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

DIVISION OF
CORPORATION FINANCE

June 7, 2013

Via E-mail
Martin P. Rosendale
Chief Executive Officer
Cytomedix, Inc.
209 Perry Parkway, Suite 7
Gaithersburg, MD 20877

Re: Cytomedix, Inc.
Post-effective amendment to Form S-3 on Form S-1
Filed May 20, 2013
File No. 333-183703

Dear Mr. Rosendale:

We have limited our review of your registration statement to those issues we have addressed in our comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter by amending your registration statement and providing the requested information. Where you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your registration statement and the information you provide in response to these comments, we may have additional comments.

Selling Security Holders, page 17

1. Please tell us whether any Cytomedix affiliates sold any securities registered for sale on this registration statement since March 17, 2013. If any such sales did occur, please provide us your analysis of why it was appropriate to use a registration statement Form for which, according to your "Explanatory Note," you were not eligible; for guidance, see the Division of Corporation Finance's Securities Act Forms Compliance and Disclosure Interpretation 114.04 available on the Commission's website.

Penny Stock, page 21

2. Please provide us your analysis supporting your conclusion that your stock currently is penny stock. Address in your analysis Rule 3a51-1(g). If your stock is not currently a penny stock but you meant to disclose that your stock was and may again be a penny

stock, please revise your references to penny stock throughout your document to clarify. If your stock is a penny stock, please remove from your filing references to the statutory safe harbor that is not available to penny stock issuers; we note for example the second sentence on page 22.

Financial Statements

3. Please provide us your analysis supporting your conclusions regarding which Cytomedix fiscal years are required to be presented in the financial statements included in this registration statement. Cite all authority on which you rely.

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 the information the Securities Act of 1933 and all applicable Securities Act rules require. 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.

Notwithstanding our comments, before we can declare the amended registration statement effective, the company should provide us with a letter, acknowledging that:

- should the Commission or the staff, acting pursuant to delegated authority, declare the filing effective, it does not foreclose the Commission from taking any action with respect to the filing;

- the action of the Commission or the staff, acting pursuant to delegated authority, in declaring the filing effective, does not relieve the company from its full responsibility for the adequacy and accuracy of the disclosure in the filing; and

- the company may not assert staff comments and the declaration of effectiveness as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

Please contact Tom Jones at (202) 551-3602 or me at (202) 551-3617 with any questions.

Sincerely,

/s/ Russell Mancuso

Russell Mancuso
Branch Chief

cc (via e-mail): F. Alec Orudjev, Esq.