



DIVISION OF  
CORPORATION FINANCE

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

June 28, 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 June 25, 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. Regarding your response to prior comment 1, we note that you mention that no Cytomedix affiliates sold securities registered for sale on this registration statement after your notice. However, it is unclear when you provided the notice. Therefore, please tell us directly whether any Cytomedix affiliates sold any securities registered for sale on this registration statement since March 17, 2013.

Exhibit 5.1

2. The third paragraph of this exhibit appears to omit counsel's opinion on the shares mentioned in clause (ii) of the exhibit's first paragraph. Please file an opinion that addresses all securities registered for sale on the registration statement.

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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.