Analysis of the Interplay Between Vascular Sprouting and Tumor Spheroids

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Green ➔ Endothelial Cells
Red ➔ Melanoma Cells
Background

- Angiogenesis is the process by which blood vessels sprout and form new networks (Figure 1).1
- Tumors promote and manipulate this process to become vascularized, gain nutrients, grow, and metastasize (Figure 2).2

Methods

Goal 1: I will create a new protocol to model tumor angiogenesis in three dimensions by coating human umbilical vein endothelial cells (HUVECs) on protein beads and co-culturing them with melanoma spheroids (Figure 3).

Goal 2: I will analyze and characterize vascular sprouting in a matrix in the presence and absence of tumor cells utilizing immunofluorescence and live imaging techniques.

Results

Goal 1

• I optimized my assay so that tumor spheroids and HUVECs sprout in fibrin, supplemented with growth factors from fibroblasts.
• I stained and imaged them using confocal microscopy (Figure 4A, 4B).

Goal 2

• My initial analysis showed HUVEC apoptosis (cell death) in the proximity of melanoma cells, as well in direct cell-cell contact with melanoma cells (Figure 5A, 5B).
• I will continue to optimize my protocol and analyze vascular sprouting, as well as utilizing improved methods for staining in confocal microscopy.

Figure 4

Figure 5. Melanoma cells (red). HUVECs (green).