

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 11-K

FOR ANNUAL REPORTS OF EMPLOYEE STOCK REPURCHASE SAVINGS AND SIMILAR PLANS
PURSUANT TO SECTION 15(d) OF THE
SECURITIES EXCHANGE ACT OF 1934

(MARK ONE)

ANNUAL REPORT PURSUANT TO SECTION 15(d) OF THE SECURITIES
EXCHANGE ACT OF 1934

FOR THE FISCAL YEAR ENDED DECEMBER 31, 2004

OR

TRANSITION REPORT PURSUANT TO SECTION 15(d) OF THE SECURITIES
EXCHANGE ACT OF 1934

FOR THE TRANSITION PERIOD FROM _____ TO _____

COMMISSION FILE NUMBER 001-09974

Enzo Biochem, Inc. Salary Reduction Profit Sharing Plan

(Full title of the plan and the address of the plan, if different from that
of the issuer named below:)

ENZO BIOCHEM, INC., 60 EXECUTIVE BOULEVARD, FARMINGDALE, NY 11735

(Name of issuer of the securities held pursuant to the plan and the address
of its principal executive office)

ENZO BIOCHEM, INC.
SALARY REDUCTION PROFIT SHARING PLAN

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DECEMBER 31, 2004:

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Trustees of
Enzo Biochem, Inc. Salary Reduction Profit Sharing Plan

We have audited the accompanying statements of net assets available for benefits
of Enzo Biochem, Inc. Salary Reduction Profit Sharing Plan (the "Plan") as of

December 31, 2004 and 2003, and the related statement of changes in net assets available for benefits for the year ended December 31, 2004. These financial statements are the responsibility of the Plan's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audit in accordance with generally accepted auditing standards as established by the Auditing Standards Board (United States) and in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. The Plan is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. Our audit included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Plan's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the net assets available for benefits of the Plan as of December 31, 2004 and 2003 and the changes in net assets available for benefits for the year ended December 31, 2004 in conformity with accounting principles generally accepted in the United States of America.

Our audits were conducted for the purpose of forming an opinion on the basic financial statements taken as a whole. The supplemental schedule of assets held for investment purposes at the end of the year, is presented for the purpose of additional analysis and is not a required part of the basic financial statements but is supplementary information required by the Department of Labor's Rules and Regulations for Reporting and Disclosure under the Employee Retirement Income Security Act of 1974. The supplemental schedule is the responsibility of the Plan's management. The supplemental schedule has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

Watson Rice LLP
 May 23, 2005
 New York, New York

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ENZO BIOCHEM, INC.
 SALARY REDUCTION PROFIT SHARING PLAN

STATEMENTS OF NET ASSETS AVAILABLE FOR BENEFITS

DECEMBER 31,

	2004	2003
	-----	-----
ASSETS		
Cash	\$ 13,334	\$ --
Investments at Fair Value:		
Mutual funds	7,765,886	6,213,531
Common stock	2,289,847	1,685,349
	-----	-----
	10,055,733	7,898,880
	-----	-----
Receivables:		
Employer's contributions	351,579	282,239
Participants' contributions	19,258	480
	-----	-----
	370,837	282,719
	-----	-----
Loans receivable - participants	218,831	235,312

TOTAL ASSETS	10,658,735	8,416,911
LIABILITIES		
Benefit claims payable	6,333	--
TOTAL LIABILITIES	6,333	--
NET ASSETS AVAILABLE FOR BENEFITS	\$10,652,402	\$ 8,416,911

See notes to financial statements.

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ENZO BIOCHEM, INC.
SALARY REDUCTION PROFIT SHARING PLAN
STATEMENT OF CHANGES IN NET ASSETS AVAILABLE FOR BENEFITS
FOR THE YEAR ENDED DECEMBER 31, 2004

Additions to Net Assets Attributed to:		
Participants' contributions		\$ 885,264
Employer's contributions		351,579
Rollovers		24,149
Interest on loans to participants		11,413
Investment income		102,623
Net appreciation in fair value of investments:		
Mutual funds	752,772	
Common stock	190,241	943,013
Total Additions		2,318,041
Deductions from Net Assets Attributed to:		
Benefits paid to participants		57,715
Administrative expenses		24,835
Total Deductions		82,550
Net increase in net assets		2,235,491
Net Assets Available for Benefits, Beginning of Year		8,416,911
Net Assets Available for Benefits, End of Year		\$10,652,402

See notes to financial statements.

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NOTE 1: PLAN DESCRIPTION

The following description of the Enzo Biochem, Inc. Salary Reduction Profit-Sharing Plan ("the Plan") provides only general information. Participants should refer to the Plan Agreement, as amended, for a more complete description of the Plan's provisions.

GENERAL

The Plan is a defined contribution plan covering all eligible full time employees of Enzo Biochem, Inc., Enzo Clinical Labs, Inc., Enzo Therapeutics, Inc. and Enzo Life Sciences (the "Companies") who have completed three months of service and have attained age twenty-one.

The Plan is subject to the provisions of the Employee Retirement Income Security Act of 1974 (ERISA).

CONTRIBUTIONS

Eligible employees can elect to defer up to 17% of their compensation, as defined by the Plan, limited to the maximum for each year (\$13,000 in 2004 and \$12,000 in 2003) permitted by the Internal Revenue Code. Effective January 1, 2002, catch-up contributions are also permitted for participants who have attained age 50 by December 31st, in accordance with Section 414(v) of the Code, in an amount up to a maximum of \$3,000 in 2004, and \$2,000 in 2003, without regard to the Plan limitation of 17% of compensation, bringing those participants' statutory limitation to \$16,000 for 2004 and \$14,000 for 2003.

In addition, the Companies will contribute to the Plan a discretionary matching contribution equal to 50% of the employees' 401(k) contribution, not to exceed 50% of 10% of the employee's annual compensation. Participants who have completed a year of service during the plan year and are actively employed as of the last day of the plan year shall be deemed eligible to share in the matching contribution for the year. In 2004 and 2003 the total matching contributions were \$351,579 and \$282,239, respectively, in the form of Enzo Biochem Inc. company stock.

PARTICIPANTS' ACCOUNTS

Contributions are invested in a choice of fourteen mutual funds and the common stock of Enzo Biochem, Inc. (see Note 7). Contribution selections are designated by the participants. Each participant's account is credited with the participant's contribution and allocations of (a) the Companies contributions and, (b) Plan earnings, and charged with an allocation of administrative expenses. Allocations are based on participant compensation or account balances, as defined. The benefit to which a participant is entitled is the benefit that can be provided from the participant's vested account.

VESTING

Participants' contributed funds arising from salary reductions and the earnings thereon, are fully vested at all times. Vesting in the Companies' matching contribution and earnings thereon, is ratable over four years of service. Any forfeited amounts shall be applied to reduce future employers' contributions. For the years ended December 31, 2004 and 2003, employer contributions were reduced by forfeitures of approximately \$7,000 and \$0, respectively.

ENZO BIOCHEM, INC.
SALARY REDUCTION PROFIT SHARING PLAN

NOTES TO FINANCIAL STATEMENTS

NOTE 1: PLAN DESCRIPTION (CONTINUED)

LOANS TO PARTICIPANTS

Participants may borrow from their 401(k) accounts a minimum of \$1,000 up to a maximum of 50% of their vested account balance or

\$50,000. Participants are entitled to borrow from their account for a maximum loan term of five years unless the proceeds are used to acquire a principal residence in which case it may exceed 5 years. The loans are secured by the participant's vested account balance and bear a reasonable rate of interest. Principal and interest is paid ratably through payroll deductions.

PAYMENT OF BENEFITS

On termination of service due to death, disability or retirement, participants may elect to receive an amount equal to the value of the participants' vested interest in their account in either a lump sum amount or in various annuity options. For termination of service due to other reasons, a participant may receive the value of the vested interest in their account as a lump sum distribution. Benefits are payable in the form of cash or property.

OPERATING EXPENSES

Certain operating expenses of the Plan are absorbed by the Plan Sponsor.

NOTE 2: SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The Plan's financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America and under the accrual basis method of accounting.

The Plan's investments are stated at fair value except for its benefit responsive investment contract which is valued at contract value (Note 4). Investment earnings are reinvested in the respective funds. Investment earnings include the Plan's proportionate share of realized gains and losses on the disposal of investments, and appreciation or depreciation in the fair value of the underlying investments comprising the respective mutual funds. All purchases and sales are recorded on a trade date basis.

The Plan presents in the statement of changes in net asset available for benefits, the net appreciation in fair value of its investments, which consists of the realized gains or losses and the unrealized appreciation (depreciation) on those investments.

The preparation of the financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect reported amounts and disclosures in the financial statements. Actual results could differ from those estimates.

ENZO BIOCHEM, INC.
SALARY REDUCTION PROFIT SHARING PLAN

NOTES TO FINANCIAL STATEMENTS

NOTE 3: INVESTMENTS

The following table presents the fair values, as determined by quoted market price, of the investments except for the Metropolitan Life Insurance contract which is presented at contract value:

<TABLE>
<CAPTION>

	2004	2003
	-----	-----
<S>	<C>	<C>
Enzo Biochem, Inc.*	\$ 2,289,847	\$ 1,685,349
American Century Government Bond	\$ 188,121	\$ 33,501
American Funds AMCAP Fund CL A	\$ 26,459	\$ 167,211
American Funds European Balanced Fund CL A*	\$ 1,318,378	\$ 1,115,300
American Funds Europacific Growth CL A*	\$ 1,174,844	\$ 911,523
American Funds Washington Mutual Investors Fund CL A*	\$ 2,117,271	\$ 1,401,057
Baron Growth Fund	\$ 46,874	\$ -
Federated Kaufmann Fund K	\$ 471,276	\$ 327,550
Fidelity Contrafund*	\$ 673,476	\$ 477,631
Fidelity Spartan US Equity Index Fund	\$ 178,479	\$ 64,696
Freemont Bond Fund	\$ 6,481	\$ -

Hotchkis & Wiley Mid Cap Value CL 1	\$	26,381	\$	-
Janus Fund*	\$	696,237	\$	571,213
Neuberger & Berman Genesis Fund Trust	\$	319,346	\$	202,482
Metropolitan Life Ins Co - GIC	\$	522,263	\$	387,198
Babson Value Fund	\$	-	\$	425,814
Aim Invesco Dynamics Fund	\$	-	\$	37,061
Aim Invesco Small Company Growth Fund	\$	-	\$	13,967
Aim Invesco Technology Fund Investor CL	\$	-	\$	66,829
Putnam New Opportunities Fd Sh Ben Int A	\$	-	\$	10,498

</TABLE>

* Denotes investments representing 5% or more of net assets available for benefits at December 31, 2004.

NOTE 4: INVESTMENT CONTRACT WITH INSURANCE COMPANY

The Plan has a benefit-responsive investment contract with MetLife Trust Company, National Association (MetLife). MetLife maintains the contributions in separate accounts. The accounts are credited with earnings on the underlying investments and charged for participant withdrawals and administrative expenses. The contract is included in the financial statements at contract value as reported to the Plan by Counsel Trust Company. Contract value represents contributions made under the contract, plus earnings, less participant withdrawals and administrative expenses. Participants may ordinarily direct the withdrawal or transfer of all or a portion of their investment at contract value.

There are no reserves against contract value for credit risk of the contract issuer or otherwise. The average yield and crediting interest rates were approximately 3.7% for both 2004 and 2003.

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ENZO BIOCHEM, INC.
SALARY REDUCTION PROFIT SHARING PLAN

NOTES TO FINANCIAL STATEMENTS

NOTE 5: PLAN TERMINATION

Although it has not expressed any intent to do so, the Companies have the right under the Plan to discontinue their contributions at any time and to terminate the Plan subject to the provisions of ERISA.

NOTE 6: TAX STATUS

The Plan obtained its latest determination letter in February 2002 in which the Internal Revenue Service stated that the Plan was in compliance with the applicable requirements of the Internal Revenue Code.

NOTE 7: RELATED PARTY TRANSACTIONS

During 2004, the Plan purchased shares of stock in Enzo Biochem, Inc., the parent company of the Plan sponsor, at market prices totaling approximately \$133,000. In addition, shares were sold, at market prices totaling approximately \$103,000. At December 31, 2004 and 2003 the Plan held Enzo Biochem, Inc. stock at market prices totaling \$2,289,847 and \$1,685,349, respectively.

Fees paid by the Plan to the Plan administrators amounted to \$24,835 for the year ended December 31, 2004.

NOTE 8: RISKS AND UNCERTAINTIES

The Plan invests in various investment securities. Investment securities are exposed to various risk such as interest rate, market, and credit risks. Due to the level of risk associated with certain investment securities, it is at least reasonably possible that changes in the values of investment securities will occur in the near term and that such changes could materially affect participants' account balances and the amounts reported in the statement of net assets available for benefits.

ENZO BIOCHEM, INC.
SALARY REDUCTIONS PROFIT SHARING PLAN

SCHEDULE H, ITEM 4i
SCHEDULE OF ASSETS HELD AT END OF YEAR

E.I.N. # 13-2869332
PLAN # 001

YEAR ENDED DECEMBER 31, 2004

<TABLE>
<CAPTION>

VALUE (a) (e)	IDENTITY OF ISSUE, BORROWER, LESSOR OR SIMILAR PARTY (b)	DESCRIPTION OF INVESTMENT INCLUDING MATURITY DATE, RATE OF INTEREST, COLLATERAL, PAR OR MATURITY VALUE (c)	COST (d)	CURRENT
<S>	<C>	<C>		<C>
*	Enzo Biochem, Inc.	Common Stock		\$
2,289,847	American Century Government Bond	Mutual Fund		\$
188,121	American Funds AMCAP Fund CL A	Mutual Fund		\$
26,459	American Funds American Balanced Fund CL A	Mutual Fund		\$
1,318,378	American Funds Europacific Growth CL A	Mutual Fund		\$
1,174,844	American Funds Washington Mutual	Mutual Fund		\$
2,117,271	Investors Fund CL A			
	Baron Growth Fund	Mutual Fund		\$
46,874	Federated Kaufmann Fund K	Mutual Fund		\$
471,276	Fidelity Contrafund	Mutual Fund		\$
673,476	Fidelity Spartan US Equity Index Fund	Mutual Fund		\$
178,479	Freemont Bond Fund	Mutual Fund		\$
6,481	Hotchkis & Wiley Mid Cap Value CL 1	Mutual Fund		\$
26,381	Janus Fund	Mutual Fund		\$
696,237	Neuberger & Berman Genesis Fund Trust	Mutual Fund		\$
319,346	Metropolitan Life Ins Co.	Guaranteed Investment		\$
522,263		Contract		
	Participant Loans	5.00% - 9.50%	\$ -0-	\$
218,831				

</TABLE>

* Party-in-interest.

See Independent Auditors' Report.

SIGNATURES

THE PLAN. Pursuant to the requirements of the Securities Exchange Act of 1934, a trustee of the below named employee benefit plan has duly caused this

annual report to be signed on its behalf by the undersigned hereunto duly authorized.

Enzo Biochem, Inc.
Salary Reduction Profit Sharing Plan

Date: June 29, 2005

/s/ Herbert Bass

By: Herbert Bass
Trustee

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