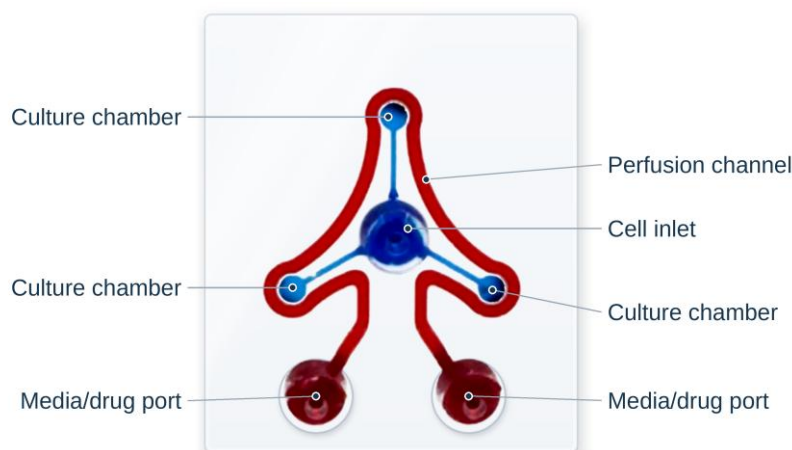


Pythia TME-Chip

3D Tumor Microenvironment Organ-on-a-Chip

The Pythia Tumor Microenvironment-Chip (TME-Chip) is a microfluidic organ-on-a-chip that recreates the human tumor microenvironment in 3D. Three culture chambers, linked by a single perfusion channel, support cell-laden extracellular matrix (ECM) culture of tumor, stromal, and immune cells for drug-response testing, live-cell imaging, and serial effluent sampling.

3 culture chambers / 1 perfusion channel / 50 × 25 mm footprint



TME-Chip with channels filled with dye for visualization: blue, cell-loading path; red, perfusion channel

Key capabilities

3D tumor culture. Each culture chamber holds a cell-laden ECM matrix, reproducing the three-dimensional architecture and cell-matrix interactions of solid tumors. Three chambers per chip allow replicate cultures under the same perfusion stream.

Multicellular co-culture. Tumor cells can be combined with stromal fibroblasts, endothelial cells, and immune cells to model tumor-stroma and tumor-immune interactions.

Controlled perfusion. A single perfusion channel delivers medium or test compounds to all three chambers at a defined flow rate, and the outlet port allows time-resolved effluent collection. A micropillar array with 40 µm gaps separates each culture chamber from the perfusion channel, so medium and compounds reach the 3D culture without a membrane barrier.

Optical access. A glass-bottom substrate (1 mm or 0.17 mm) supports brightfield, fluorescence, and confocal imaging.

Sample recovery. Collected effluent and retrieved cells support biochemical, secretome, and molecular analyses.

Applications

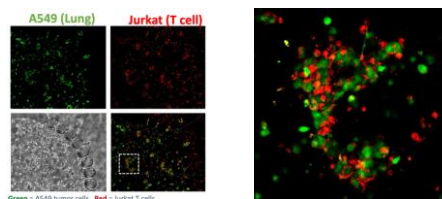
Tumor modeling • Drug efficacy testing • Tumor-stroma and tumor-immune interactions • Live-cell imaging

Analytical compatibility

Modality	Compatible methods and readouts
Live-cell imaging	Brightfield, fluorescence, and confocal; 10× - 20× (PO130) or 40× - 60× (PO131) objectives
Effluent sampling	ELISA, extracellular vesicle (exosome) analysis, and secreted biomarker profiling
Cell viability	Live/dead fluorescence staining and imaging
Cell recovery	DNA/RNA extraction for downstream genomic and transcriptomic analysis

Application example: tumor-immune co-culture

Live imaging tracks T cells as they migrate toward, contact, and infiltrate tumor cells in 3D ECM.



A549 lung cancer cells (green) and Jurkat T cells (red) on the TME-Chip: chamber overview (left) and T cells contacting tumor clusters (right)

The Pythia MPS

The Pythia microphysiological system (MPS) has three components: the Perfusion Controller programs perfusion protocols, the Perfusion Hub perfuses up to six chips in parallel, and the TME-Chip hosts the 3D tumor model.



01 Perfusion Controller

Programs flow rate and perfusion protocols



02 Perfusion Hub

Runs up to six chips in parallel



03 TME-Chip

Hosts the 3D tumor microenvironment

Technical specifications

Parameter	Specification
Product configuration	Three-chamber TME microfluidic chip, single perfusion channel
Overall dimensions	50 × 25 mm (L × W)
Culture chamber area	8.73 mm ²
Chamber-channel interface	Micropillar array, 40 μm gap (no membrane)
Chip body material	Polydimethylsiloxane (PDMS)
Bottom substrate	Glass; 1 mm (PO130) or 0.17 mm (PO131)
Flow rate	0.1 - 380 μL/min
Compatible system	Pythia Perfusion Hub (PI200) with Perfusion Controller (PI100)
Sterilization	Ethylene oxide (EO)
Storage	Room temperature in a dry place; keep sealed in original packaging until use
Shelf life	6 months from date of manufacture

Ordering information

Catalog No.	Product	Description
PO130	TME-Chip, 1 mm glass	Standard imaging (10× - 20×); 6 chips per box, sterile
PO131	TME-Chip, 0.17 mm glass	High-resolution imaging (40× - 60×); 6 chips per box, sterile
PI100	Pythia Perfusion Controller	Programmable touchscreen controller; 1 unit
PI200	Pythia Perfusion Hub	Six-channel platform with pump and six chip holders; 1 unit
PI200-C	Perfusion Hub, custom	Holders and/or platform size made to fit your device; on quotation
PA100	Reservoir and tubing set	5 mL COC medium reservoir and pump tubing; consumable

Intended use

For Research Use Only (RUO). Not for use in diagnostic or therapeutic procedures. The Pythia TME-Chip is intended for in vitro tumor microenvironment modeling and drug-response studies.

Contact and support

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