Via Facsimile and U.S. Mail
Mail Stop 4720

April 27, 2010

Michael S. Wyzga
Chief Financial Officer
Genzyme Corporation
500 Kendall Street
Cambridge, MA 02142

Re: Genzyme Corporation
Form 10-K for the Year Ended December 31, 2009
Filed on March 1, 2010
File Number: 000-14680

Dear Mr. Wyzga:

We have reviewed your filing and have the following comments. In our comments, we ask you to provide us with information to better understand your disclosure. Where our comments request you to revise disclosure, the information you provide should show us what the revised disclosure will look like and identify the annual or quarterly filing, as applicable, in which you intend to first include it. If you do not believe that revised disclosure is necessary, please explain the reason in your response. After reviewing the information provided, we may raise additional comments and/or request that you amend your filing.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filing. We look forward to working with you in these respects. We welcome any questions you may have about our comments or any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

General

1. Please note that we intend to review the Part III information that you intend to incorporate by reference into your Form 10-K when filed. We may have further comments after reviewing that information and we will not be able to clear our review of your filing until we have the opportunity to resolve any resulting comments.

Item 1. Business

Strategic Alliances, page 21

2. We note that you have obtained the exclusive license to develop and commercialize Prochymal and Chondrogen from Osiris Therapeutics, Inc. Please revise your disclosure to identify the range of tiered royalties that Osiris is eligible to receive under your agreement (i.e. "between 5% and 10%" or "low single digits"), the duration of the agreement, and any termination provisions. In addition, please file this agreement as an exhibit or provide an analysis as to why it is not material and not required to be filed.

3. We note that you have entered into a license and collaboration agreement with PTC Therapeutics, Inc. for the development and commercialization of ataluren. Please revise your disclosure to identify the range of tiered royalties that PTC is eligible to receive under your agreement (i.e. "between 5% and 10%" or "low single digits"), the duration of the agreement, and any termination provisions. In addition, please file this agreement as an exhibit or provide an analysis as to why it is not material and not required to be filed.

Patents, License Agreements and Trademarks, page 24

4. We note that you disclose a number of licensed patents that you consider important to your business. We also note that you provide a general statement as to the terms of your license and collaboration agreements. Please revise your disclosure to identify the material terms of each of your material license or collaboration agreements. Please include the following information in your revised disclosure:
   a. The range of royalty percentage (i.e. "between 5% and 10%" or "low single digits") that must be paid under the agreement;
   b. The duration of the agreement, and
   c. Any termination provisions.

   Please also file your material license or collaboration agreements as exhibits or provide an analysis as to why they are not material and are not required to be filed.

Management's Discussion and Analysis of Financial Condition and Results of Operations

Strategic Transactions, page 47

5. We note that you have entered into agreements with Bayer Schering Pharma A.G. in relation to the licensed rights to alemtuzumab, Campath, Fludara, and Leukine.

Please revise your disclosure to identify the material terms of the Bayer agreements including the following information:

a. The percentage range of revenues (i.e. "between 5% and 10%" or "low single digits") that must be paid to Bayer on the sales of each product under your agreements;
b. The duration of the agreements; and
c. Any termination provisions.

In addition, please file the agreements underlying your transactions with Bayer as exhibits.

Inventories, page 57

6. If inventory capitalized prior to regulatory approval is material to net income, please disclose:
   a. The current status of the approval process, including any contingencies needed to be resolved prior to obtaining FDA approval, the risks affecting the probability of obtaining FDA approval, and the estimated timing of obtaining approval.
   b. The specific nature of any safety and efficacy, manufacturing, and marketing or labeling issues outstanding and why the Company does not believe those issues affect its probable future benefit conclusion.
   c. The remaining shelf life of each product, as of each balance sheet date presented, and why the Company believes it will be able to realize the inventory prior to the expiration of the shelf life.
   d. The risks and uncertainties surrounding market acceptance of the product once approved and how this will effect the realization of the asset.
   e. The current status of product related litigation such as patent infringement lawsuits and the nature of all contractual restrictions that must be satisfied prior to the sale of the product, if any. Management should include within that disclosure a robust analysis of the effect any lawsuit and/or contractual restrictions had or will have on their initial assessment that an asset existed as well as their ongoing assessment of the realizability of the capitalized inventory.
   f. The effects of build–up of pre-launch inventory balances on liquidity.

Revenues

Cardiometabolic and Renal, page 66

7. Your disclosure on page 24 appears to indicate that several patents will be expiring over the next few years. Additionally, you disclose that lower cost generic or follow-on products "will negatively impact the revenues we recognize from Renagel/Renvela and Hectorol". Please disclose in quantitative and

qualitative terms, within management's discussion and analysis, the impact that expirations of each of the materially important patents have had and will have on your results of operations and liquidity in the periods presented and in future periods.

Research and Development Programs, page 85

8. Refer to your tabular disclosure on page 87. The cost incurred for significant research and development programs accounts for 13% and 22% of total research and development costs capitalized as in-process research and development ($632.9 million in 2009) and charged to expense ($865.3 million in 2009 and $1,308.3 million in 2008) for 2009 and 2008, respectively. Please disclose your criteria for deeming a program significant. In your disclosure of costs incurred for 2008, 2009 and cumulative for the significant projects, disclose the amounts of costs capitalized as in-process research and development versus charged to research and development expense. For the remainder of research and development programs that you do not deem significant, summarize the number of programs and the amount capitalized as in-process research and development and charged to expense for each period by therapeutic class showing preclinical versus clinical, and provide an estimate of the nature, timing and cost to complete these programs.

Item 15. Exhibits, Financial Statement Schedules
(a)(1). Financial Statements
Notes to Consolidated Financial Statements
Note A. Summary of Significant Accounting Policies
Inventories, page 125

9. If inventory capitalized prior to regulatory approval is material to net income, please provide the following disclosures in the financial statements:
   a. For both inventory capitalized before regulatory approval and after regulatory approval, separate quantification of the total amount of inventory by category (e.g. raw materials, work in process and finished goods) and in total.
   b. A more detailed description in Note A of the accounting policy regarding capitalization of unapproved products, which specifically states the point during the regulatory approval process that management determines a probable future benefit exists and the status of the regulatory agency's consideration of the safety and efficacy of the drug and evaluation of the manufacturing process at that point.

* * *

Please provide us the information requested within 10 business days of the date of this letter or tell us when you will provide a response prior to the expiration of the 10-day period. Please furnish a letter with your responses that keys your response to our comments. Detailed letters greatly facilitate our review. You should furnish the letter on EDGAR under the form type label CORRESP.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing 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 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 your letter, a statement from the company acknowledging that:

- the company is responsible for the adequacy and accuracy of the disclosure in the filing;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filing; and
- the company 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 filing or in response to our comments on your filing.

You may contact Tabatha Akins, Staff Accountant (202) 551-3658 or Mary Mast, Senior Staff Accountant at (202) 551-3613 if you have any questions regarding the processing of your response as well as any questions regarding comments on the financial statements and related matters. Please contact Bryan Pitko, Attorney Advisor at (202) 551-3203 with questions on any of the other comments. In this regard, do not hesitate to contact me, at (202) 551-3679.

Sincerely,

Jim B. Rosenberg
Senior Assistant Chief
Accountant