



DIVISION OF
CORPORATION FINANCE

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

September 27, 2012

Via E-mail

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

**Re: Cytomedix, Inc.
Registration Statement on Form S-3
Filed August 31, 2012
File No. 333-183704**

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 statements 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.

Form S-3 Facing Page

1. As this registration statement relates to a shelf offering, please revise the facing page to reflect that the approximate date of commencement of the proposed sale to the public is from time to time after the effective date of this registration statement. Currently the disclosure indicates that you plan to commence the offering *both* "as soon as practicable" and "from time to time."

Calculation of Registration Fee

2. Refer to footnote (1) to the fee table. It is not appropriate to state in a footnote to the fee table that you are registering an indeterminate amount of securities that underlie other securities. The underlying securities must be included in the fee table. Although the number of the underlying securities need not be determined at the time of effectiveness, as the underlying securities are offered and sold, they should be counted against the dollar

amount of the securities remaining on the registration statement as required by Rule 457(i). Please revise footnote (1) accordingly.

About Cytomedix, page 1

3. Please revise your Summary to highlight your current financial position, including quantified disclosure of your history of net losses, accumulated deficit, and substantial indebtedness, as well as your audit report containing an explanatory paragraph that substantial doubt exists as to your ability to continue as a going concern. Please also quantify the amount of cash that you are spending per month and how long your present funds will last at your current monthly rate. Finally, please also disclose any liquidity sources and what your capital needs will be for the near term.

Risk Factors, page 2

4. Please revise to eliminate the third sentence of the italicized introductory paragraph and revise as necessary to include a discussion of all material risks in your risk factor section.

We may need substantial additional financing..., page 2

5. We note your disclosure that you have registered over 12 million shares for sale by Lincoln Park Capital pursuant to an equity line financing arrangement that ends in January 2013. Here and elsewhere in your document, as appropriate, please revise to quantify the number of these shares that remain unsold.

Description of Debt Securities, page 18

6. We note the disclosure in the third paragraph of this section that you will issue senior debt securities under a senior indenture and subordinated debt securities under a subordinated indenture; however, you have filed only one form of indenture as exhibit 4.3. Please file as exhibits both the indentures pursuant to which you will issue debt securities.

Guarantees, page 20

7. We note your disclosure here and on page 19 that any debt securities may be guaranteed by your subsidiaries; however, the guarantees have not been included in the fee table or disclosed on the prospectus cover page, and the guarantors have not filed this registration statement as co-registrants. Please advise or revise.

Incorporation of Documents by Reference, page 29

8. We note your statement that you are forward incorporating by reference certain filings made “after the date of filing of this registration statement, and until all of the common stock to which this prospectus relates has been sold or the offering is otherwise

terminated.” It is unclear why you have limited forward incorporation by reference only until the completion of the sale of common stock when you have also registered other securities besides common stock. Please revise to clarify that you are incorporating by reference until all of the securities to which the prospectus relates have been sold.

Signatures

9. Please revise to indicate below the second paragraph of text required on the signature page who is signing in the capacity of controller or principal accounting officer. Refer to Instruction 1 to Signatures on Form S-3.

Exhibit 5.1

10. We note from the penultimate paragraph of the opinion that the opinion is limited to Delaware and federal law. However, you have disclosed under “Governing Law” on page 24 of the prospectus that the indenture(s) and debt securities will be governed by New York law. Please file an opinion which encompasses New York law to the extent necessary to cover the indenture(s) and debt securities.
11. We note the last sentence of the penultimate paragraph of the opinion. Please confirm that at the time of each takedown of securities from this registration statement, you will provide an opinion of counsel covering the issued securities that does not contain inappropriate assumptions or qualifications. For guidance, please refer to Section II.B.2.a of Staff Legal Bulletin No. 19, available on the Commission’s website.
12. Please file an opinion that does not contain the limitations on reliance contained in the last two sentences of the opinion. For guidance, please refer to Section II.B.3.d of Staff Legal Bulletin No. 19, available on the Commission’s website.

Exhibits 23.1, 23.2 and 23.3

13. We reference the disclosure in Exhibit 23.2 that the copy of the audit report in the Form 10-K includes a typographical error in the date. Please amend your December 31, 2011 Form 10-K incorporated by reference in this Registration Statement to include an audit report with the correct date. Please also have your auditors remove the language related to the error in their audit report in the updated consent.
14. To the extent there is a delay in requesting effectiveness of your registration statement, or there is any change, other than typographical, made to the financial statements, or there have been intervening events since the prior filing that are material to the company, please provide currently dated and signed consents from your independent accountants with your next amendment.

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, in the event you request acceleration of the effective date of the pending registration statement please provide a written statement from the company 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 refer to Rules 460 and 461 regarding requests for acceleration. We will consider a written request for acceleration of the effective date of the registration statement as confirmation of the fact that those requesting acceleration are aware of their respective responsibilities under the Securities Act of 1933 and the Securities Exchange Act of 1934 as they relate to the proposed public offering of the securities specified in the above registration statement. Please allow adequate time for us to review any amendment prior to the requested effective date of the registration statement.

You may contact Julie Sherman at (202)-551-3640 or Brian Cascio, Accounting Branch Chief, at (202)-551-3676 if you have any questions regarding comments on the financial statements and related matters. Please contact Tom Jones at (202) 551-3602 or Mary Beth Breslin, Senior Attorney, at (202) 551-3625 with any questions.

Sincerely,

/s/ Mary Beth Breslin for

Amanda Ravitz
Assistant Director

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