**Supplementary Figures**

**An ex vivo Vessel Injury Model to Study Remodeling**

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**Supplementary Figure 1.** Negative control for IF staining. For negative control (A and C), secondary antibodies were applied without incubating samples with primary antibodies.
Supplementary Figure 2. A. Intact rat aorta. B and C, Vessel injury, including gentle denudation (B) and medial injury (C) successfully removed the native EC layer of intact rat aortas. Neointimal-like cell layer on luminal surface (white arrows) forms after 7 days of culture, and these neointimal cells do not stain vWF (D). Scale bar: 100 µm.

Supplementary Figure 3. Gently denuded rat aortas cultured with high serum, statically, for 4 (A) and 7 (B) days. Unlike medially-injured rat aortas, medial proliferation is not observed even with 30% FBS in culture media. Scale bar: 100 µm.
**Supplementary Figure 4.** H&E (A) and CD31/αSMA (B) stain in medially-injured and HUVEC-seeded human umbilical arteries after 7 days of static culture. Unlike the HUVEC-seeded umbilical arteries that are cultured with arterial flow, excessive dilation and SMC death is not observed after static culture. Scale bar: 100 μm.
**Supplementary Figure 5.** Intact rat aorta (A, D, G), gently-denuded and HUVEC-seeded rat aorta (B, E, H), and injured and HUVEC-seeded rat aortas were cultured with 20 cm$^2$/dyne shear stress in bioreactors for 7 days. Ki67 and TUNEL stain shows that combination of ECs and arterial flow causes SMC death only in injured rat aortas. Scale bar: 100 μm.