

Abstract Submitted
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Measuring morphological response of endothelial cells in shear flow CHIAMIN LEONG, RPI, GARY NACKMAN, RWJ Medical School, TIMOTHY WEI, RPI — The normal physiological endothelial cell response to hemodynamic loadings can be categorized into morphological and biological responses. Cell morphological response includes changes in shape, size, height, and orientation. Cells sense mechanical stimuli and transduce them into chemical signals involving gene and protein expression, mechanotransduction. Abnormal endothelial response has been implicated in the localization of arterial disease like atherosclerosis. Though mechanotransduction involves a coupled (*i.e.* morphological and biological) process, to date many investigations into endothelial cells are still done in the decoupled way. The ultimate goal of our study is simultaneous flow and biological measurements to better understand arterial disease at the cellular and sub-cellular level. *In vitro* μ PIV measurements have been made in steady flow over live human aortic endothelial cells flush-mounted in a small rectangular channel. Cells are subjected to a step change in shear stress from zero to 15 dynes/cm². Cell surface maps, surface pressure, and wall shear stress are extracted from measurements taken 0, 3, 6, 12, 18, and 24 hours after applying shear. This work has laid a framework for future simultaneous measurements.

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