form of Underwriting Agreement
1.2**	<a href="#">Sales Agreement, dated May 12, 2023, between Enzo Biochem, Inc. and B. Riley Securities, Inc.</a>
4.1	<a href="#">Common Stock Specimen Certificate (incorporated by reference to Exhibit 4.6 to the registration statement on Form S-8 of Enzo Biochem, Inc. (No. 333-123712))</a>
4.2*	Form of Certificate of Designations of Preferred Stock
4.3	<a href="#">Form of Indenture between Enzo Biochem, Inc. and one or more trustees to be named (incorporated by reference to Exhibit 4.3 to the registration statement on Form S-3 of Enzo Biochem, Inc. (No. 333-190321))</a>
4.4*	Form of Note
4.5*	Form of Common Stock Warrant Agreement and Warrant Certificate
4.6*	Form of Preferred Stock Warrant Agreement and Warrant Certificate
4.7*	Form of Debt Securities Warrant Agreement and Warrant Certificate
4.8*	Form of Deposit Agreement
4.9*	Form of Unit Agreement
5.1**	<a href="#">Opinion of McDermott Will &amp; Emery LLP, counsel to the registrant</a>
23.1	<a href="#">Consent of Independent Registered Public Accounting Firm</a>
23.2	<a href="#">Consent of McDermott Will &amp; Emery LLP (contained in Exhibit 5.1)</a>
24.1	<a href="#">Power of Attorney (contained on page II-5)</a>
25.1†	Form T-1 Statement of Eligibility of Trustee
107**	<a href="#">Filing Fee Table</a>

\* To be filed by amendment or by a report filed under the Securities Exchange Act of 1934, as amended, and incorporated herein by reference, if applicable.

\*\* Previously filed.

† To be filed separately under electronic form type 305B2, if applicable.

(b) *Financial Statement Schedules.* None.

#### Item 17. Undertakings

The undersigned registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and

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(iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement.

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

(2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

(3) To remove from registration by means of a post-effective amendment, any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser:

(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; or

(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;

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(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.

(7) To file an application for the purpose of determining the eligibility of the trustee to act under subsection (a) of section 310 of the Trust Indenture Act ("Act") in accordance with the rules and regulations prescribed by the Commission under section 305(b)(2) of the Act.

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 SEC such indemnification is against public policy as expressed in the Securities Act of 1933 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.

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Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this Amendment No. 1 to its registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of New York, State of New York, on this 25th day of May, 2023.

**ENZO BIOCHEM, INC.**

By: /s/ Hamid Erfanian  
Name: Hamid Erfanian  
Title: Chief Executive Officer  
(Principal Executive Officer)

By: /s/ Patricia Eckert  
Name: Patricia Eckert  
Title: Interim Chief Financial Officer  
(Principal Accounting Officer)

In accordance with the requirements of the Securities Act of 1933, this registration statement or amendment thereto has been signed by the following persons in the capacities and on the dates indicated:

<u>/s/ Hamid Erfanian</u> Hamid Erfanian	Chief Executive Officer (Principal Executive Officer)	May 25, 2023
<u>/s/ Patricia Eckert</u> Patricia Eckert	Interim Chief Financial Officer (Principal Accounting Officer)	May 25, 2023
<u>Elazar Rabbani, Ph.D.</u>	Director	May 25, 2023
<u>/s/ Bradley Radoff</u> Bradley Radoff	Director	May 25, 2023
<u>/s/ Ian Walters</u> Ian Walters	Director	May 25, 2023
<u>/s/ Mary Tagliaferri, M.D.</u> Mary Tagliaferri, M.D.	Chair of the Board	May 25, 2023

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the incorporation by reference in this Registration Statement of Enzo Biochem, Inc. on Amendment No. 1 to Form S-3 (File No. 333-271911) to be filed on or about May 25, 2023 of our reports dated October 14, 2022 on our audits of the financial statements and financial statement schedule as of July 31, 2022 and 2021 and for each of the years in the three-year period ended July 31, 2022, and the effectiveness of Enzo Biochem Inc.'s internal control over financial reporting as of July 31, 2022, which reports were included in the Annual Report on Form 10-K filed October 14, 2022. We also consent to the reference to our firm under the caption "Experts" in this Registration Statement on Form S-3.

*/s/ EisnerAmper LLP*

EISNERAMPER LLP  
Iselin, New Jersey  
May 25, 2023