# A 3D tissue model for evaluating lymphovascular invasion of breast cancer cells

Duke LICENSING & VENTURES

## Value proposition

Tissue engineering is an emerging market expected to witness significant growth over the next few years, with a CAGR of approximately 34.9%. There are many applications of tissue engineering, including the development of tools for studying cellular processes and screening of potential therapeutic agents. These systems combine the high-throughput nature of two-dimensional models but also consider the spatially-relevant cell-to-cell and cell-to-matrix interactions afforded by in vivo testing. Consequently, *in vitro* engineered tissue models will likely be an essential component of next generation drug screening methodologies.

## Technology

Dr. Devi has developed a 3D tissue model for studying and testing therapies that target lymphovascular invasion (LVI) of inflammatory breast cancer cells. LVI is an incompletely understood process of several types of cancers; however, it has been linked to the ability of tumor cells to escape immunological rejection – a hallmark of cancer. This system overcomes several of the disadvantages of testing LVI in mouse models, which is limited by a lack of appropriate models, their resource-intensive nature, and an inability to effectively study human tissues. In Dr. Brown's model, lymphatic endothelial cells from a patient are plated onto a permeable membrane and coated with a collagen hydrogel layer to simulate interstitial tissue. A perfusion pump is utilized to mimic interstitial fluid and lymph flow. Tumor cell emboli are then placed into the transwell chamber, and invasion beyond the LEC layer can be easily assessed. Using this system, potential therapeutic agents targeting LVI can be evaluated in a high-throughput manner.

## Advantages

3D tissue models enable the high throughput, *in vitro* evaluation of therapeutic agents in a manner that considers the important cell-to-cell and cell-to matrix interactions that occur in living tissues.

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