## MICROPHYSIOLOGICAL SYSTEMS (MPS)

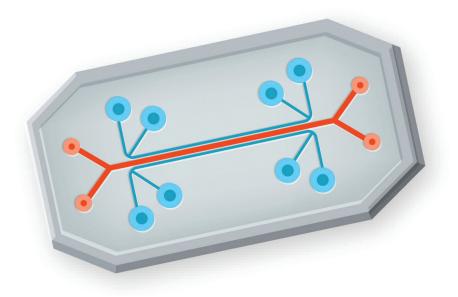
Microphysiological systems (MPS), also called organs-on-chips, are microfluidic devices that emulate tissue and organ physiology *in vitro*. MPS allow for the application of fluid flow and the combination of several organ systems.

## **ATTRIBUTES**

- A system that allows for the three-dimensional co-culture of multiple cell types
- Independently controlled parameters (e.g. types, ratios, and configurations of cells; transcellular chemical, molecular, and oxygen gradients; flow levels; and mechanical forces)
- Biochemical and biomechanical microenvironments that influence cell activities
- Tissue-tissue interfaces which recapitulate tissue-barrier functions and transcellular transport, absorption, and secretion
- High-resolution imaging capability in real time

## **APPLICATIONS**

- Discovering mechanisms of human disease and pathways of toxicity
- Identifying human responses to drugs, toxins, and environmental cues
- Testing drugs and chemicals under physiological conditions
- Modelling pharmacokinetic and pharmacodynamic properties of drugs
- Investigating toxicokinetic parameters of chemicals
- Studying the interplay of several organ systems in multi-organ MPS/human-on-a-chip



| SELECT PUBLICATIONS  |  |  |
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| Bahinski <i>et al.</i> The promise and potential of "organs-on-chips" as preclinical models. <i>Appl In Vitro Toxicol</i> . 2015;1(4):235-242.   | Marx <i>et al.</i> Biology-Inspired Microphysiological Systems to Advance Patient Benefit and Animal Welfare in Drug Development. <i>ALTEX</i> . 2020;37(3):365-394. | Low et al. Organs-on-chips: into the next decade. Nat Rev Drug Discov. 2020. |
| INDUSTRY PLAYERS   |  |  |
| • 4DCell • AlveoliX • AxoSim • BiomimX • BEOnChip • Cherry Biotech • Cellasys • CN Bio Innovations • Emulate • Hesperos • HµREL® Corporation • IONTOX* • IVTech* • Kirkstall* • MesoBioTech • Micronit • Mimetas • Nortis • Novoheart • OSPIN • SynVivo • TARA • Tissue Dynamics • TissUse  *Offers a system which is scaled to a slightly larger size than microfluidic systems |  |  |
| MPS NETWORKS   |  |  |
| ■ EurOoC  ■ Organ-on-a-Chip Technologies Network  ■ hDMT  ■ IQMPS  |  |  |