# **SynTumor Vascularized Cancer Models**

SynTumor vascularized Tumor-on-Chip models allow real-time visualization and quantitative assessment of cell-cell and cell-drug interactions in a physiologically realistic tumor microenvironment. The tumor models enable analysis of circulation in the microvasculature, transport across the vessel walls, and drug delivery to tumors.

- Morphologically realistic in vivo-based architecture
- Engineered porous structures recreate fluid-filled interstitial spaces
- · Side-by-side architecture enables quantitative real-time visualization
- Recreates a viable histological slice by incorporating geometries of actual microvascular networks with interstitial spaces and tissues/tumors
- Monitor interactions between tumor, stromal, vascular and immune cells





# Microvascular or Idealized<br/>Network Co-culture ChipsMulti-Chambered Chips-<br/>High or Low PerfusionTandem Design with Separate<br/>Vascular Network BedsImage: Design with Separate<br/>Image: Design

Multiple device architectures are available including the idealized IMN2 (radial or linear) devices, or microvascular (SMN2) network chip configurations in single or multi-chamber formats. Chips can be selected to accommodate 2D (IMN2, SMN2 chips) or 3D (IMN3, SMN3 chips) tumor cultures.

# Monitor Phenotypic Behavior of Tumor Cells in Real-Time

#### **Metastatic Tumor**

#### Non-Metastatic Tumor



A metastatic tumor (left) rapidly spreads to adjacent chambers, while a non-metastatic tumor does not (right). Insert shows immunocytochemistry-stained images highlighting spindle cell morphology for metastatic tumor cells in contrast to non-metastatic tumor clusters.



Macromolecular tracers such as fluorescently labeled dextran can be used to measure the permeability of the tumor-endothelial co-cultures. Secretion of proteases by metastatic tumors increases tissue permeability and increases the accumulation of the tracer in the tumor channel similar to the vascular channel. In a non-metastatic tumor, there is very little accumulation of the tracer in the tumor chamber.

Impact of metastatic vs. nonmetastatic cells on vasodilation can be evaluated.

# **Modeling Unique Microenvironments**



SynTumor models can investigate factors influencing drug delivery and efficacy including various flow effects in areas of high an low perfusion

# **Product Purchase Options**

Catalog#	Description	Price
403002, 403004, 403006, 403008, 403010, 403012	SynTumor Model Starter Kits - Includes 12 chips, pneumatic priming device, tubing, clamps, syringes and needles. Choose from IMN2 radial, Linear or SMN2 microvascular network chips	IMN2 Kit - \$2,100 SMN2 Kit - \$2,500
102012-Stu3, 102004-Stu3	SynTumor IMN2-Radial Chips (8μm pillars and 2μm slits) - Pack of 3	
108007-Stu3, 108011-Stu3	SynTumor IMN2 Linear network chips (3 $\mu m$ and 5 $\mu m$ slits) - Pack of 3	\$375
105007-Stu3, 105015-Stu3	SynTumor microvascular network chip (2 $\mu$ m and 8 $\mu$ m pillars) - Pack of 3	\$499

### Assay Development and Screening Services using SynTumor

Real-time Monitoring of Cancer, Stromal, Immune, and Vascular Cell Interactions

SynTumor Models Available	<ul> <li>Monoculture using tumor cell lines</li> <li>Co-Culture with endothelial cells</li> <li>Tri-Culture with stromal and endothelial cells</li> <li>Tri-Culture with stromal, endothelial and immune cells</li> </ul>		
Assays available:	<ul> <li>Efficacy and toxicity Screening</li> <li>Cell proliferation, morphology, viability</li> <li>Tumor-induced vascular leakage</li> <li>Tumor Intravasation and extravasation</li> </ul>	<ul> <li>Tumor Immune Cell interactions</li> <li>Drug delivery, uptake, and efficacy</li> <li>Biomarker analysis</li> <li>On-chip or off-chip analysis</li> </ul>	

Selected Publications using the SynTumor Models

- (1) Rapid Assessment of Nanoparticle Extravasation in a Microfluidic Tumor Model Mai N. Vu et al (2019). ACS Applied Nano Materials 2 (4), 1844-1856.
- (2) A Microvascularized Tumor-mimetic Platform for Assessing Anti-cancer Drug Efficacy Pradhan S et al (2018) *Scientific Reports* Volume 8, Article number: 3171.
- (3) A Biomimetic Microfluidic Tumor Microenvironment Platform Mimicking the EPR Effect for Rapid Screening of Drug Delivery Systems

Tang Y et al (2017). Scientific Reports 7, Article number: 9359.

(4) Microfluidic Co-Culture Devices To Assess Penetration Of Nanoparticles Into Cancer Cell Mass Jarvis, M et al (2017). *Bioeng Transl Med.* Sep 26;2(3):268-277.

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