Current treatments and diagnosis of triple negative breast cancer are not effective because of triple negative protein expression, meaning it lacks the main receptors targeted in cancer treatments. By analyzing the shape descriptors of breast cancer cells, a deeper understanding can be obtained of the influence of the tumor microenvironment on breast cancer. Through the study of the morphological changes of the cells, and by focusing on the area, aspect ratio, circularity and protrusiveness. We aim to understand how the tumor microenvironment will influence the progression of breast cancer.

**Methods**

The tumor region (red) is encapsulated with SUM159 triple negative breast cancer cells. The stromal region (green) introduces immune cells and cancer associated fibroblasts. While the media region (white) houses the cell culture medium.

**Experimental Setup**

To obtain a higher resolution of the cells from the microscopic images, max stack analysis was performed utilizing the Z-project tool within ImageJ. The image was divided into three channels and assigned different colors for the cell body and nucleus. The morphological features were hand traced using the freehand tool and uploaded to create a mask. Upon creating the mask, using the particle analyzer plugin, shape descriptors were quantified across each condition.

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**Results**

Tri-Culture has varying significance in circularity because the data was analyzed with both cancer cells and macrophages. Analysis was done with three replicates for each stromal condition.