

## Supplemental Material

### Supplemental Tables

Primer sequences of human glyceraldehydes-3-phosphate dehydrogenase (GAPDH), human collagen type I alpha 2 (COL1A2), human vascular endothelial-cadherin (CDH5/VE-Cadherin), human alpha-smooth muscle actin ( $\alpha$ -SMA); actin alpha 2 (ACTA2), human Snail, human vascular cell adhesion molecule-1 (VCAM-1) and human intercellular adhesion molecule-1 (ICAM-1).

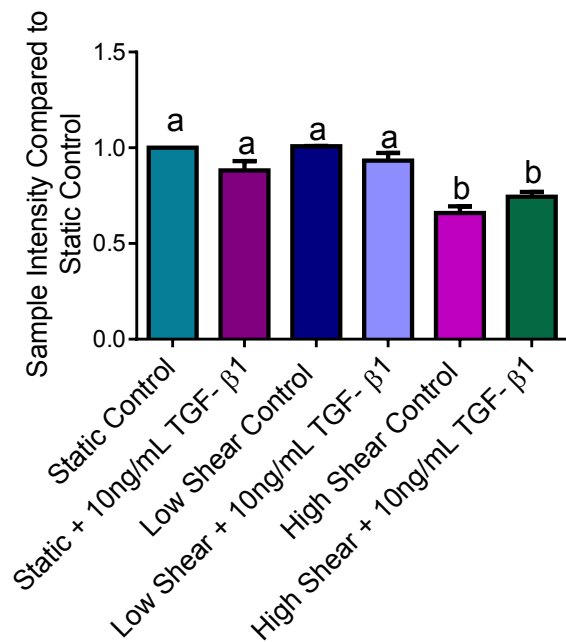
**Table 1. Primer sequences**

| Gene                                  | Forward Primer         | Reverse Primer         | References                              |
|---------------------------------------|------------------------|------------------------|-----------------------------------------|
| <b>HU GAPDH</b><br><b>Housekeeper</b> | GACCACAGTCCATGACATCACT | TCCACCACCCTGTTGCTGTAG  | Tallkvist et al.<br>(2000) <sup>1</sup> |
| <b>HU COL1A2</b>                      | AGGACAAGAACACGTCTGG    | GGTGATGTTCTGAGAGGCATAG | Wang et al.<br>(2014) <sup>2</sup>      |
| <b>HU CDH5/</b><br><b>VE-cadherin</b> | CAGCCCAAAGTGTGTGAGAA   | CGGTCAAAGTCCCCATACTT   | Cheng et al.<br>(2013) <sup>3</sup>     |
| <b>HU ACTA2</b>                       | GTGCTGGACTCTGGAGATGG   | AATAGCCACGCTCAGTCAGG   | Liew et al. (2006) <sup>4</sup>         |
| <b>HU Snail</b>                       | CTAGAGTCTGAGATGCCCCG   | CTAGAGTCTGAGATGCCCCG   | Franses et al.<br>(2013) <sup>5</sup>   |
| <b>HU VCAM-1</b>                      | CATGGAATTCGAACCCAAA    | CCTGGCTCAAGCATGTCATA   | Calabriso et al.<br>(2015) <sup>6</sup> |
| <b>HU ICAM-1</b>                      | AGACATAGCCCCACCATGAG   | CAAGGGTTGGGGTCAGTAGA   | Calabriso et al.<br>(2015) <sup>6</sup> |

|                                         | Static        |               | Low Shear     |               | High Shear    |               |
|-----------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                         | -TGF- $\beta$ | +TGF- $\beta$ | -TGF- $\beta$ | +TGF- $\beta$ | -TGF- $\beta$ | +TGF- $\beta$ |
| $\alpha$ -SMA protein expression        | +             | +             | +             | +             | -             | -             |
| $\alpha$ -SMA gene expression           | -             | -             | -             | +             | -             | -             |
| VE-cadherin gene expression             | -             | -             | -             | -             | -             | -             |
| Snail gene expression                   | -             | -             | -             | -             | +             | -             |
| VCAM-1 gene expression                  | -             | -             | +             | +             | -             | -             |
| ICAM-1 gene expression                  | -             | -             | -             | -             | -             | -             |
| HUVEC Invasion                          | -             | -             | -             | +             | -             | -             |
| Cell-cell junctional gap width increase | -             | +             | +             | +             | -             | -             |
| COL1A2 gene expression (fibrosis)       | +             | +             | -             | -             | -             | -             |
| Collagen type I production              | +             | +             | -             | +             | -             | -             |

**Table 2.** Full summary of endothelial to mesenchymal transformation (EndMT) study results. Symbols depict regulation of human umbilical vein endothelial cells (HUVEC) behavioral changes when exposed to static conditions, low at 1 or (c) high at 20 dynes cm<sup>-2</sup> shear flow with and without transforming growth factor-beta 1 (TGF- $\beta$ 1). Conditions with (-) sign represent no significance, (+) show significant upregulation among conditions compared to static condition without TGF- $\beta$ 1 exposure.

## Supplemental Figure and Figure Legends



**Fig. 1.** Protein expression analysis of alpha-smooth muscle actin ( $\alpha$ SMA) and endothelial to mesenchymal (EndMT) marker. Error bars show SEM,  $n = 5$  confocal images. Bars that don't share any letters are significantly different according to a one-way ANOVA with Tukey's post-hoc testing ( $P < 0.05$ ).

## Supplemental Video and Video Legends

Supplemental Video 1: Microbeads flowing at the bottom wall of microchannel over collagen gel.

## Reference

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