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Online Proceedings

POSTER SESSION 3

Commons East, Easel 84

2:30 PM to 4:00 PM

Characterization of Vascular Permeability in Heterogeneous Endothelial Cell Monolayers

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Vessels of different organs have heterogeneous permeability to serve distinct physiological functions. Differences in basal vascular permeability may result from heterogeneity in the endothelial cells that line the vessel walls, which are influenced by many factors—including differences in the complexity of cell-cell junctions and the expression of various diaphragms that span the cell body. In addition, many diseased states are often associated with elevated levels of permeability, including viral hemorrhagic fever and tumor-induced angiogenesis. To understand such fundamental heterogeneity of the blood vessels and further investigate the change of vascular structure and function in disease scenarios, we characterized the permeability of endothelial cells harvested from different areas of the body. Human primary cells—including endothelial cells from various organs and epithelial cells from the proximal tubules of the kidney (PTECs)—were seeded on gelatin-coated transwells. We measured transendothelial electrical resistance (TEER) using a Millicell ERS Voltohmmeter, and determined solute permeability by tracking the perfusion of fluorescent dextran across the cell monolayer over time. Immunostaining was performed to observe monolayer formation, while transmission electron microscopy (TEM) was utilized to observe ultrastructure. Preliminary TEM images demonstrate distinct morphological differences between endothelial cell types, specifically in the complexity of cell-cell junctions. Investigations into the impact of these morphological differences on vascular permeability are ongoing, and a definitive conclusion will be made upon the study's completion.