

DEVICE FOR HIGH THROUGHPUT INVESTIGATIONS OF CELLULAR INTERACTIONS

ABSTRACT

Provided herein are microfluidic devices that can be used as a 3D bioassay, *e.g.*, for drug screening, personalized medicine, tissue engineering, wound healing, and other applications. The device has a series of channels (*e.g.*, small fluid channels) in a small polymer block wherein one or more of the channels can be filled with a biologically relevant gel, such as collagen, which is held in place by posts. As shown herein, when the device is plated with cells such as endothelial cells, new blood vessels grow in the gel, which is thick enough for the cells to grow in three dimensions. Other channels, *e.g.*, fluid channels, allow drugs or biological material to be exposed to the 3D cell growth. Cells, such as endothelial cells, can be cultured and observed as they grow on the surface of a 3D gel scaffold, where *e.g.*, rates of angiogenesis can be measured, as well as intervascularization and extravascularization of cancerous cells.

(Fig. 1)