

Mail Stop 4720

August 18, 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
Supplemental Response filed July 31, 2009
File No. 000-50791**

Dear Mr. Snyder:

We have reviewed your filing 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

1. We note your response to Comments 6 and 7 and reissue the Comments. Please provide us with proposed disclosure for your 2010 proxy statement which identifies:
 - The pre-set corporate objectives, their quantitative and qualitative terms and target percentages; and
 - The pre-set individual performance objectives, their quantitative and qualitative terms and target percentages.

Please discuss how the level of achievement of both corporate objectives and individual performance objectives factor into your determination of the annual incentive awards made to executive officers. Please note, we are not advising you to amend your prior executive compensation disclosure to include information relating to 2009. To the extent that you are concerned about the release of our correspondence, you may request confidential treatment pursuant to Rule 83. In order to do this, please file on EDGAR your supplemental response requesting confidential treatment under Rule 83, redacting the information you argue to be confidential. Please note that only those words, numbers and phrases for which confidentiality is necessary should be redacted. Further, an unredacted copy of your supplemental response requesting Rule 83 treatment must be mailed directly to the Staff.

Additionally, please note that in order to keep your performance metrics confidential pursuant to Instruction 4 to Item 402(b) of Regulation S-K you must submit an analysis supporting your conclusion that you are likely to suffer competitive harm if the information is disclosed. We are generally only willing to grant confidential treatment for performance goals if you can demonstrate how the disclosure of these goals will allow your competitors to discover information about break even points, cost structures relating to specific products or similarly sensitive information. In these instances, you must submit a detailed analysis, identifying the competitively harmful information and demonstrating how the information could be harmful to your company.

Kent Snyder
Senomyx, Inc.
August 18, 2009
Page 3

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.

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