Chip-S1® Basic Research Kit

Create custom Organ-Chip models to suit a wide variety of applications

Overview

An Organ-Chip is a living, micro-engineered environment that recreates the natural physiology and mechanical forces cells experience within the human body. With the Emulate Chip-S1 Basic Research Kit, you can harness the power of this complex microenvironment to build a wide variety of Organ-Chip models in the Human Emulation System.

Model Configuration

At the heart of the Chip-S1 Basic Research Kit is the **Chip-S1®** Stretchable Chip and accompanying **Pod®** Portable Module. The chip securely connects to the Pod via the chip carrier, and the Pod reservoir lid acts as the interface between Zoë and the chip.

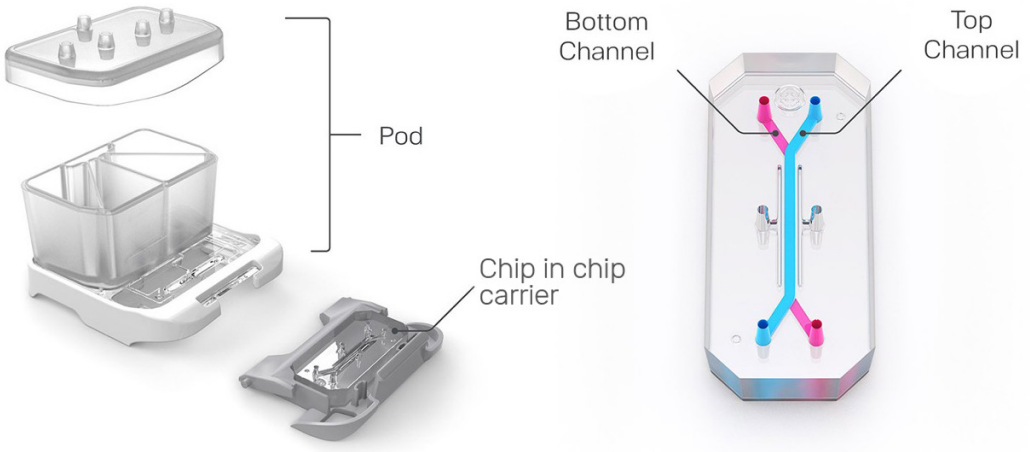


Figure 1: *Pod Portable Module and Chip-S1 diagram.*

Chip-S1 Stretchable Chip

The Chip-S1 Stretchable Chip (see **Figure 2**) features two distinct microfluidic channels separated by a porous, flexible membrane. This configuration enables the co-culture of organ-specific epithelial/parenchymal cells in one channel and organ-specific vasculature in the other. Vacuum channels enable cyclic stretch on the membrane to mimic dynamic functions, such as breathing and peristalsis.

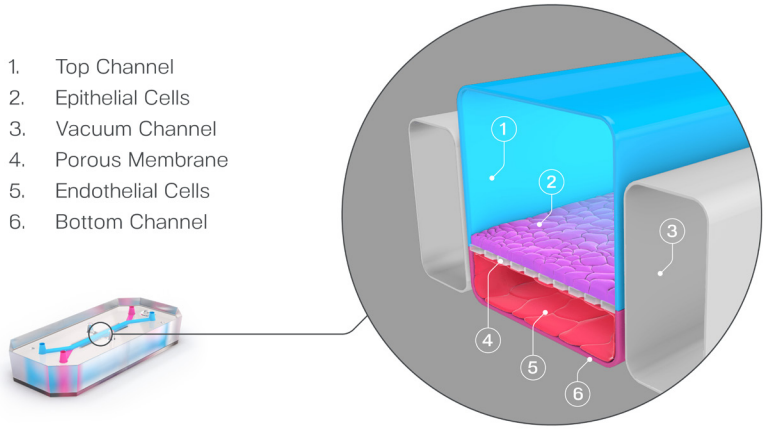


Figure 2: *Chip-S1 diagram.*

Pod Portable Module

Each Chip-S1 connects to a Pod which, through Zoë, enables automated control of media flow and dosing while maintaining ease of portability for routine microscopy observation (see **Figure 3**). The Pod stores 4 mL of media for each microfluidic channel, enabling automated media flow for up to 5 days. Media effluent can be easily collected from the outlet reservoirs for downstream analysis.

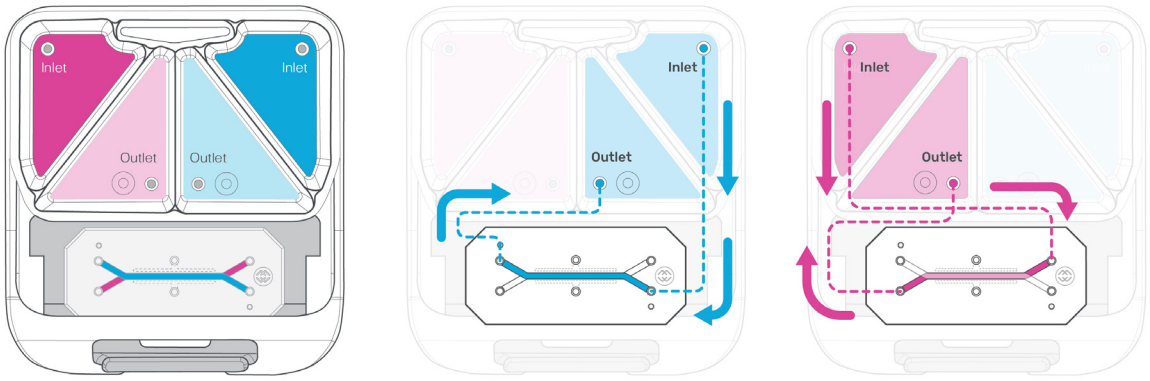


Figure 3: *Pod reservoir diagram.*

Key Features

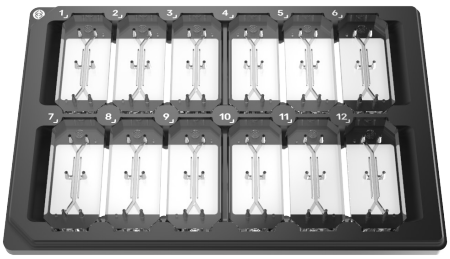
- **Tissue-Tissue Interface**
  - Porous membrane permits compartment crosstalk and cell migration
  - Separate cell compartments enable controlled seeding and media delivery
- **Dynamic Environment**
  - Fluid flow through the channels creates shear stress that drives cell maturation and improves functionality
  - Tunable cyclic stretch recreates dynamic functions, such as breathing and peristalsis
- **Precise Microenvironment Control**
  - Automated fluid flow precisely controls media delivery and compound dosing
  - Reservoirs provide easy access to sample chip effluent for downstream analysis
  - Integrated platform simplifies the culture process
- **Microscope Compatibility**
  - Portable Pod reservoir enables easy mid-experiment cell viability and health checks on laboratory microscopes without interrupting fluid connections
  - Fixed Chip Imaging Adapter organizes up to 12 fixed chips for high-throughput imaging

Part of the Human Emulation System®

The Emulate Chip-S1 Basic Research Kit is designed to be used as part of the Human Emulation System, a complete Organ-on-a-Chip solution that includes instruments, consumables, and software, providing the dynamic conditions needed to culture up to 12 Organ-Chips.

In addition to the Chip-S1 Basic Research Kit, Emulate offers a number of companion products:

- Pod Imaging Adapter: for microscopic inspection during an experiment
- Fixed Chip Imaging Adapter: for post-experiment fixation, staining, and analysis
- Compound Distribution Kit: for assessment of PDMS compound absorption and adsorption for specific classes of small molecules



Chip Specifications:

Top Channel

Width x height dimensions	1,000 µm x 1,000 µm
Area	28.0 mm^2
Volume	28.041 µL
Imaging distance from bottom of chip to top of membrane	850 µm

Bottom Channel

Width x height dimensions	1,000 µm x 200 µm
Area	24.5 mm^2
Volume	5.6 µL

Membrane

Pore diameter	7.0 µm
Pore spacing	40 µm (hexagonally packed)
Thickness	50 µm
Co-culture area	17.1 mm^2

Kit Specifications:

Specification	Details
Compatible cell types	The open nature of the Emulate Chip-S1 Basic Research Kit makes it compatible with practically any type of human or animal cells, including: • Primary cells • Dissociated or intact organoids • Induced pluripotent stem cells (iPSCs) • Immortalized cell lines
Characterization endpoints	Image analysis • Brightfield, fluorescence, and electron microscopy Omics analysis • RNAseq, proteomics, and metabolomics Effluent analysis • Cytokine release, injury markers, barrier function (P_{app}), etc.
Storage conditions	• ER-1® Reagent: -20°C • ER-2® Reagent: 2–8°C • Other kit components: Ambient temperature (15–25°C)
Shelf life	• Organ-Chips & Pods: 2 years from date of manufacture • ER-1 & ER-2: 1 year from date of manufacture
Sterility	All consumables are terminally sterilized with gamma irradiation in final packaging

Ordering Information

Kits are available in sets of 12 or 24 chips, with the following consumables:

- Chip-S1® Stretchable Chip in a Chip Carrier
- Pod® Portable Module
- ER-1® / ER-2® Chip Activation Reagents

Product Name	Kit Contents	Catalog Number
Emulate Chip-S1 Basic Research Kit (12-pack)	12 sets of chips, plus 4 Steriflip® filters	BRK-S1-WER-12
Emulate Chip-S1 Basic Research Kit (24-pack)	24 sets of chips, plus 8 Steriflip® filters	BRK-S1-WER-24

Companion Products:

Product Name	Description	Catalog Number
Pod Imaging Adapter	Organizes 2 Pods for quick cell viability and health checks and ensures compatibility with SBS footprint inverted microscopes	POD-IMG
Fixed Chip Imaging Adapter	Organizes 12 fixed chips for high-throughput imaging and ensures compatibility with SBS footprint imaging equipment	CHIP-IMG
Compound Distribution Kit	Includes 3 test chips, 3 Pods, and 2 Steriflip filters. Used to quantify compound absorption and adsorption for specific classes of small molecules to PDMS	CDK-001