

Mail Stop 4720

October 28, 2009

Kent Snyder
President & Chief Executive Officer
Senomyx, Inc.
4767 Nexus Centre Drive
San Diego, California 92121

**Re: Senomyx, Inc.
Form 10-K for the year ended December 31, 2008
Filed February 12, 2009
Schedule 14A filed April 20, 2009
File No. 000-50791**

Dear Mr. Snyder:

We have reviewed your supplemental response filed September 30, 2009 and have the following comments. Where the 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, 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 comment or on any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

Schedule 14A

Executive Compensation

Components of Executive Compensation Programs, page 21

Annual Performance-Based Bonus, page 21

1. Please refer to your response to Comment 1 regarding individual objectives. We note your argument that disclosure of the specific quantitative and qualitative terms of the individual goals for the company's performance-based 2009 cash bonuses is not material in view of the company's total executive compensation practices and philosophy. Please be advised that the purpose of the CD&A is to provide the reader with all material information that is necessary for an understanding of the registrant's compensation policies and decisions regarding its named executive officers. Please refer to Instruction 1 to Item 402(b) of Regulation S-K. We consider each element of the company's compensation policies and practices to be material.

Please provide us with draft disclosure for your 2009 proxy statement which provides the following:

- A discussion of the quantified terms of the individual objectives identified; and
- A discussion of how the level of achievement will affect the actual bonuses to be paid.

Please also confirm that you will disclose the level of achievement of these objectives.

* * *

Please respond to these comments within 10 business days or tell us when you will provide us with a response. Please provide us any requested information. Detailed cover letters greatly facilitate our review. Please file 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.

Kent Snyder
Senomyx, Inc.
October 28, 2009
Page 3

In connection with responding to our comments, please provide, in writing, 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.

Please do not hesitate to contact Rose Zukin at (202) 551-3239 or me at (202) 551-3715 if you have questions regarding the comments and related matters.

Sincerely,

Jeffrey Riedler
Assistant Director