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

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Post-Effective Amendment No. 1 to FORM S-3 REGISTRATION STATEMENT No. 333-271911  
Post-Effective Amendment No. 1 to FORM S-3 REGISTRATION STATEMENT No. 333-272727

UNDER  
THE SECURITIES ACT OF 1933

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**ENZO BIOCHEM, INC.**  
(Exact name of registrant as specified in its charter)

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New York  
(State or other jurisdiction of incorporation)

13-2866202  
(I.R.S. Employer Identification Number)

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

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Patricia Eckert  
Chief Financial Officer  
21 Executive Blvd.  
Farmingdale, New York 11735  
(631) 755-5500  
(Name, address, including zip code, and telephone number, including area code, of agent for service)

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*Copy to:*

Adam Finerman  
Baker & Hostetler LLP  
45 Rockefeller Plaza  
New York, NY 10111  
(212) 589-4233

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**Approximate date of commencement of proposed sale to the public:** Not applicable. Removal from registration of securities that were not sold pursuant to the above referenced registration statements.

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

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

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

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

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

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

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

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input checked="" type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

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

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**EXPLANATORY NOTE  
DEREGISTRATION OF SECURITIES**

These Post-Effective Amendments (these “Post-Effective Amendments”) relate to the following Registration Statements on Form S-3 (each, a “Registration Statement,” and collectively, the “Registration Statements”), filed with the Securities and Exchange Commission (the “SEC”) by Enzo Biochem, Inc. (the “Company”):

- Registration Statement No. 333-271911 filed with the SEC on May 15, 2023, as amended by Amendment No. 1 filed with the SEC on May 26, 2023 and Amendment No. 2 filed with the SEC on June 16, 2023, registering (i) the offering, issuance and sale by the Company of up to \$150,000,000 of the Company’s common stock, par value \$0.01 (“Common Stock”), preferred stock, depositary shares, debt securities, warrants and units and (ii) the offering, issuance and sale by the Company of up to \$30,000,000 of Common Stock pursuant to a sales agreement, between the Company and B. Riley Securities, Inc., and declared effective on June 21, 2023; and
- Registration Statement No. 333-272727 filed with the SEC on June 16, 2023, as amended by Amendment No. 1 filed with the SEC on July 10, 2023 and Amendment No. 2 filed with the SEC on July 18, 2023, registering the resale of up to an aggregate of 3,527,808 shares of Common Stock by the selling shareholders identified in the Registration Statement, consisting of (i) 1,000,000 shares of Common Stock issuable upon exercise of warrants and (ii) 2,527,808 shares of common stock issuable upon the conversion of debentures, and declared effective on July 18, 2023.

On June 23, 2025, the Company entered into an Agreement and Plan of Merger (the “Merger Agreement”) with Bethpage Parent, Inc., a Delaware corporation (“Parent”) and Bethpage Merger Sub, Inc., a New York corporation and wholly owned subsidiary of Parent (“Merger Sub”). Pursuant to the Merger Agreement, on August 20, 2025, Merger Sub merged with and into the Company (the “Merger”), with the Company surviving the Merger as a wholly owned subsidiary of Parent.

In connection with the Merger, the offerings of securities pursuant to the Registration Statements have been terminated. In accordance with the undertakings made by the Company in the Registration Statements to remove from registration, by means of a post-effective amendment, any of the securities registered pursuant to the Registration Statements which remain unsold at the termination of the offerings, the Company hereby terminates the effectiveness of each Registration Statement and removes from registration all Shares registered under the Registration Statements that remain unsold as of the date hereof. Each Registration Statement is hereby amended, as appropriate, to reflect the deregistration of such securities. After giving effect to these Post-Effective Amendments, there will be no remaining securities registered by the Company pursuant to the Registration Statements.

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## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused these Post-Effective Amendments to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Farmingdale, State of New York, on August 20, 2025.

**ENZO BIOCHEM, INC.**

By: /s/ Patricia Eckert  
Name: Patricia Eckert  
Title: Chief Financial Officer

No other person is required to sign these Post-Effective Amendments in reliance upon Rule 478 under the Securities Act of 1933, as amended.

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