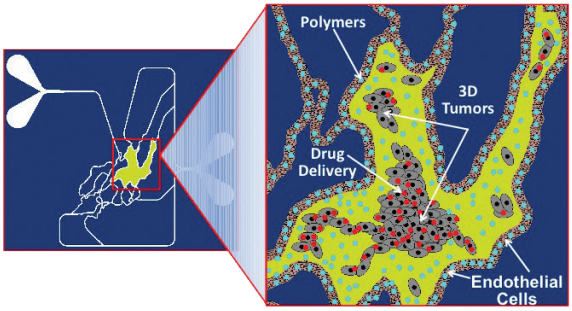
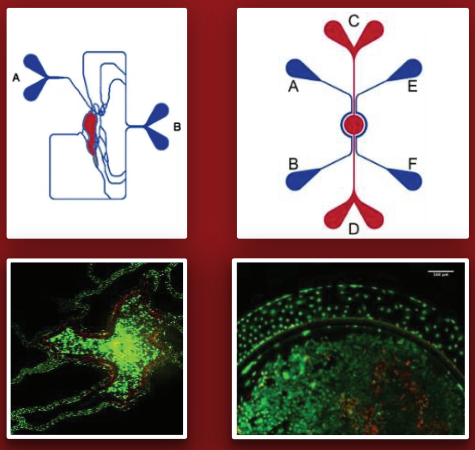
SynTumor Vascularized Cancer Models

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. These tumor models enable analysis of circulation in the microvasculature, transport across the vessel walls, and drug delivery to tumors.

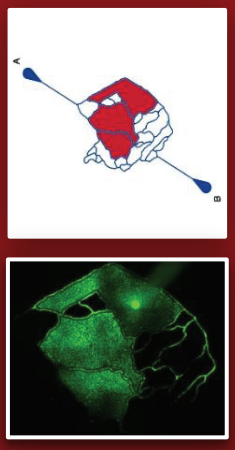


- Morphologically realistic *in vivo*-based architecture
- Engineered porous structures recreate fluid-filled interstitial spaces
- Side-by-side architecture enables quantitative real-time visualization
- Recreates a viable histological slice by incorporating geometries of actual microvascular networks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

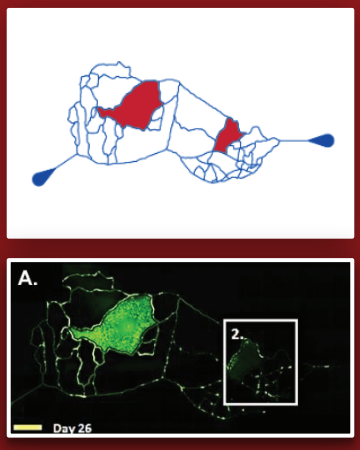
Microvascular or Idealized Network Co-culture Chips



Multi-Chambered Chips- High or Low Perfusion



Tandem Design with Separate Vascular Network Beds

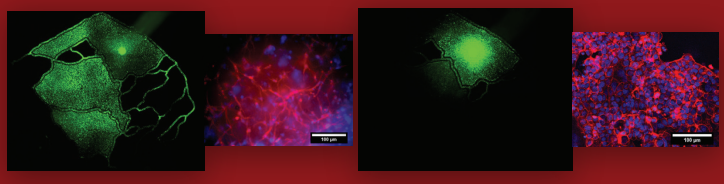


Multiple device architectures are available including the idealized IMN2 (radial or linear) devices, or microvascular (SMN2) network chip configurations in single or multi-chamber formats. Chips can be selected to accommodate 2D (IMN2, SMN2 chips) or 3D (IMN3, SMN3 chips) tumor cultures.

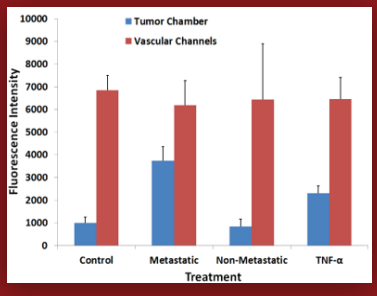
Monitor Phenotypic Behavior of Tumor Cells in Real-Time

Metastatic Tumor

Non-Metastatic Tumor



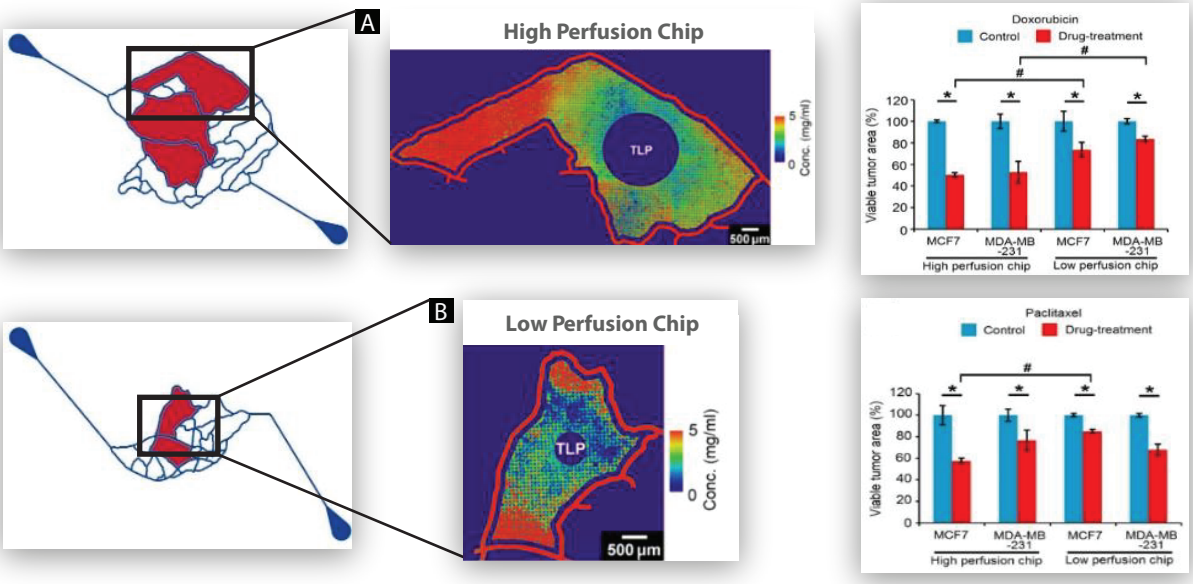
A metastatic tumor (left) rapidly spreads to adjacent chambers, while a non-metastatic tumor does not (right). Insert shows immunocytochemistry-stained images highlighting spindle cell morphology for metastatic tumor cells in contrast to non-metastatic tumor clusters.



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 and low perfusion.

Product Purchase Options

Catalog#	Description	Price
403002, 403004, 403006, 403008, 403010, 403012	SynTumor Model Starter Kits - Includes 10 chips, pneumatic priming device, tubing, clamps, syringes and needles. Choose from IMN2 radial, Linear or SMN2 microvascular network chips	IMN2 Kit - $1,700 SMN2 Kit - $2,100
403001, 403003, 403005, 403007, 403009, 403011	SynTumor Model Assay Kits - Includes 10 chips, tubing, slide clamps, needles, and syringes. Choose from IMN2 radial, Linear or SMN2 microvascular network chips	IMN2 Kit - $1,500 SMN2 Kit - $1,800
102012-Stu3, 102004-Stu3	SynTumor IMN2-Radial Chips (8um pillars and 2um slits) - Pack of 3	$350
108007-Stu3, 108011-Stu3	SynTumor IMN2 Linear network chips (3um and 5um slits) - Pack of 3	$350
105007-Stu3, 105015-Stu3	SynTumor microvascular network chip (2um and 8um pillars) - Pack of 3	$475

Assay Development and Screening Services using SynTumor

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

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

Selected Publications using the SynTumor Model

(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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SYNVIVO
HEADQUARTERS
601 Genome Way
Suite 2023E
Huntsville, AL 35806

(256) 726-4838 • sales@synvivobio.com • support@synvivobio.com

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