

## Millicell® Inserts and Plates

For more *in vivo* - like membrane-based cell culture

The research need to narrow the gap between *in vitro* and *in vivo*, or 2D and 3D, cell environments has never been greater. Our sixty-plus year legacy of precision engineered filtration and cell culture expertise continues to provide the modern tools needed to support cell growth that is more predictive of natural cellular behavior.



### Enables predictive cell culture

**More natural cell growth is the result of biologically thoughtful engineering.**

Cells *in vivo* live in a truly three-dimensional environment, and can access nutrients from every side. In contrast, traditional plastic culture plates force cells to grow on a smooth, two-dimensional surface, leading to flattened nuclei and poor function.

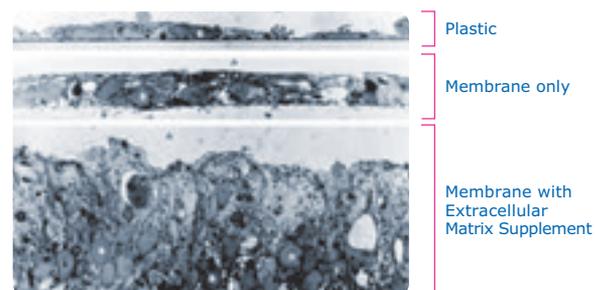
Millicell® inserts and plates feature membranes that allow easy access to both the apical and basolateral sides of cells. This encourages three-dimensional growth and opens up more options for co-culture and extended length studies. All of these enable a more accurate, predictive *in vitro* model than regular plastic plates.

### Flexible formats

Our flexible formats include hanging and standing single-well inserts, multi-well plate assemblies, and tissue culture-treated receiver plates—all of which are available in a full selection of well sizes and membranes. We also have the microfluidic controlled cell culture systems, water purification, sterile filtration, media, kits, and research reagents that you need to develop and interrogate your model system.

### Closer to nature

- Improved cell morphology
- More intracellular organelles
- Better cell differentiation
- Higher cell densities
- More culture stability over time



**Figure 1.**

A comparison of Sertoli cells grown on various surfaces. This seminal publication demonstrates that cells grown on Millipore® membranes impregnated with reconstituted basement membrane (RBM) form tall, columnar monolayers with ovoid or pyramidal nuclei that more closely mimic *in vivo* growth.

Byers SW, Hadley MA, Djakiew D, Dym M. Growth and characterization of polarized monolayers of epididymal epithelial cells and Sertoli cells in dual environment culture chambers. *J Androl.* 1986 Jan-Feb;7(1):59-68.

### Millicell® Hanging Inserts

- For co-culturing and permeability assays
- Unique design allows easy basolateral access and decreases risk of contamination
- Optically clear and translucent PET membranes are available in 3 well sizes and up to 5 pore sizes



### Millicell® Standing Inserts

- Promotes excellent cell growth and provides an exceptional opportunity for cell studies
- Available with Biopore™ (PTFE) membrane, MF-Millipore™ (mixed cellulose esters) membrane, and polycarbonate membrane—with 5 pore sizes and 2 well sizes



### Millicell® Organotypic Standing Insert

- For high cell viability and superior study of three dimensional explant structures
- Shorter profile allows inserts to fit inside a standard petri dish
- The optically clear Biopore™ (PTFE) membrane provides high viability—for as long as 40 days—and excellent trans-membrane oxygen transport



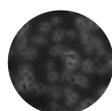
## Membrane Types



### Biopore™ PTFE Membrane (polytetrafluoroethylene)

For low protein binding, live cell viewing, and immunofluorescent applications.

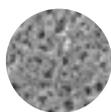
This optically transparent membrane exhibits little or no background fluorescence compared with other membrane matrices. It can be optimized for low protein-binding and low fluorescence applications, and is suitable for attachment-dependent cells if it is coated with an extracellular matrix.



### Isopore™ PCF Membrane (polycarbonate)

For growth of attachment-dependent cells without matrix.

This hydrophilic polycarbonate membrane is tissue culture-treated to allow growth of attachment-dependent cells without the use of extracellular coating matrix (ECM). It is especially recommended for transport/permeability applications.



### MF-Millipore™ MCE Membrane (mixed cellulose esters)

For exceptional anatomical and functional polarization.

This Triton®-free membrane can be used for cell surface receptor, *in vitro* toxicology, microbial attachment, and polarized uptake assays. When compared to plastic, cells had two- to three-fold higher densities and a more cuboidal morphology with rounded nuclei.



### PET Membrane (polyethylene terephthalate)

For growth of attachment-dependent cells without matrix.

This track-etched, thin film membrane is translucent or microscopically transparent for better cell visualization and monitoring of the cell monolayer. It is tissue culture treated to promote cell attachment and growth.

## Millicell®-24 and Millicell®-96 Plate Assemblies

- Complete system with a multiwell membrane-bottom plate, single-well and/or multiwell receiver tray, and lid
- Apical assist protects the cell monolayer; allows for easier pipetting and basolateral access
- Teardrop-shaped receiver wells eliminate air bubbles
- Raised well edges for improved tape sealing, and large font labeling for easy well identification



## Millicell® ERS 3.0 Digital Voltohmmeter

The Millicell® ERS 3.0 streamlines data capture with intuitive, user-friendly enhancements. Achieve more stable measurements using a self-standing, in-well probe. Keep track of your results with real-time, on-instrument voltage or resistance data recording. Simplify analysis across wells and between experiments using a cloud-based application. Obtain consistent readings with low noise, greater resolution, and high accuracy. Optimize your transepithelial electrical resistance experiments with the Millicell® ERS 3.0.

- Intuitive touchscreen interface
- On-instrument data logging and background subtraction
- Export results via ethernet, USB drive, or upload to cloud
- Corded power or battery pack power source for use on the bench or in the hood
- Adjustable electrode, compatible with a wide variety of permeable inserts including Millicell® cell culture inserts and plates.
- Built-in sensor to measure and record media temperature
- Resistance range of 0 – 100 k $\Omega$ , with 1  $\Omega$  resolution

For more information about the Millicell® ERS 3.0, please visit: [SigmaAldrich.com/millicell-ers](https://SigmaAldrich.com/millicell-ers)



## Millicell® DCI Digital Cell Imager

Assess your cell cultures with ease. The Millicell® DCI Digital Cell Imager provides quick, objective determination of common cell culture parameters including confluency, cell count, and morphology. Save time and conserve precious culture sample with in-vessel measurement. Track and record cell culture data using streamlined data management web tools. Analyze cell growth trends with instant access to historical data for more consistent cell cultures.

- Reduced user bias for more consistent cell cultures
- Hemocytometer or in-vessel measurement
- Two-click image capture
- Convenient, web-based cloud service for data analysis, storage, and archiving

For more information about the Millicell® DCI Digital Cell Imager, please visit:

[SigmaAldrich.com/millicell-dci](https://SigmaAldrich.com/millicell-dci)



## Ordering Information

Membrane	Pore Size	Device Size	Qty/ Pk	Cat. No.
<b>Millicell® Single-Well Standing Inserts</b>				
Organotypic Biopore™ (PTFE): Height 5 mm	0.4 µm	6-well	50	PICM0RG50
HA insert MF-Millipore™ (mixed cellulose esters)	0.45 µm	6-well 24-well	50 50	PIHA03050 PIHA01250
CM insert Biopore™ (PTFE)	0.4 µm	6-well 24-well	50 50	PICM03050 PICM01250
PCF insert Isopore (polycarbonate):	0.4 µm 0.4 µm 3 µm 8 µm 12 µm	6-well 24-well 24-well 24-well 24-well	50 50 50 50 50	PIHP03050 PIHP01250 PITP01250 PI8P01250 PIXP01250

<b>Millicell®-24 Cell Culture Plate Assemblies</b>				
24-well cell culture plate, single-well feeder tray, 24-well receiver tray, and lid	PCF	0.4 µm	1	PSHT010R1 PSRP010R1 PSST010R1 PSMT010R1 PSET010R1
	PET	1 µm		
	PCF	3 µm		
	PCF	5 µm		
24-well cell culture plate, 24-well receiver tray, and lid	PCF	3 µm	5	PSST010R5 PSMT010R5 PSET010R5
	PCF	5 µm		
	PCF	8 µm		
24-well cell culture plate, single-well feeder tray, and lid	PCF	0.4 µm	5	PSHT010R5 PSRP010R5
	PET	1 µm		

<b>Millicell®-96 Cell Culture Plate Assemblies</b>				
96-well cell culture plate, single-well feeder tray, 96-well receiver tray, and lid	PCF	0.4 µm	1	PSHT004R1 PSRP004R1
	PET	1 µm		
96-well cell culture plate, 96-well receiver tray, and lid	PCF	0.4 µm	5	PSHT004S5
96-well cell culture plate, single-well feeder tray, and lid	PCF	0.4 µm	5	PSHT004R5 PSRP004R5
	PET	1 µm		

Pore Size (µm)	Pore Density (pores/cm²)	Optical Clarity	6-well Cat. No.	12-well Cat. No.	24-well Cat. No.
<b>Millicell® Single-Well Hanging Inserts</b>					
0.4	100 x 10 <sup>6</sup>	Translucent	PTHT06H48	PTHT12H48	PTHT24H48
	4 x 10 <sup>6</sup>	Clear	PCHT06H48	PCHT12H48	PCHT24H48
1.0	22 x 10 <sup>6</sup>	Translucent	PLRP06H48	PLRP12H48	PLRP24H48
	2 x 10 <sup>6</sup>	Clear	PTRP06H48	PTRP12H48	PTRP24H48
3.0	2 x 10 <sup>6</sup>	Translucent	PTSP06H48	PTSP12H48	PTSP24H48
	0.6 x 10 <sup>6</sup>	Clear	PCSP06H48	PCSP12H48	PCSP24H48
5.0	0.6 x 10 <sup>6</sup>	Translucent	PTMP06H48	PTMP12H48	PTMP24H48
	0.2 x 10 <sup>6</sup>	Translucent	PTEP06H48	PTEP12H48	PTEP24H48
8.0	0.06 x 10 <sup>6</sup>	Clear	PCEP06H48	PCEP12H48	PCEP24H48

Product description	Qty/ Pk	Cat. No.
<b>Millicell® ERS 3.0 Digital Voltohmmeter</b>		
Millicell® ERS 3.0 Instrument		MERS03000
<b>Included with Instrument:</b>		
Standard Adjustable Electrode (for 6-, 12-, 24-well plates)		
Wi-Fi® USB Dongle		
Power Cord		
Verification Device		
Free six month trial subscription to Millicell® Cloud		
<b>Additional Accessories and Service Options:</b>		

Battery for Millicell® ERS 3.0	MERS03BAT
Millicell® ERS 3.0 96-well Electrode	MERS0396P
Foot Pedal Accessory	MERS03PED
Power Supply Battery	MDCI1PWRSUP
USB Adapter	MDCI1USBDD0N

<b>Cloud Software Options:</b>	
Annual subscription	MERS03CL1YR
5-Year license	MERS03CL5YR

<b>Millicell® DCI Digital Cell Imager</b>		
Millicell® DCI Instrument		MDCI10000

<b>Included with Instrument:</b>		
Wi-Fi® USB Dongle		
Power Cord		
Free six month trial subscription to Millicell® Cloud		

<b>Additional Service Options:</b>	
Cloud Software Options	
Annual subscription	MDCI1T1YR
5-Year license	MERS03CL5YR

<b>Media Filtration Products</b>		
Stericup® Quick Release, 0.22 µm PES membrane, 500 mL	12	S2GPU05RE
Sterile Millex®-GP syringe filter unit, PES membrane	50	SLGPR33RS
Steriflip®-GP filter unit, PES membrane	25	SCGP00525

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