

Engineering Microvascular Networks for Mechanotransduction  
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The Polacheck lab has engineered vascular networks in microfluidic devices by combining human umbilical vein endothelial cells (HUVEC) and human lung fibroblasts (HLF) in 3D fibrin hydrogels. However, microvasculature formed using this method produced vessels that were sparse, thin, and not perfusable due to a lack of patent lumens. A major contributor to this lack of function is thought to be fibrin hydrogel degradation due to HLF-mediated proteolysis contractile forces. Preliminary work suggests that limiting contact between HLFs and HUVECs results in better network morphology and hydrogel integrity. The aim of my project is to investigate why limited contact between the two cell types results in improved network topology and function and work towards creating more controlled microvascular networks that could eventually be implanted.