

Brain-Chip R1 BioKit

A first-in-class, isogenic model of the human neurovascular unit.

Key Benefits

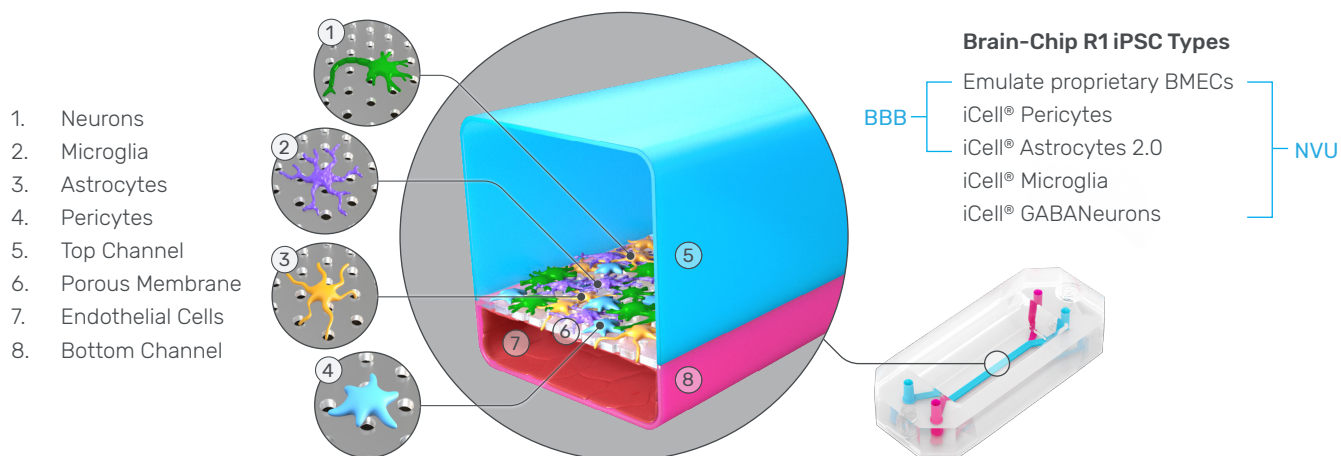
- **Five iPSC-derived cell types, one isogenic system**
- **Resting, physiologically relevant state**
- **Simplified, direct-to-chip workflow**—ready to use, no differentiation needed
- **Four-day experimental window** for functional BBB and neuroinflammation assays
- **Built on the Chip-R1™ Rigid Chip** for minimal drug absorption in BBB transport studies

Overview

The Brain-Chip R1 is an isogenic, human-relevant Organ-Chip model designed to recapitulate the cellular diversity and functional interactions of the neurovascular unit (NVU). This model integrates five human iPSC-derived cell types—neurons, astrocytes, microglia, pericytes, and Emulate’s proprietary brain microvascular endothelial cells (BMECs)—within the dynamic, perfused microenvironment of the [Chip-R1™ Rigid Chip](#).

Model Configuration

The Brain-Chip R1 features two parallel channels separated by a thin, porous membrane. The brain channel (top) contains the neural tissue, including neurons, microglia, astrocytes, and pericytes, while the vascular channel (bottom) contains the BMECs.



Model Characterization

In the brain channel, neurons, astrocytes, microglia, and pericytes exhibit characteristic morphologies and organize into integrated multicellular clusters representative of the neurovascular unit (Figure 2A). In the vascular channel, BMECs form a continuous, confluent monolayer with strong ZO-1 staining, indicative of well-defined tight junctions (Figure 2B). The model maintains a tight, stable barrier (Figure 3) and resting glial state (Figure 4) throughout the experimental period, enabling assessment of small-molecule permeability, cytokine release, and transporter function. Learn more in the [Brain-Chip R1 Technical Note](#).

Morphology

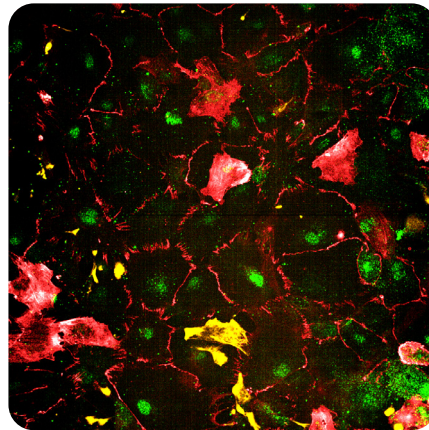
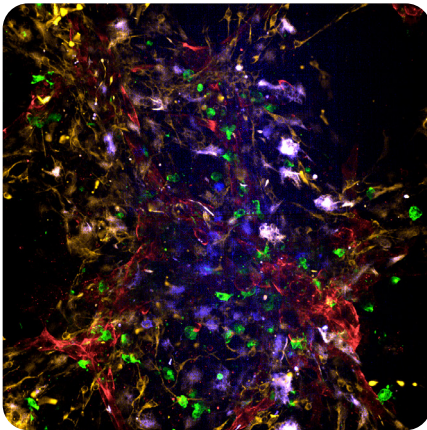


Figure 2: Representative confocal images of the Brain-Chip R1 at the start of the experimental window. A) Brain channel showing staining for microglia (Iba1, green), astrocytes (GFAP, blue), neurons (MAP2, orange), and pericytes (NG2, red). B) Vascular channel showing staining of BMECs for ZO-1 (red) and TfR1 (green). Astrocyte projections from the brain channel are observed by GFAP staining (yellow).

Barrier Function

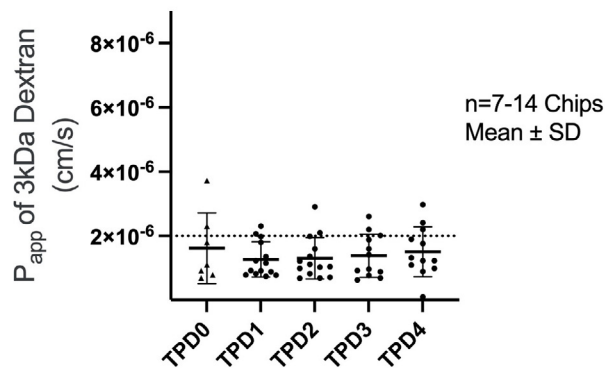


Figure 3: The Brain-Chip R1 maintains a consistent barrier between the vascular and brain channels over a four-day experimental window (Timepoint Days 0-4).

Resting State

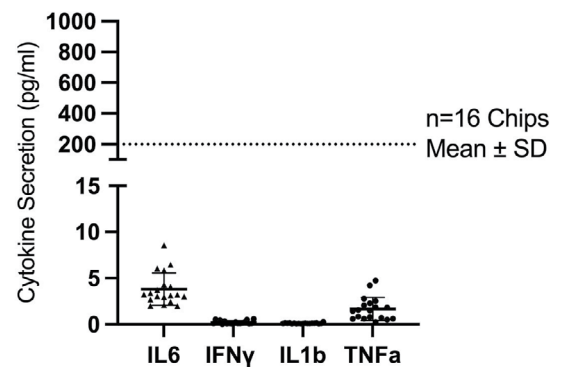


Figure 4: The Brain-Chip R1 exhibits low baseline levels of key cytokines at the start of the experimental window, indicating a resting state (Timepoint Day 0).

Compatible with Zoë Culture Module

The Brain-Chip R1 is designed to be cultured using a Zoë Culture Module, a complete Organ-on-a-Chip platform that provides the dynamic conditions needed to culture up to 12 Organ-Chips per Zoë.



Brain-Chip R1 BioKit Specifications

Specification	Details
Cell types	Isogenic, iPSC-derived human cells: • iCell® GABANeurons • iCell® Microglia • iCell® Astrocytes 2.0 • iCell® Pericytes • Emulate proprietary BMECs All cell types are manufactured by FUJIFILM Cellular Dynamics, Inc. (FCDI) using FCDI's proprietary iPSC line
Media	• Custom brain channel media • Custom vascular channel media
Organ-Chip consumables	• Chip-R1™ Rigid Chips • Pod-2™ Portable Modules • Steriflip® filters
Storage conditions	• Cells: Store in liquid nitrogen • Media: Store at -20°C • Other kit components: Ambient temperature (15-25°C)
Shelf life	Cells: 6 months from date of shipment Media: 1 year from date of manufacture Organ-Chip consumables: 1 year from date of manufacture
Characterization endpoints	Imaging • Brightfield & immunofluorescence microscopy Effluent analysis • Apparent permeability assays • Cytokine profiling Off-chip analysis • RNA and protein extraction to support various downstream assays

Ordering Information

Product Name	Cell Types	Chips per Kit	Catalog Number
Brain-Chip R1 BioKit	• iCell® GABANeurons • iCell® Microglia • iCell® Astrocytes 2.0 • iCell® Pericytes • Emulate proprietary BMECs	12	BIO-BR1-12

To learn more, visit emulatebio.com/brain-chip.