MIMETAS

OrganoTEER®

Know Your Barriers. Fast.

Features

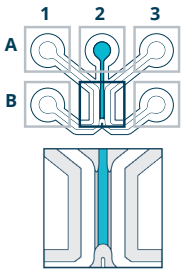
- **TEER measurement on 3D tubules**
- **Membrane-free barrier resistance**
- **Measurement under physiological conditions**
- **Time-lapse under perfusion**
- **Rapid TEER measurement**
- **High throughput**
- **Diverse applications**
- **User-friendly**

What's included

- **OrganoTEER® Device**
- **Laptop with OrganoTEER® software**
- **2x measurement electrode boards**
- **Installation & training**
- **OrganoReady® Colon Caco-2 for training**
- **2-year warranty including 2 preventive maintenances**

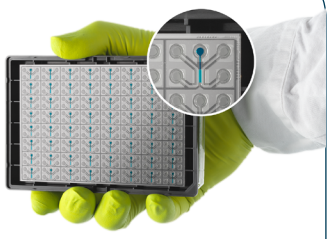
1. The OrganoPlate® Technology

The OrganoPlate® 3-lane is a 3D culture platform with 40 or 64 chips. It enables consistent and reproducible tubule formation and barrier integrity using most epithelial and endothelial cell types. These polarized tubules provide access to both the apical and basolateral sides, enabling asymmetric drug treatments and media sampling. For optimal performance, our ready-to-use OrganoReady models or OrganoReady® Collagen, a pre-seeded plate with validated Collagen batches in the middle channel, are recommended.



A1: Left channel inlet
B1: Left channel outlet
A2: Middle channel inlet
B2: Observation window
A3: Right channel inlet
B3: Right channel outlet

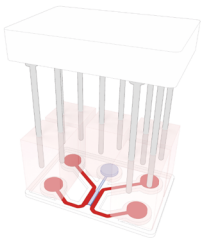
Right channel: Empty
Middle channel: Collagen-I
Left channel: Empty



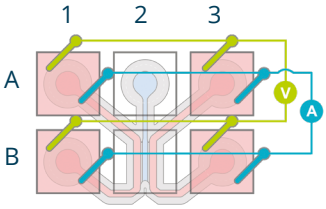
The OrganoReady Collagen 3-lane 64 layout and chip design. The platform features 64 individual microfluidic chips pre-seeded with Collagen-I in the middle channel. The PhaseGuide™ allows precise patterning of extracellular matrix (ECM) and facilitates cell barrier formation without the use of artificial membranes between channels.

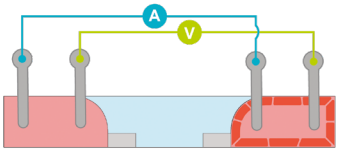
2. The OrganoTEER® Device

Trans-Endothelial and Epithelial Electrical Resistance (TEER) is a non-disruptive readout for paracellular and intercellular barrier integrity. MIMETAS developed the OrganoTEER device, a fast and automated impedance measurement system capable of analyzing 40 or 64 chips in under 2 minutes. The OrganoTEER allows precise measurement of 3D barrier models developed in the OrganoPlate® platform, either as single measurements or in time-lapse settings, without interference from physical membranes.



The electrodes of the OrganoTEER are lowered into the wells of the OrganoPlate® 3-lane 64 platform.





Schematic overview showing the electrode positioning in OrganoPlate 3-lane 64 chip. Current-carrying electrodes (blue) impose an AC voltage across the chip and voltage-sensing electrodes (green) measure the resulting current.

3. Measuring TEER in our OrganoReady models

The OrganoTEER device enables quantitative assessment of barrier integrity-modulating conditions like inflammatory or cytotoxic treatments over minutes, hours and days. Time-lapse measurements can be performed in an incubator under perfusion flow conditions. The OrganoTEER software supports quick chip selection, allowing the measure of up to 128 barriers simultaneously (2 tubules per chips). The software provides immediate results, saving time and facilitating quick data analysis.

Predicting BBB Toxicity

The OrganoReady® BBB HBMEC provides a standardized platform for robust evaluation of blood-brain barrier (BBB) integrity. Dose-dependent barrier disruption induced by various cytotoxic, metabolic, or inflammatory conditions can be captured with time-lapse TEER measurements.

Predicting Vascular Toxicity

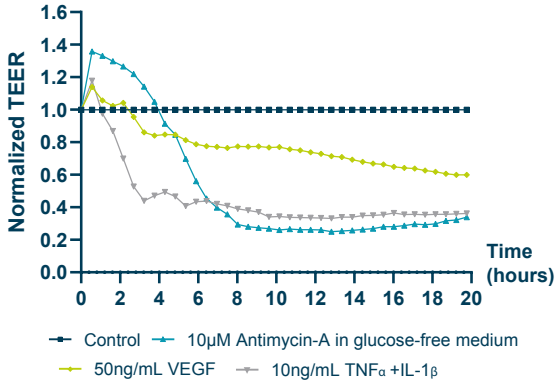
The OrganoReady® Blood Vessel model provides robust endothelial barriers using primary human endothelial cells (HUVEC). It offers a scalable, high-throughput platform to replicate endothelial function and dysfunction, with TEER measurements enabling precise assessment of barrier integrity.

Predicting Gastrointestinal Toxicity

The OrganoReady® Colon Organoid model can be integrated into toxicology workflows for identifying gastrointestinal toxicity. By combining the OrganoTEER device with functional readouts of cell health (cell viability and cytotoxicity), adverse effects of small compounds on perfused colon organoid tubules can be quantitatively assessed.

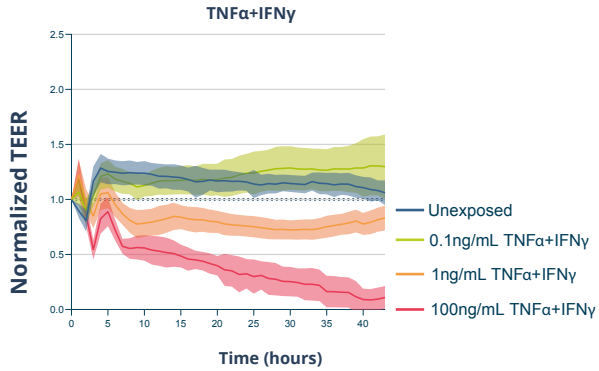
Get started with your OrganoStart™ Pro package!

Blood Brain Barrier Mechanisms of Toxicity



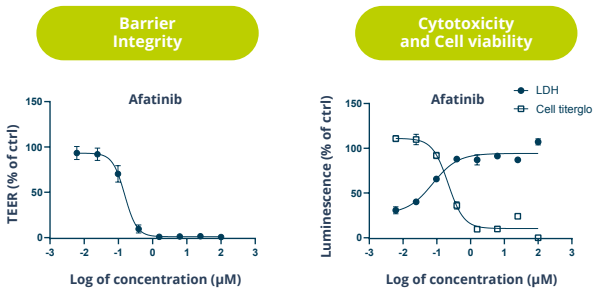
TEER time-lapse measurements of OrganoReady BBB HBMEC (3-lane 64) exposed to various barrier disrupting metabolic and inflammatory conditions. An acute drop in TEER was observed across all mechanisms of toxicity. Readings were acquired every 8 minutes under perfusion at 37 ˚C (normalized to control, SD, n=3).

Blood Vessel Inflammatory Response



TEER time-lapse measurements of OrganoReady Blood Vessel HUVEC (3-lane 64) exposed to inflammatory cytokines. Dose dependent decrease in TEER was observed. Readings were acquired every 1h04mn under perfusion at 37˚C (normalized to T0, SD, n=12-13).

Dose-dependent Gut Toxicity Assessment



Dose-dependent TEER (barrier resistance), LDH (cytotoxicity) and ATP (cell viability) measurements of colon organoid tubules exposed to Afatinib (n=4, N=2). After 72 hours of exposure to Afatinib, a dose-dependent decrease in barrier integrity, cytotoxicity and cell viability was observed, while the control drug, Finasteride (not shown), did not cause significant changes.