**Editorial comments:**  
  
1. The editor has formatted the manuscript to match the journal's style. Please retain the same.

*Author response: Thank you for the formatting. We have retained the formatting in the document.*

2. Please address all the specific comments marked in the manuscript.

*Author response: We have made changes to the manuscript to address all the specific comments marked in the manuscript.*

*Lines 34-37: We have rephrased the summary to be less than 50 words.*

*Lines 105-106: We have removed commercial language – “ibidi”. The use of this language was intended to address a specific reviewer comment that asked about these systems and we have tried to include general comments without commercial language that address the reviewer comment.*

*Lines 121, 125, 623, 629, 1320, 1321, 1378, 1396, 1398, 1401, 1413, 1437: We have converted dynes/cm2 to S.I. units. Line 623: We have included the conversion of S.I. units Pa to dynes/cm2 to facilitate unit conversion that is used in flow rate formulas or other manuscripts.*

*Line 166: We agree that a note is appropriate.*

*Line 168: We have re-organized this text to improve clarity of the steps.*

*Line 258: We have removed highlighting to keep the script within the length limits.*

*Line 268: We have removed highlighting to keep the script within the length limits.*

*Line 409: We have re-organized this section to improve the clarity of the steps.*

*Line 428: We have clarified the language to indicate a glass slide.*

*Line 440: We have re-organized this section to reflect the editor’s suggestions and avoid redundant sentences.*

*Line 569: We have removed the commercial language “Oligofectamine”.*

*Line 638, 1311: We have removed quotation marks as this is not a citation. It is a short form referring to our specific environment and set-up built for experiments involving laminar flow.*

*Line 687: We have moved the list of autoclaved materials to Table 2.*

*Line 1224, 1296: We have removed highlighting for steps that involve calculations.*

3. Presently the protocol is more than 10 pages. Please reduce the protocol length to fit in 10 pages max (hard cut limit) including heading and spacings. Please do not use redundant sentences. Also please remove the list of equipment autoclaved and make a separate table for this.

*Author response: We have reduced the length of the protocol to fit in 10 pages. We have removed the list of equipment autoclaved and made a separate table (Table 2) to refer to these items.*

4. The highlighted text does not form a cohesive story. Also please remember that if you highlight a step, please highlight subsequent steps stating how the protocol is performed. Please ensure that the highlight is no more than 2.75 pages including heading and spacings.

*Author response: We have amended our highlighted text to form a more cohesive story. We have focused the highlighted text on steps that are more specific to our use of endothelial cells in this setting and that include elements that are unique to our protocol. As such, we have included the cell seeding, and method of cell harvesting for RNA from endothelial cells, as well as our particular environment used for running multiple concurrent laminar flow experiments and the set-up of our flow monitors.*

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*Author response: All the illustrations in this manuscript are original artwork made for this manuscript. We have adapted the data for Figure 4 for this manuscript and cited in the figure legend Line 415. The figure itself is original for this JoVE manuscript. This link (*[*http://www.pnas.org/page/authors/licenses)*](http://www.pnas.org/page/authors/licenses)) *to the editorial policy outlines the journal’s policy on use of materials.*

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