



DIVISION OF
CORPORATION FINANCE

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

October 19, 2011

Via E-mail

Andrew S. Maslan
Chief Financial Officer
Cytomedix, Inc.
209 Perry Parkway, Suite 7
Gaithersburg, MD 20877

**Re: Cytomedix, Inc.
Post-Effective Amendment No. 2 to Form S-1
Filed October 4, 2011
File No. 333-170747**

Dear Mr. Maslan:

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.

Item 16. Exhibits and Financial Statement Schedules, page 96

1. Please tell us why your filing does not include the interactive data file exhibit required by Regulation S-K Item 601(b)(101).

Signatures, page 100

2. Please amend your filing to include the signature of the principal executive officer below the second paragraph of the Signature Page in accordance with the requirements of Form S-1.

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

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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.

You may contact Aslynn Hogue at (202) 551-3841 or Jay Mumford at (202) 551-3637 with any questions.

Sincerely,

/s/ Jay Mumford for

Russell Mancuso
Branch Chief

cc (via e-mail): F. Alec Orudjev, Esq. — Cozen O'Connor