

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 8-K

CURRENT REPORT PURSUANT
TO SECTION 13 OR 15(D) OF THE
SECURITIES EXCHANGE ACT OF 1934

Date of report (Date of earliest event reported): **June 29, 2012**

Enzo Biochem, Inc.

(Exact Name of Registrant as Specified in Its Charter)

New York

(State or Other Jurisdiction of Incorporation)

001-09974

(Commission File Number)

13-2866202

(IRS Employer Identification No.)

**527 Madison Avenue
New York, New York**

(Address of Principal Executive Offices)

10022

(Zip Code)

(212) 583-0100

(Registrant's Telephone Number, Including Area Code)

(Former Name or Former Address, if Changed Since Last Report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (*see* General Instruction A.2. below):

- Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
- Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
- Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
- Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Item 9.01. Financial Statements and Exhibits.

(d) Exhibits.

Exhibit No.

5.1 Opinion of Greenberg Traurig, LLP.

23.1 Consent of Greenberg Traurig, LLP (included in Exhibit 5.1).

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Date: June 29, 2012

ENZO BIOCHEM, INC.

By: /s/ Barry Weiner

Name: Barry Weiner

Title: President, Chief Financial Officer,
Principal Accounting Officer and
Director

EXHIBIT INDEX

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[LETTERHEAD OF GREENBERG TRAURIG, LLP]

June 29, 2012

Enzo Biochem, Inc.
527 Madison Avenue
New York, New York 10022

Re: Enzo Biochem, Inc.

Ladies and Gentlemen:

We are acting as counsel to Enzo Biochem, Inc., a New York corporation (the “Company”), in connection with the issuance of 275,000 shares (the “Shares”) of the Company’s common stock, par value \$0.01 (the “Common Stock”), to the Company’s legal counsel, Greenberg Traurig, LLP, in satisfaction of outstanding legal fees. The issuance of the Shares was registered by the Company with the Securities and Exchange Commission (the “Commission”) on the Company’s registration statement on Form S-3 (No. 333-168311) (the “Registration Statement”) filed with the Commission under the Securities Act of 1933, as amended (the “Act”), and the prospectus (the “Prospectus”) and prospectus supplement (the “Prospectus Supplement”) with respect thereto, dated August 5, 2010 and June 29, 2012, respectively. The Registration Statement was declared effective by the Securities and Exchange Commission on August 5, 2010.

This opinion is being delivered in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Act.

In rendering this opinion, we have examined (i) the Registration Statement, the Prospectus and the Prospectus Supplement, (ii) the Certificate of Incorporation, as amended, of the Company, (iii) the Amended and Restated Bylaws of the Company, (iv) certain resolutions of the board of directors of the Company and a duly authorized committee thereof, relating to the issuance of the Shares, and (v) certificates of officers of the Company and of public officials and such other records, instruments and documents as we have deemed advisable in order to render this opinion. In our examination, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals and the conformity with the originals of all documents submitted to us as copies.

Based upon, subject to and limited by the foregoing, we are of the opinion that the Shares have been duly and validly authorized and upon issuance, delivery and payment therefor in the manner contemplated by the Registration Statement, the Prospectus and the Prospectus Supplement, will be validly issued, fully paid and nonassessable.

We express no opinion as to matters governed by any laws other than the substantive laws of the State of New York and the federal laws of the United States of America, as in effect on the date hereof.

We hereby consent to the filing of this opinion as an exhibit to the Registration Statement and to the reference to our firm under the caption "Legal Matters" in the Prospectus Supplement. In giving such permission, we do not admit hereby that we come within the category of persons whose consent is required under Section 7 of the Securities Act, or the rules and regulations of the Commission thereunder. This opinion is expressed as of the date hereof, and we disclaim any undertaking to advise you of any subsequent changes in the facts stated or assumed herein or of any subsequent changes in applicable law.

Very truly yours,

/s/ Greenberg Traurig, LLP

Greenberg Traurig, LLP
