Vascular Endothelial Growth Factor (VEGF) Expression of Retinal Pigment Epithelium (RPE)

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Age-related macular degeneration (AMD) is the leading cause of permanent vision loss in developed nations, characterized by a detached retina and currently has no cure. Overexpression of vascular endothelial growth factor (VEGF) has been found to be an important biomarker in this disease. Retinal pigment epithelium (RPE) are the primary retinal source of VEGF and also express VEGF receptors. By studying the effect of different substrates on VEGF expression in RPE cells, an in vitro model can be created to understand how VEGF leads to vascular atrophy and deterioration in the eye. In this experiment, 12-well plates were coated with Polydimethylsiloxane (PDMS), PDMS treated with O2 plasma, or Fibronectin. Blank wells made of Polystyrene were either treated with O2 plasma or left untreated. Cells were grown on the substrates and a VEGF enzyme-linked immunosorbent assay (ELISA) was used to measure VEGF. Statistical analysis showed a significant difference between VEGF expression between hydrophilic substrates (Fibronectin and O2 treated surfaces) and hydrophobic surfaces. Hydrophobic surfaces had higher VEGF expression and made it more difficult for cells to attach. VEGF expression seems to be influenced by cell adhesion. This initial study showed feasibility for follow-up research to systematically examine the effect of surface and surface patterning on VEGF expression

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