

Abstract Submitted
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In vitro measurements of pulsatile flow over endothelial cells CHIA MIN LEONG, TIMOTHY WEI, RPI, GARY NACKMAN, Univ. of Medicine & Dentistry of NJ — Alterations in mechanotransduction by endothelial cells to underlying smooth muscle cells is a key factor in human arterial diseases such as atherosclerosis and intimal hyperplasia. The goal of this study was to determine the relative importance of the spatially and temporally varying pressure field over the cells relative to the local wall shear stress under different flow conditions. In vitro high resolution micro-PIV measurements were made over cultured endothelial cells flush mounted in a small rectangular channel. Using multiple measurement planes, local surface height, surface pressure, and wall shear stress could be extracted from the measurements. For the steady laminar flow case, data clearly indicate that surface pressure is on the order of wall shear. A comparison of the steady flow case with a pulsatile flow case will also be reported. Consequently, the total stress tensor acting on ECs needs to be considered in examining bio-chemical activity in vascular diseases.

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