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Human Validation Infratrcture

Organ-on-Chip Platforms for Dynamic Culture,
Aerosol Delivery & Real-Time Monitoring

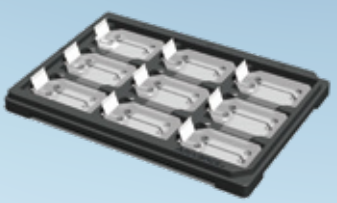
Product Brochure

Organ-on-Chip

S-Series

E-Series

H-Series



Microphysiological Systems

MPS-LITE

MPS-CORE

MPS-PRO

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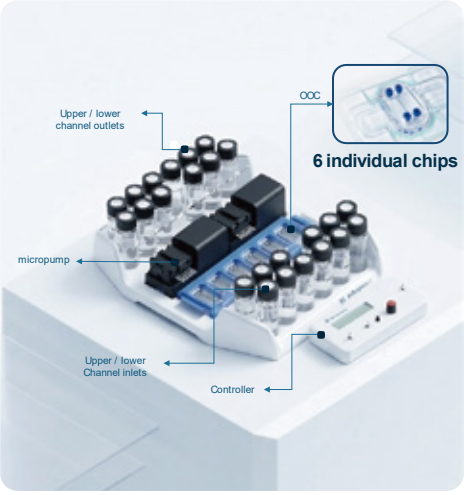
MPS-LITE

Ready to Run.
MPS-LITE Makes It Simple to Start.

A Ready-to-Deploy Organ-on-a-Chip Platform

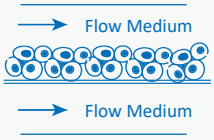
MPS-LITE is a plug-and-play platform for organ-on-chip research. It enables long-term perfusion culture to form physiologically functional 3D tissues and maintains a controlled microenvironment with shear stress and stable flow conditions.

The platform is compatible with microscopes for real-time observation and image capture, streamlining daily operation. Its modular design accommodates single-cell or multi-cell co-culture and works with both primary cells and cell lines to build diverse tissue models. Built for organ modeling, drug screening, and mechanistic studies, MPS-LITE accelerates complex biological experiments with improved reliability and reproducibility.



Plug-and-Play

Rapid deployment of organ-on-chip in your laboratory



Dynamic Perfusion Culture

Supports long-term cell viability and function

Real-Time Imaging

Enables microscopic observation for cellular responses

Specification

Designed for operation in a standard cell culture incubator. Biosafety requirements should be determined based on the biological materials and intended application.

Dimensions	211 x 250 x 76 mm
Chip Capacity	6 chips
Flow Rate	1.0-100.0 µL/min
Flow Rate Accuracy	± 20 %
Power Supply	AC 110-220 V

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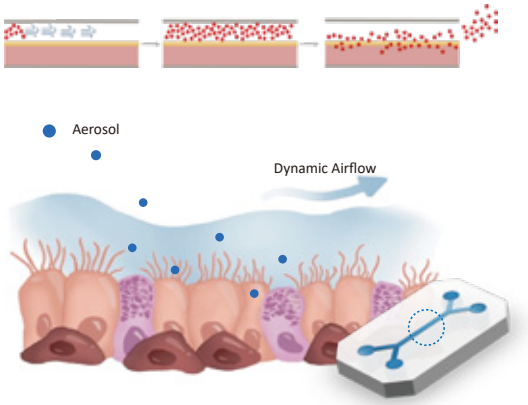
MPS-CORE

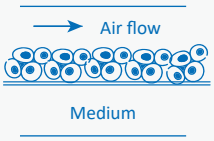
Accerlarate Respiratory and Inhaled Nanoparticle Delivery Research

Advanced Aerosol Delivery for Inhaled Drugs

The MPS-CORE Delivery System enables precise aerosol delivery to Lung-on-chip cultivated tissues. Supporting both Air/Liquid interface and aerosol exposure testing, it simulates respiratory functions, allowing for accurate testing of a wide range of inhalable treatments.

The system enables clean and reliable testing across a wide range of inhalable therapies, including liposomes, nanoparticles, and airborne pathogens. It delivers reproducible data on drug deposition, absorption, and clearance, providing researchers with valuable insights to optimize inhalation therapies and accelerate drug development for respiratory diseases.





Air/Liquid Interface

Simulating respiratory conditions with dynamic airflow

Low Nebulization volume

Testing with small quantities of drugs, reducing costs

Single-use components

Ensuring a uncontaminated testing environment

Delivery Specification

Inhalation System enables precise exposure of lung-on-chip to inhaled drugs, liposomes, and nanoparticles.

Chip Capacity	6 chips
Particle Size	< 5 µm
Exposure Volume	≥ 200 µL
Flow Rate	20 mL/min
Exposure Duration	5 - 10 min

Patent: US Patent No. US11732230B2

MPS-PRO

Real-Time, Label-Free and
Non-Destructive Monitoring

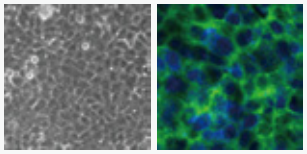
Quantitative Barrier Assessment

MPS-PRO integrates electrode measurement enables real-time, non-destructive assessment of barrier function in organ-on-chip models. By translating electrical responses into quantitative and traceable data, the system supports longitudinal monitoring of tissue development and responses to drugs, chemicals, and environmental stimuli.

Designed to support regulatory-aligned New Approach Methods (NAMs) studies, MPS-PRO provides objective functional endpoints for model characterization, experimental comparison, and nonclinical safety assessment.

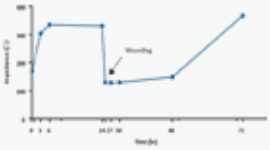
Real-Time Sensing

Quantifies barrier responses through TEER and live-cell imaging.



Barrier Monitoring

Tracks barrier formation, maturation, and disruption throughout tissue culture.



Drug Response Assessment

Evaluates dynamic barrier responses to drug candidates and treatment conditions.

Specification

Multi-channel EIS measurement with configurable settings and time-course data analysis.

Chip Capacity	6 chips
Measurement Principle	EIS
Frequency Range	10 µHz–200 kHz
AC Amplitude Range	1–900 mV RMS
Monitoring Interval	0.1 s
Data Visualization	Bode, Nyquist and time-course plots
Data Export	Excel and CSV

Applications

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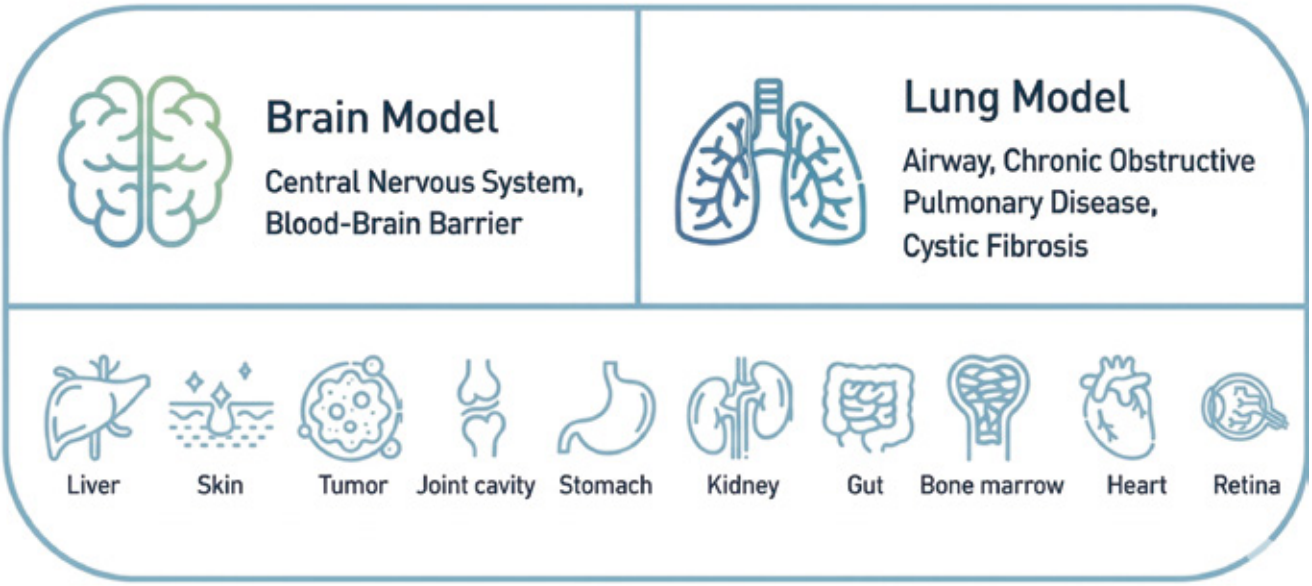
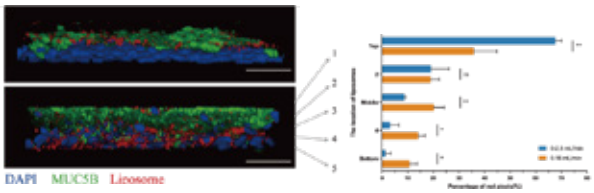


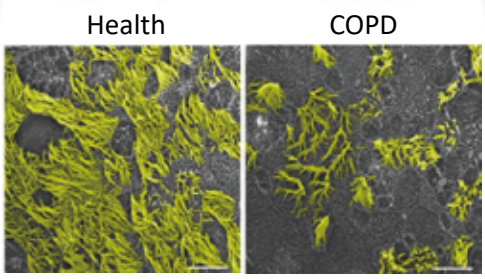
Z-axis Liposome Pentration of 3D Small Airway Model

Our innovative system replicates human inhalation and liposome delivery processes, providing z-axis resolution of translocation between the mucus layer, the cell layer, and even the air-to-blood layer



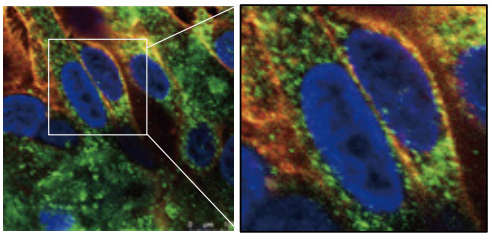
Cilia Response in COPD Drug Testing

This case examines drug impact on cilia function in a COPD model. Under COPD conditions, the platform monitors changes in cilia beating frequency, coordination, and mucus transport efficiency. Drug interactions reveal improved cilia activity, aiding mucus clearance and respiratory function.



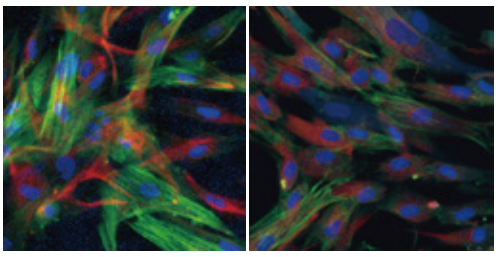
CFTR Targeting in Cystic Fibrosis

Following small molecule drug treatment on the CF model, CFTR protein migration to the cell membrane is observed and confirmed by WGA staining. This localization serves as a marker to evaluate therapeutic efficacy, enhancing chloride ion transport and cellular function.



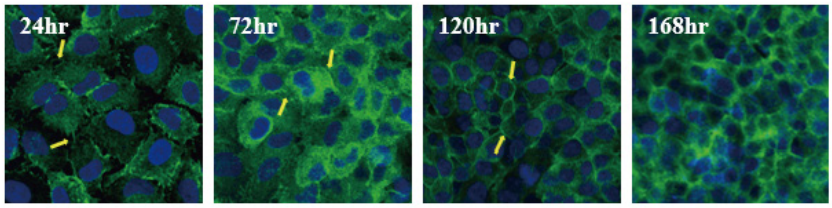
Reduced Fibrosis Marker α-SMA in IPF Treatment

Utilizing the platform to assess an antifibrotic agent's efficacy in Idiopathic Pulmonary Fibrosis shows a significant reduction in α-SMA, a primary fibrosis marker, underscoring its therapeutic potential.

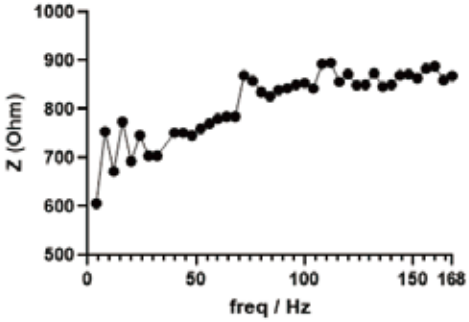


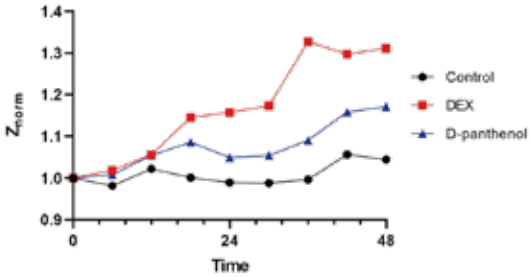
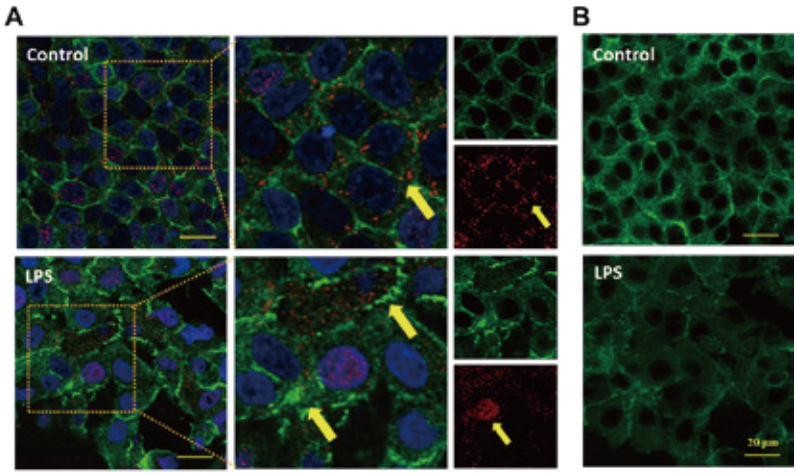
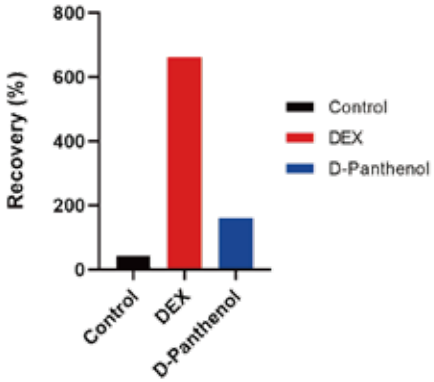
Impedance Tracking of Cell Barrier Development

Impedance measurements were performed at multiple time points to monitor barrier development during cell culture. As the cell monolayer matured, increasing impedance corresponded with enhanced cell coverage and more distinct expression of the junctional proteins ZO-1 and E-cadherin. These results demonstrate the potential of non-destructive electrical measurements for longitudinal evaluation of tissue barrier formation.



Zoom in on the image



Evaluating Treatment-Driven Recovery of Epithelial Barrier Function

LPS exposure disrupted epithelial junctions, as indicated by fragmented ZO-1 expression and the redistribution of E-cadherin from the cell membrane to the cytoplasm. Longitudinal impedance measurements differentiated treatment responses, showing rapid barrier recovery with dexamethasone and gradual improvement with D-panthenol.