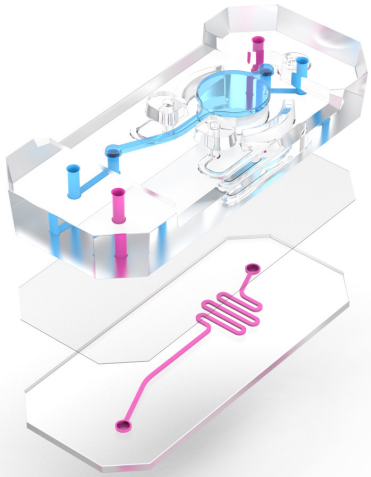
# Chip-A1™ Basic Research Kit

Create custom Organ-Chip models to suit applications requiring 3D gel matrices or direct compound dosing



## 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-A1™ Basic Research Kit, users can harness the power of this technology to build a wide variety of Organ-Chip models in the Human Emulation System. The Chip-A1 Accessible Chip allows researchers to more effectively model complex 3D tissues, such as the tumor microenvironment and skin, with direct compound dosing capabilities.

## Model Configuration

The primary components of the Chip-A1 Basic Research Kit are the Chip-A1 Accessible Chip and accompanying Pod Portable Module. The Chip-A1 securely connects to the Pod via the chip carrier, and the Pod reservoir lid acts as the interface between Zoë and the chip **(See Figure 1)**.

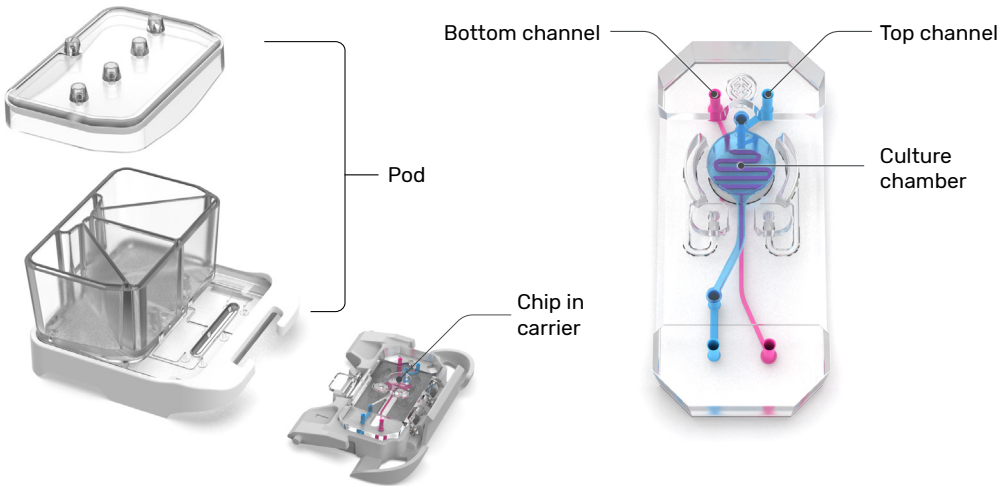



***Figure 1:*** *Pod Portable Module and Chip-A1 diagram.*

## Chip-A1 Accessible Chip

The Chip-A1 Accessible 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, or stromal cells in the top channel and organ-specific vasculature in the bottom channel. The defining feature of the Chip-A1 is its accessible culture chamber within the top channel, which accommodates ECM gel scaffolds of up to 3 mm thick and enables users to incorporate stromal layers and create stratified epithelial tissue. Additionally, the hinged lid provides direct access to the culture chamber, enabling users to directly treat the top compartment with aerosolized or topical compounds. Vacuum channels enable cyclic stretch on the membrane to mimic dynamic functions, such as breathing and peristalsis.

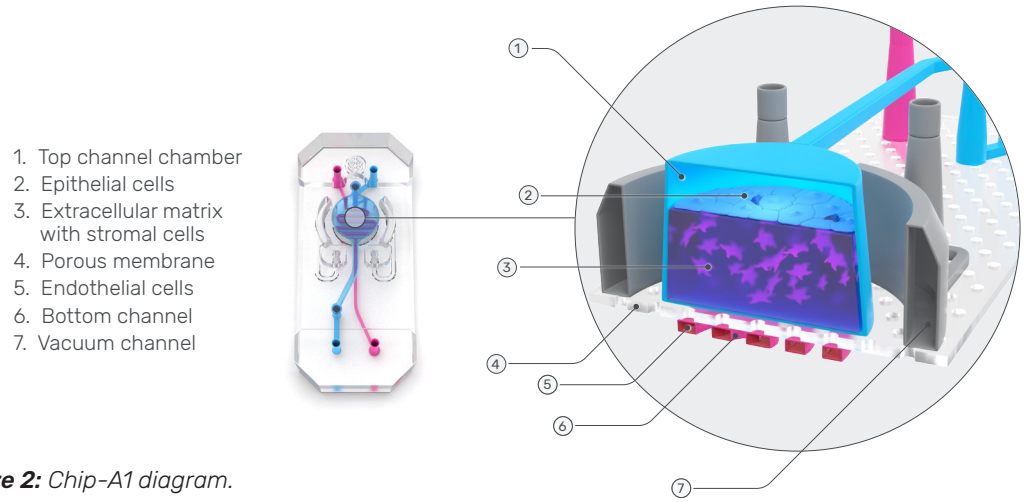



***Figure 2:*** *Chip-A1 diagram.*

## Pod Portable Module

Each Chip-A1 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 3 days. Media effluent can be easily collected from the outlet reservoirs for downstream analysis.

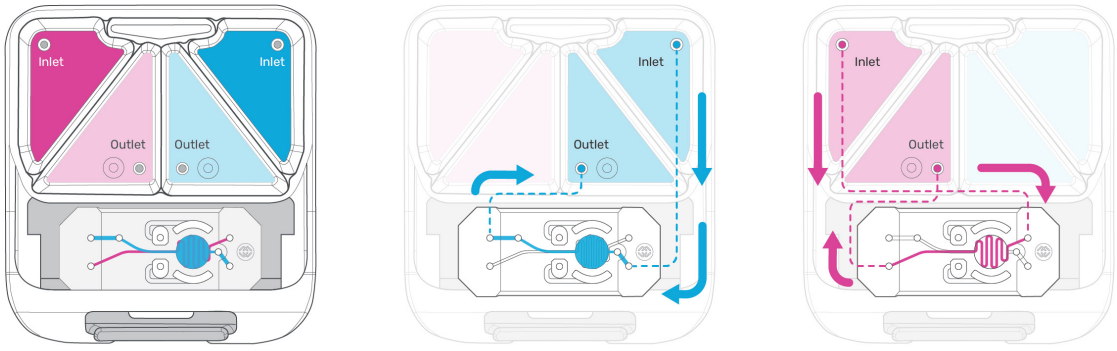


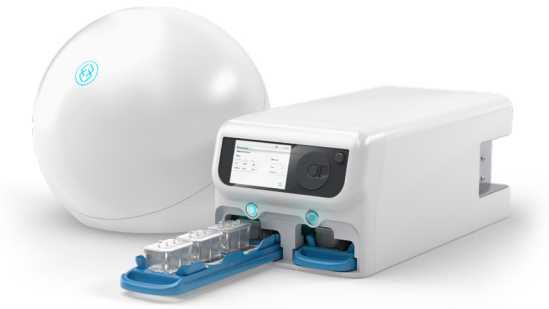

***Figure 3:*** *Pod reservoir diagram.*

## Key Features

- **Accessible Culture Chamber**
  - Circular culture chamber enables users to create gels or scaffolds up to 3 mm thick
  - Hinged lid provides direct access to the culture chamber for topical or aerosolized compound delivery
- **Tissue-Tissue Interface**
  - Porous membrane permits compartment crosstalk and cell migration
  - Separate cell compartments enable controlled seeding and media delivery
- **Dynamic Microenvironment with Precise Control**
  - 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
  - Automated control enables precise media delivery and compound dosing, simplifying 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

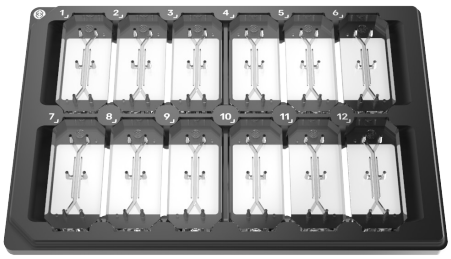
## Part of the Human Emulation System®

The Emulate Chip-A1 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-A1 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




*Fixed Chip Imaging Adapter, compatible with Chip-S1 (shown) and Chip-A1*

## Chip Specifications:

### Top Channel

| | |
|---|---|
| Chamber dimensions | Diameter at bottom: 6.90 mm<br>Diameter at top: 6.25 mm<br>Height: 3.70 mm |
| Area at membrane | 37.4 $mm^2$ |
| Chamber volume | 125 µL |
| Imaging distance from bottom of chip to top of membrane | 900 µm |

### Bottom Channel

| | |
|---|---|
| Width x height dimensions | 400 µm x 200 µm |
| Area | 13.5 $mm^2$ |
| Volume | 6.1 µL |

### Membrane

| | |
|---|---|
| Pore diameter | 7.0 µm |
| Pore spacing | 40 µm (hexagonally packed) |
| Thickness | 50 µm |

## Kit Specifications:

| Specification | Details |
|---|---|
| **Compatible cell types** | The open nature of the Emulate Chip-A1 Basic Research Kit makes it compatible with practically any type of human or animal cells, including:<br>• Primary cells<br>• Dissociated or intact organoids<br>• Induced pluripotent stem cells (iPSCs)<br>• Immortalized cell lines |
| **Characterization endpoints** | Image analysis<br>• Brightfield, fluorescence, and electron microscopy<br>Omics analysis<br>• RNAseq, proteomics, and metabolomics<br>Effluent analysis<br>• Cytokine release, injury markers, barrier function ($P_{app}$), etc. |
| **Storage conditions** | • ER-1® Reagent: -20°C<br>• ER-2® Reagent: 2–8°C<br>• Other kit components: Ambient temperature (15–25°C) |
| **Shelf life** | • Organ-Chips & Pods: 2 years from date of manufacture<br>• ER-1 & ER-2: 1 year from date of manufacture |
| **Sterility** | All consumables—including chips, Pods, carriers, and gel stamps—are sterilized prior to shipment. |

## Ordering Information

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

- Chip-A1 Accessible Chip in a Chip Carrier
- Pod Portable Module
- Gel Stamp
- ER-1 / ER-2 Chip Activation Reagents

| Product Name | Sets per Kit | Catalog Number |
|---|---|---|
| **Emulate Chip-A1 Basic Research Kit (12-pack)** | 12 sets of chips, plus 4 Steriflip® filters | BRK-A1-WER-12 |
| **Emulate Chip-A1 Basic Research Kit (24-pack)** | 24 sets of chips, plus 8 Steriflip® filters | BRK-A1-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 |