



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

May 11, 2010

Via Facsimile (617) 235-7351 and US Mail

Henri A. Termeer
Chairman & Chief Executive Officer
Genzyme Corporation
500 Kendall Street
Cambridge, MA 02142

**Re: Genzyme Corporation
Definitive Additional Soliciting Materials
Filed May 6 & 7, 2010 on Schedule 14A
File No. 0-14680**

Dear Mr. Termeer:

We have reviewed your filings and have the following comments.

Soliciting Materials filed May 6, 2010 (Letter to Shareholders)

General

1. We refer to prior comment 3 of our letter dated April 20, 2010 and your response confirming that you would set forth the basis for any claims made regarding the potential applicability of the Clayton Act in future soliciting materials. The letter to shareholders does not set forth the basis for your opinion regarding the potential applicability of the Clayton Act. In future filings, please ensure that all solicitations alleging the potential violation also sets forth the basis for your claims.

Soliciting Materials filed May 7, 2010 (Analyst Day Presentation)

2. In future filings, please clearly identify beneath each slide, the sources of the information from which data has been taken. Specifically, given the reference throughout the materials to non-GAAP financial metrics, ensure that references to the appendix containing the GAAP reconciliation for such figures is also included in footnotes to the graphics and/or data being presented.

3. Please supplementally provide us with support for the data presented in:

- the Strategic Financial Overview section, pages 5-7 and 9-13;
- the Regional Optimization section, pages 19-21;
- the Overview of Renal and Mipomersen section, pages 5-6;
- the Genzyme Transplant and Oncology section, pages 7,9, 14 and 17; and,
- the Personalized Genetic Health section, pages 36-40 and 47.

This comment applies to analogous statements in the May 7, 2010 Investor Presentation. Please mark any supporting documents provided to identify the specific information relied upon, such as quoted statements, financial statement line items, press releases, and mathematical computations, and identify the sources of all data utilized.

Soliciting Materials filed May 7, 2010 (Investor Presentation)

4. We refer to comment 1 above and conclusory statements made in the presentation regarding the “clear” violation of the Clayton Act that would occur should either Dr. Denner or Dr. Mulligan be elected. While the disclosure in these materials sets forth what you believe to be the basis for your claims, the disclosure does not characterize each statement as an expression of your opinion. Please note that each statement or assertion of opinion or belief should be characterized as such. Please make a corrective filing that clarifies that statements regarding the possible application of the Clayton Act are expressions of your opinion or belief. The corrective filing should also clarify that neither the Federal Trade Commission or any other judicial or regulatory authority charged with administration and/or interpretation of the Clayton Act has made a factual determination that the election of either Icahn nominee would constitute a violation of the Clayton Act.

* * *

Please respond to the above comments promptly and comply with our comments when disseminating information in the future. If you believe that compliance with our comments is not appropriate, please provide the basis for your view in your response letter filed via EDGAR and tagged as “CORRESP”. You should be aware, however, that we may have additional comments based on your supplemental response.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filings to be certain that the filing includes all information required under the Securities Exchange Act of 1934 and that they have provided all information investors require for an informed investment decision. Since the company and its

Mr. H. Termeer
Genzyme Corporation
May 11, 2010
Page 3

management are in possession of all facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

In connection with responding to our comments, please provide, in writing, a statement from the participants acknowledging that:

- the participants are responsible for the adequacy and accuracy of the disclosure in the filings;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filings; and
- the participants may not assert staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

In addition, please be advised that the Division of Enforcement has access to all information you provide to the staff of the Division of Corporation Finance in our review of your filings or in response to our comments on your filings.

Please direct any questions to me at (202) 551-3757. You may also contact me via facsimile at (202) 772-9203. Please send all correspondence to us at the following ZIP code: 20549-3628.

Sincerely,

Melissa Campbell Duru
Special Counsel
Office of Mergers and Acquisitions

Cc (via facsimile): Andrew J. Sung, Esq.
Ropes & Gray LLP