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

DIVISION OF
CORPORATION FINANCE

January 10, 2014

Via E-mail
Christopher G. Chavez
Chief Executive Officer
TriVascular Technologies, Inc.
3910 Brickway Blvd.
Santa Rosa, CA 95403

Re: TriVascular Technologies, Inc.
Draft Registration Statement on Form S-1
Submitted December 16, 2013
CIK No. 0001432732

Dear Mr. Chavez:

We have reviewed your registration statement and have the following 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 providing the requested information and either submitting an amended draft registration statement or publicly filing your registration statement on EDGAR. If 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 the information you provide in response to these comments and your amended draft registration statement or filed registration statement, we may have additional comments.

Overview, page 1

1. Please clarify what you mean by "leveraging proven engineering concepts from other industries." Specify the concepts and industries to which you are referring and briefly explain how the concepts are "proven."

2. Where you make comparisons between your device and "conventional devices," such as in the first and second paragraphs of this section, please specify the conventional devices to which you are referring. Also disclose the basis for your beliefs that your technology addresses "many of the limitations associated with conventional EVAR devices" and treats "a broader population of patients."

3. Please revise your disclosure, here and in the Business section, to state briefly the basis for your beliefs that your device is "new generation" or "next generation," and allows for patients to be treated "less invasively, more efficiently, and potentially more cost-effectively."

4. Where you make claims in your Summary and elsewhere in your document regarding the efficacy of your device, please revise to state that the longest-term available clinical data from your pivotal clinical trial is four years, as disclosed on page 12.

5. In the third paragraph where you mention your revenues and net losses for the year ended December 31, 2012 and the nine month period ended September 30, 2013, please also disclose your accumulated deficit as of those periods. Please also disclose that your auditor has included an explanatory paragraph in its audit report as to the existence of doubt as to your ability to continue as a going concern.

The Market—AAA Disease, page 2

6. Please provide objective third party support for each place where you discuss the characteristics or statistical data regarding your industry and provide us with copies of the industry reports and research studies cited throughout your prospectus, clearly marked to support references made therein. Please also tell us whether you commissioned any of this data.

7. Please tell us whether your products can address the entire market for abdominal aortic aneurysm stent grafts that you cite here, and on page 55. If not, please tell us why you believe it is appropriate to highlight this information in your prospectus.

8. Where you highlight the size of your market opportunity in the Summary, please balance this disclosure by indicating, if true, that a small portion of that market is represented by people who have been diagnosed with abdominal aortic aneurysm disease, and that only a portion of the diagnosed population is treated for the disease. In this regard, we note your risk factor disclosure on page 11 regarding the United States patient population figures.

Our Solution—The Ovation System, page 3

9. Please tell us whether there are any devices available from your competitors that also contain some or all of the advantages contained in this section.

Jumpstart Our Business Startups Act of 2012 (JOBS Act), page 5

10. Please tell us when, relative to circulating a preliminary prospectus, you will decide the exemptions and reduced reporting requirements of the JOBS Act on which you plan to rely.

11. Please supplementally provide us with copies of all written communications, as defined in Rule 405 under the Securities Act, that you, or anyone authorized to do so on your behalf, present to potential investors in reliance on Section 5(d) of the Securities Act, whether or not they retain copies of the communications. Similarly, please supplementally provide us with any research reports about you that are published or distributed in reliance upon Section 2(a)(3) of the Securities Act of 1933 added by Section 105(a) of the Jumpstart Our Business Startups Act by any broker or dealer that is participating or will participate in your offering.

The Offering, page 6

12. Please tell us when the reverse stock split will be effective.

Use of Proceeds, page 32

13. Please disclose the approximate amount of the proceeds currently intended to be used for each purpose that you mention in the last sentence of the third paragraph of this section. If material amounts of other funds are necessary to accomplish the purposes cited – such as repayment of your promissory note to Boston Scientific Corporation or term loan to Capital Royalty Partners, or completion of the research and development and clinical testing mentioned on pages 40 and 42, please state the amount and sources of such other funds; see instruction 3 to Regulation S-K Item 504.

Capitalization, page 34

14. Please revise to remove the caption relating to cash and cash equivalents from the presentation of capitalization.

15. We note the disclosures here and throughout the filing that there are 36,625,054 shares of common stock issuable upon the exercise of options to purchase your common stock outstanding as of September 30, 2013 at a weighted average exercise price of $0.11 per share. Please reconcile this with your disclosures on page F-30 which disclose 62,867,302 outstanding stock options at a weighted average exercise price of $0.10 per share.

Comparison of Nine Months Ended September 30, 2013 and 2012, page 43

16. With respect to your increased international revenue during the period, please revise to specify the markets in which you commenced selling your products and the markets that were more deeply penetrated. To the extent possible, please quantify the portion of the increase attributable to each of these factors.

Cost of Goods Sold, Gross Profit and Gross Margin, page 43

17. We see that $8,736,000 of cost of goods sold resulted in a positive margin, unlike prior periods, which had negative gross margins. We also note that in your Consolidated Statement of Cash Flows you provide a negative $1,399,000 item for the provision for excess and obsolete inventory to reconcile net loss to net cash used in operating activities. It appears that this provision would have had a significant impact on your cost of goods sold and gross margins. Please tell us more about this provision. Also, please discuss in your MD&A all material factors that impact your gross margin. For further guidance, please refer to Item 303 and the related instructions in Regulations S-K as well as SEC Interpretive Release No. 33-8350.

Intellectual Property, page 69

18. Please tell us the expiration dates of your material patents.

19. Please clarify the terms of your intellectual property agreements, mentioned in the third paragraph of this section, including a description of the agreements' duration, importance to your business, and material termination provisions.

Legal Proceedings, page 74

20. Please tell us why you believe the legal proceeding discussed in the first paragraph of page F-35 does not need to be disclosed in this section.

Certain Relationships and Related Party Transactions, page 93

21. We note your disclosure on page 97 that you extended loans to certain executive officers in connection with the early exercise of stock options and for relocation-related expenses. Please provide disclosure pursuant to Item 404 of Regulation S-K regarding these transactions or tell us why you do not believe they are required to be disclosed, citing all legal authority on which you rely. Refer to Instruction 1 of Item 404. From the disclosure on pages F-19 and F-20, it appears that these transactions exceeded the threshold set forth in Item 404(a) and should be disclosed.

Compensation Arrangements, page 97

22. Please file any exhibits relating to this section which are required by Item 601(b)(10)(iii) of Regulation S-K.

Forum Selection, page 104

23. We note your disclosure entitled Forum Selection on page 104. Several lawsuits are currently challenging the validity of choice of forum provisions in certificates of

incorporation. Please disclose that although you have included a choice of forum clause in your restated certification of incorporation, it is possible that a court could rule that such provision is inapplicable or unenforceable.

Consolidated Financial Statements, page F-1

Consolidated Statements of Comprehensive Loss, page F-4

24. We note the weighted average shares used to compute net loss per share for the years ended December 31, 2011 and 2012 and the nine months ended September 30, 2013. Please reconcile these shares with the shares issued and outstanding according to the consolidated balance sheets on page F-3 and the consolidated statements of convertible preferred stock and stockholders' deficit on page F-5.

Note 14. Equity Incentive Plan, page F-29

25. Please note that we will delay our final assessment of stock based compensation pending inclusion of the estimated IPO price in the filing.

If you intend to respond to these comments with an amended draft registration statement, please submit it and any associated correspondence in accordance with the guidance we provide in the Division's October 11, 2012 announcement on the SEC website at http://www.sec.gov/divisions/corpfin/cfannouncements/drsfilingprocedures101512.htm.

Please keep in mind that we may publicly post filing review correspondence in accordance with our December 1, 2011 policy (http://www.sec.gov/divisions/corpfin/cfannouncements/edgarcorrespondence.htm). If you intend to use Rule 83 (17 CFR 200.83) to request confidential treatment of information in the correspondence you submit on EDGAR, please properly mark that information in each of your confidential submissions to us so we do not repeat or refer to that information in our comment letters to you.

You may contact Dennis Hult at (202) 551-3618 or Lynn Dicker, Reviewing Accountant, at (202) 551-3616 if you have questions regarding comments on the financial statements and related matters. Please contact Ted Moskovitz at (202) 551-3689 or Mary Beth Breslin, Senior Attorney, at (202) 551-3625 with any other questions.

Sincerely,

/s/ Mary Beth Breslin for

Amanda Ravitz
Assistant Director

cc (via e-mail): Michael Rosenthall, Arnold & Porter