Abstract Submitted
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Simultaneous measurement of flow over and transmigration through a cultured endothelial cell layer[1] LORI LAMBERT, University of Nebraska - Lincoln, IRAKLIS PIPINOS, TIMOTHY BAXTER, JASON MACTAGGART, DEREK MOORMEIER, KENNETH BAYLES, University of Nebraska Medical Center, TIMOTHY WEI, University of Nebraska - Lincoln — The measurement and analysis of fluid forces on endothelial cells at the cellular and subcellular levels is an essential component of understanding mechanotransduction and atherogenesis. The ultimate goal of this study is to examine and model the transport and transmigration of low-density lipoproteins across a confluent endothelial layer as a function of fluid loading and time. In this study, steady flow over a cultured endothelial cell layer at shear rates up to 20 dynes/cm^2 in a 350 μm x 70 μm cross section mircrochannel was measured using μPTV measurements. By using multiple measurement planes parallel to the channel wall, wall shear stress and wall pressure were computed as well as the endothelial cell topography. The study was performed over a period of 18 hours in which the transport and transmigration of fluorescently tagged low-density lipoproteins through a cultured endothelial cell layer were examined as a function of fluid forces, cell topography, and time.

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