



Millicell[®]

Cell Culture and Insert Plates

For improved physiological function

- Promotes more natural cell behavior than plastic plates
- Allows cells to access media from both the apical and basolateral sides
- Choose from the widest range of membrane-based devices

Membranes Allow More Natural Cell Growth than Plastic

With Millicell inserts, attachment or suspension cells can access media from both their apical and basolateral sides.

Cell growth, structure, and function more closely mimic what occurs *in vivo*. In addition, Millicell inserts make it possible to study both sides of the cell monolayer.

Unique Designs Make the Devices Very User-Friendly

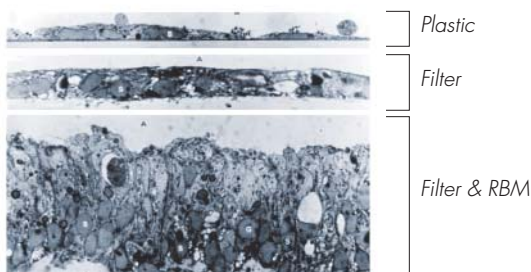
Cell culture insert devices may look similar, but Millipore products incorporate design features that can make your work easier. See inside for additional information.

Broadest Selection of Membranes and Devices Gives You Greater Choice

Choose the most appropriate membrane and device format for your research. We offer hanging and standing single-well inserts, as well as 24-well and 96-well insert plates. We also offer a range of high purity water systems and sterilizing filter devices for media preparation.

Better Cell Morphology

Cells grow better on a membrane than on plastic because they're nourished from both the apical and basolateral sides.



A comparison of Sertoli cells grown on plastic and on a Millipore membrane impregnated with reconstituted basement membrane (RBM) demonstrates that cells grown on Millipore membrane (bottom) form tall columnar monolayers with ovoid or pyramidal nuclei(s).

Single-well Cell Culture Inserts

Sterile, ready-to-use Millicell inserts are available in 12 and 30 mm diameters for 24- or 6-well plates. The inserts are easily prepared for SEM and TEM visualizing techniques, and they are compatible with cellular and/or fluorescent stains.



Insert Formats

Millicell Hanging Insert

For co-culturing and permeability assays or when inserts are frequently handled individually

A unique design allows easier basolateral access than other hanging inserts with less risk of contamination. The inserts are available in 5 pore sizes and 3 diameters, including a 1 μm pore size that is optically transparent for better visualization by microscopy.

Millicell Insert

Promotes excellent cell growth and provides an exceptional opportunity for cell studies

The original Millicell standing cell culture inserts are available with three different membrane types, including Biopore (PTFE) membrane, MF-Millipore (mixed cellulose esters) membrane, and polycarbonate membrane.

Millicell Organotypic Insert

For high cell viability and superior study of three dimensional explant structure

These standing inserts have a lower wall, so they are easy to manipulate and can fit inside a standard petri dish. The Biopore™ (PTFE) membrane provides high viability—for as long as 40 days—and excellent trans-membrane oxygen transport. The membrane is optically clear and optimized for long-term organotypic explant maintenance.



Membrane Types

Biopore Membrane (hydrophilic PTFE)*

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

Exhibits little or no background when using fluorescent stains compared to other membrane matrices. Provides optimum viewing of live cells through the transparent Biopore membrane. Can be optimized for low protein-binding and low fluorescence applications. Must be coated with an extracellular matrix when working with attachment-dependent cells.

MF-Millipore™ Membrane (mixed cellulose esters)*

For exceptional anatomical and functional polarization

The Triton®-free, mixed cellulose esters 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.

Isopore™ Membrane (polycarbonate)*

For growth of attachment-dependent cells without matrix

The 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. The inserts are available in 5 pore sizes.

PET (polyethylene terephthalate) Membrane*

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.



Specifications

Millicell Standing Inserts

Size	Surface Area (cm ²)	Pore Size (µm)	Membrane Type
24 well	0.3	0.4, 3, 8, 12	MCE, PCF, PET, PTFE
6 well	1.1		

Millicell Hanging Inserts

Size	Surface Area (cm ²)	Pore Size (µm)	Membrane Type
24 well	0.3	0.4, 1, 3, 5, 8	PET
12 well	1.1		
6 well	4.5		

* All membranes are hydrophilic

Multiwell Cell Culture Insert Plates

Sterile, ready-to-use multiwell inserts are available in 24- and 96-well sizes.

Unique features such as the apical assist and tear-drop well design provide greater convenience and reproducibility than standard multiwell cell culture insert plates.



Apical assist protects cell monolayer

A small lip on the inside edge of each well prevents the tip of the pipette from going too far into the apical well and accidentally touching the cell monolayer. (See illustration below.)

Unique design prevents trapped air

A unique tear-drop well design reduces the chance of air bubbles forming under the filter plate, which can interfere with optimal cell feeding. The single-well feeder tray has baffles to reduce media leakage and contamination.

Ports provide easy basolateral access

Patent-pending apical and basolateral access ports provide contamination-free access to cell monolayers. They also simplify cell feeding, media changes, and sample analysis.

Basolateral access ports are especially effective during transport rate analysis as there is no need to disassemble the assay system to sample basolaterally. Each well and basolateral access hole is aligned to facilitate the use of automated probes.

Membrane Pore Density by Pore Size

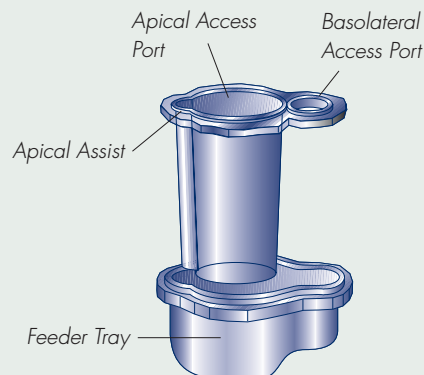
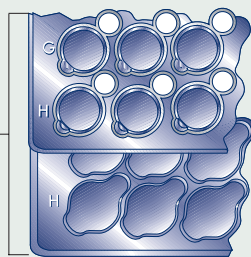
Pore Size	Membrane	Pore Density (per cm ²)
0.4 µm	PCF	1 × 10 ⁸
1 µm	PET	2 × 10 ⁶
3 µm	PCF	2 × 10 ⁶
5 µm	PCF	6 × 10 ⁵
8 µm	PCF	2 × 10 ⁵

Surface area is 0.7 cm² for 24-well plates, 0.1 cm² for 96-well plates

Millipore multiwell cell culture plates

Top View (not assembled)

Growth Assembly (single well feeding tray also available)



These automation-compatible plates incorporate a patented design to maintain assay integrity and prevent monolayer disruption, contamination or damage during analysis. The 96-well growth assemblies include a choice of a 96-well or single-well feeder trays. The format is also available in a 24-well design.

ANSI/SBS-compatible design is fully automatable

Protocols are available from Millipore at www.millipore.com/automation.

Millicell 24-well Cell Culture Insert Plates

Larger membrane area increases assay sensitivity

Millicell-24 plates have twice the surface area of other 24-well membrane-based plates, so you can increase cell growth and assay sensitivity.

Smaller liquid volumes mean less dilution of transported material

Millicell-24 plates have a recommended 1:2 ratio between the volumes of liquid in the apical and basolateral chambers, as compared to other 24-well inserts that have up to a 1:6 ratio. The smaller differential in Millicell-24 plates results in less dilution of transported material, higher signal, and greater sensitivity.



Additional features improve convenience

- Feet on the underside of the plate allow you to place it on a sterile surface in the hood while feeding—you don't need to hold the plate
- Raised well edges improve tape sealing
- Identification information printed in large, easy-to-read type

Millicell 96-well Cell Culture Insert Plates

Complete system for cell growth and drug transport experiments

With this complete system, you can grow, feed, and analyze cells in one membrane-bottom plate. The plate can be used with either a single-well or a 96-well feeding tray.

At the time of transport analysis, the plate is simply transferred to a 96-well transport tray for analysis. This streamlined design enhances compatibility with:

- Seed-and-feed systems
- Most liquid handlers
- Transepithelial electrical resistance (TEER) measurement systems

Choice of membranes lets you optimize for your application

Millicell-96 cell culture plates can be used for a wide variety of applications from cell surface receptor assays, to *in vitro* toxicology, to transport/permeability studies. See the applications guide for a complete listing.

The plates are available with thin-film polycarbonate (PCF) membrane or polyethyleneterephthalate (PET), which is available in a microscopically-transparent 1.0 μm pore size.



Application Guide

Filter Code (Recommended Pore Size)

	Millicell Standing Insert (pore size)	Millicell Hanging Insert (pore size)	Millicell 24-Well Plate (pore size)	Millicell 96-Well Plate (pore size)
Angiogenesis	PCF (3, 8)	PET (3, 5, 8)	PET (3, 5, 8)	MultiScreen MIC Plate*
Cell Proliferation	PCF (0.4)	PET (1)	PCF (0.4)	PCF (0.4) PET (1)
Cell Surface Receptors	PCF (0.4) HA (0.45) CM (0.4)	PET (1)	PCF (0.4) PET (1.0)	PCF (0.4) PET (1)
Chemotaxis	PCF (3, 8)	PET (3, 5, 8)	PET (3, 5, 8)	MultiScreen MIC Plate*
Co-culture	PCF (0.4) CM (1)	PET (1, 3)	PET (1) PCF (0.4)	PCF (0.4) PET (1)
Invasion	PCF (8)	PET (5, 8)	PET (5, 8)	MultiScreen MIC Plate*
Epithelial Cell Growth	PET (1)	PET (1)	PET (1)	PCF (0.4) PET (1)
Feeder Layers	PCF (0.4, 3, 8)	PET (0.4, 1, 3, 5, 8)	PET (0.4, 3, 5, 8)	PCF (0.4) PET (1)
Fluorescent Detection/ Immunohistochemistry	PCF CM (0.4)	PET (all)	PCF PET (1)	PCF PET (1)
In Vitro Fertilization	CM (0.4)	PET (1)	PET (1)	PET (1)
In Vitro Toxicology	PCF (0.4) CM (0.4) HA (0.45)	PET (0.4, 1)	PCF (0.4) PET (1)	PCF (0.4) PET (1)
Microbial Attachment	PCF (0.4) CM (0.4) HA (0.45)	PET (0.4, 1)	PCF (0.4) PET (1)	PCF (0.4) PET (1)
Organotypic	Organotypic (0.4)			
Phase Contrast Microscopy	CM (0.4)	PET (1)	PET (1)	PET (1)
Polarized Protein Secretions	PCF (0.4) CM (1)	PET (0.4, 1)	PCF (0.4) PET (1)	PCF (0.4) PET (1)
Polarized Uptake	PCF (0.4) CM (0.4) HA (0.45)	PET (0.4, 1)	PCF (0.4) PET (1)	PCF (0.4) PET (1)
Transport/Permeability	PCF (0.4)	PET (1)	PCF (0.4) PET (1)	PCF (0.4) PET (1)
Tumor Cell Metastasis and Invasion	PCF (8)	PET (5, 8)	PET (5, 8)	MultiScreen MIC Plate*

*For additional information, visit www.millipore.com/drugdiscovery.

Filter Codes

Code	Membrane Type	Membrane Material
CM	Biopore	Hydrophilic PTFE
HA	MF-Millipore	Mixed cellulose esters
PCF	Isopore	Polycarbonate
PET		Polyethylene terephthalate

Ordering Information

Millicell Single-well Inserts



Membrane	Pore Size	Device Size	Qty/Pk	Catalogue No.
Millicell Standing Inserts				
Organotypic Insert*				
Biopore (Hydrophilic PTFE)	0.4 μm	6 well	50	PICM ORG 50
HA Insert				
MF-Millipore™ (Mixed Cellulose Ester)	0.45 μm	24 well	50	PIHA 012 50
		6 well	50	PIHA 030 50
CM Insert *				
Biopore (Hydrophilic PTFE)	0.4 μm	24 well	50	PICM 012 50
		6 well	50	PICM 030 50
PCF Insert				
Isopore (Polycarbonate)	0.4 μm	24 well	50	PIHP 012 50
	3 μm			PITP 012 50
	8 μm			PIEP 012 50
	12 μm			PIXP 012 50
	0.4 μm	6 well	50	PIHP 030 50
Millicell Hanging Inserts				
PET Insert				
PET	0.4 μm	6 well	48	PIHT 3OR 48
	1 μm			PIRP 3OR 48
	3 μm			PISP 3OR 48
	5 μm			PIMP 3OR 48
	8 μm			PIEP 3OR 48
	0.4 μm	12 well	48	PIHT 15R 48
	1 μm			PIRP 15R 48
	3 μm			PISP 15R 48
	5 μm			PIMP 15R 48
	8 μm			PIEP 15R 48
	0.4 μm	24 well	48	PIHT 12R 48
	1 μm			PIRP 12R 48
	3 μm			PISP 12R 48
	5 μm			PIMP 12R 48
	8 μm			PIEP 12R 48

* For attachment-dependent cells, this membrane needs to be coated with an extra cellular matrix.

Ordering Information

Millicell 24-well Assemblies



Description	Components	Membrane (Pore Size)	Qty/Pk	Catalogue No.
Millicell-24 Cell Culture Plates	24-well cell culture plate, single-well feeder tray, lid	PCF (0.4 µm)	1	PSHT 010 R1
		PCF (3 µm)	5*	PSHT 010 R5
		PCF (5 µm)	1	PSST 010 R1
		PCF (5 µm)	5*	PSST 010 R5
		PCF (8 µm)	1	PSMT 010 R1
		PCF (8 µm)	5*	PSMT 010 R5
		PET (1 µm)	1	PSET 010 R1
		PET (1 µm)	5*	PSET 010 R5
			1	PSRP 010 R1
			5*	PSRP 010 R5
24-well Receiver Trays with Lids			5*	PSMW 010 R5
Single-well Feeder Trays with Lids			5*	PSSW 010 R5

Millicell 96-well Assemblies



Description	Components	Membrane (Pore Size)	Qty/Pk	Catalogue No.
Millicell-96 Cell Culture Plates	Growth plate, 96-well feeder tray, transport tray, lid	PCF (0.4 µm)	2	MACA C02 S2
		PCF (0.4 µm)	5*	MACA C02 S5
	Growth plate, single-well feeder tray	PCF (0.4 µm)	5*	MACA C02 B5
	Growth plate, single-well feeder tray	PET (1 µm)	1	PSRP 004 R1
		PET (1 µm)	5*	PSRP 004 R5
96-well Feeder/Transport Trays with Lids			5*	MACA C0R S5
Single-well Feeder Tray with Lids			5*	MACA C0F S5

* Bulk Pack

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