

Cellular Sample Preparation

Prepare, grow and analyze with advanced systems for every cell culture challenge. To complement our trusted sterile filtration tools, Merck Millipore supports both conventional and emerging formats for mammalian cell culture with innovative solutions ranging from inserts and filter plates to optimized platforms for dynamic microenvironment control.

Prepare

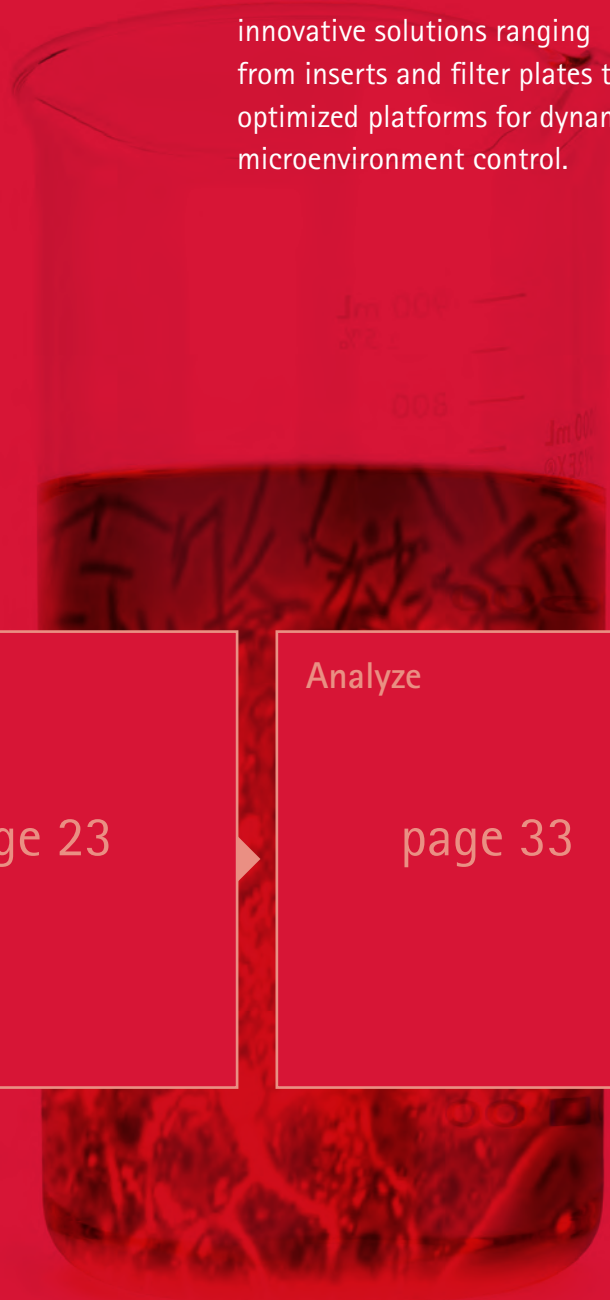
With industry-leading, innovative designs for filtration devices and over 50 years of membrane technology expertise, Merck Millipore offers a wide range of solutions to make the repetitive yet critical steps of preparing cells and media accurate, quick and easy.

Grow

page 23

Analyze

page 33



Water for Cell Culture

Certified water quality from an ISO® 9001 / cGMP environment



Water for Cell Culture has been developed for laboratories requiring less than 50 L of water/year. Intended for research use only, it has been tested and is suitable for use in experiments requiring sterile, mycoplasma-free and pyrogen-free water.

Features & Benefits

- Certified water quality: Strict quality control tests and production in an ISO® 9001 / cGMP environment provide high-quality water for critical cell culture experiments. Delivered with a Certificate of Quality.

- Mycoplasma-free: Sterile and free of pyrogens, mycoplasma, calcium and magnesium.
- Easy traceability: One label can be peeled off and affixed to a laboratory notebook for traceability in experiments.
- Volume range adapted to user needs: Available in 1 L, 0.5 L, 125 mL bottles in different package sizes.

Applications

Cell Culture, Cell-based Assays, Sterile Applications

Ordering Information

Description	Volume (mL)	Volume (L)	Qty/Pk	Catalogue No.
Ultrapure Water for Cell Culture, cell culture tested, delivered sterile, mycoplasma-free and pyrogen-free		1	1	H20CC1001
		1	6	H20CC1006
	500		1	H20CC0501
	500		6	H20CC0506
	125		6	H20CC0106
	125		24	H20CC0124

For more information visit: www.merckmillipore.com/labwater

Stericup® and Steritop® Filter Units

Efficient media sterilization and storage up to 1 L



single, ready-to-use format. Its no-tip, easy-grip flask design and balanced profile improve stability during filtration in tight laminar flow hoods, and the convenient labeling and packaging make it easy to open and track each device. The bottom of the receiver flask is slightly recessed, so you can conveniently stack capped flasks after filtration, maximizing precious refrigeration space. You can also use Steritop® bottle-top devices with your own sterile capture flask or bottle.

- Durapore® membrane for ultra-low protein binding for minimum absorption and protein loss
- Snug tight packaging, easy tear-open pouch, and convenient label designs make storing, opening and tracking your devices easy and efficient
- Stable base and easy grip design of the Stericup® device enable any user to comfortably perform all stages of the workflow in a laminar flow hood
- Recessed bottom of Stericup receiver flasks allows flasks to be stacked easily in refrigerated spaces

Features & Benefits

- Millipore Express® PLUS membrane for fastest flow rates and low protein binding to minimize absorption and protein loss, which affect downstream performance and costs

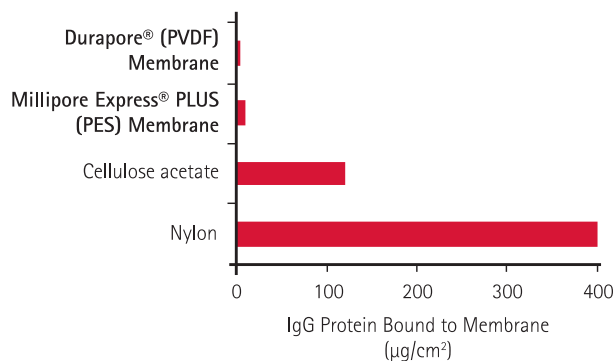
Applications

Sterilization of Aqueous Solutions (150 mL to 1 L); Sterile Filtration of Culture Media and Buffers with High-Value Protein or Small Molecule Component

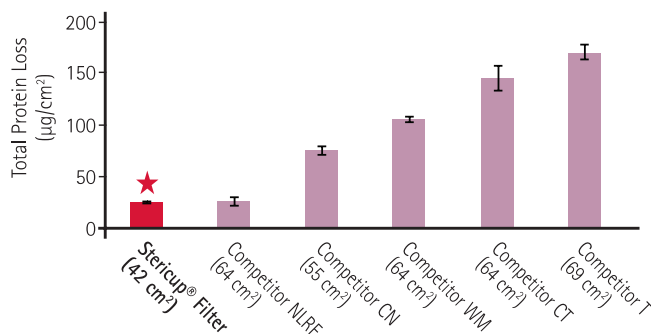
The Stericup® vacuum filtration system is the most efficient single-use, disposable process for sterile media preparation. It combines a Steritop® filter unit with a receiver flask for processing and storing volumes from 150 mL to 1,000 mL in a

Product Performance

Protein Binding by Membrane Type



Low Protein Binding: Minimizes Protein Loss



13 mm disks were cut out from different filtration devices (n=3). Protein binding was quantified by incubating discs in 1 mL tracer (1 mg/mL goat IgG in PBS containing ¹²⁵I-goat IgG at 0.1 µCi/mL). After 2 h of shaking at RT, the tracer solution was aspirated. Disks were washed 3X in PBS then assayed for bound radioactivity.

Ordering Information

Description	Membrane/Application	Pore Size (µm)	Funnel Capacity (mL)	Receiver Bottle (mL)	Qty/Pk	Catalogue No.
Stericup® Filter Units – combine a filter unit with a receiver flask and cap for processing and storage.						
Stericup®-VP Filter Units	Millipore Express® PLUS (PES) / removal of mycoplasma*	0.1	250	250	12	SCVPU02RE
			1000	1000	12	SCVPU11RE
Stericup®-GP Filter Units	Millipore Express® PLUS (PES) / fast filtration of tissue culture media and buffers	0.22	150	150	12	SCGPU01RE
			250	250	12	SCGPU02RE
			500	500	12	SCGPU05RE
			500	1000	12	SCGPU10RE
			1000	1000	12	SCGPU11RE
Stericup®-GV Filter Units	Durapore® (PVDF) /filtration of high value biomolecules, lowest protein binding	0.22	150	150	12	SCGVU01RE
			250	250	12	SCGVU02RE
			500	500	12	SCGVU05RE
			500	1000	12	SCGVU10RE
			1000	1000	12	SCGVU11RE
Stericup®-HV Filter Units	Durapore® (PVDF) /filtration of high value biomolecules, lowest protein binding	0.45	150	150	12	SCHVU01RE
			250	250	12	SCHVU02RE
			500	500	12	SCHVU05RE
			1000	1000	12	SCHVU11RE
Steritop® Bottle-Top Filter Units can be used on bottles with 33 mm or 45 mm openings.						
Steritop®-GP Filter Units	Millipore Express® PLUS (PES) / fast filtration of tissue culture media and buffers	0.22	150	33	12	SCGPS01RE
				45	12	SCGPT01RE
			250	33	12	SCGPS02RE
				45	12	SCGPT02RE
				500	33	12
1000	45	12	SCGPT05RE			
	45	12	SCGPT10RE			
Steritop®-GV Filter Units	Durapore® (PVDF) /filtration of high value biomolecules, lowest protein binding	0.22	500	45	12	SCGVT05RE
Receiver Bottles and Caps			250	45	12	SC00B02RE
			500	45	12	SC00B05RE
			1000	45	12	SC00B10RE

*0.10 µm pore size is designed to enhance maximum filtration of tissue culture media but it is not a guarantee of complete mycoplasma removal.

For more information visit: www.merckmillipore.com/cellculture

Simply better membrane technology, simply better Stericup® filters.




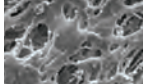
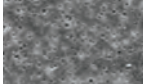
Don't take risks with your media. If your sterile filtration membranes are clogging and/or binding serum proteins in your media, your cells risk:

- Cellular damage
- Exposure to toxins
- Suboptimal cell growth

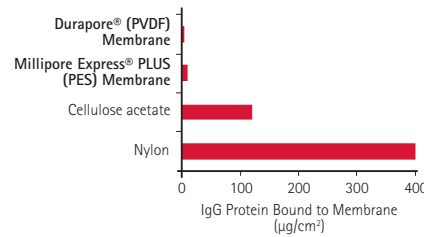
Trust Stericup® filters with NEW improved Millipore Express® PLUS membrane. Our most popular Stericup® membrane, Millipore Express® PLUS polyethersulfone (PES), now delivers even faster filtration rates while reducing overall protein and reagent loss.

Learn more at: www.merckmillipore.com/sterilefiltration

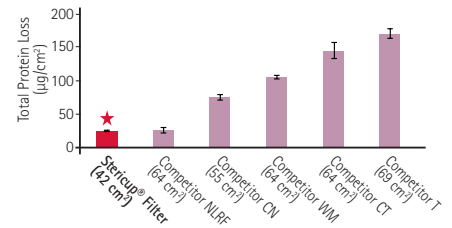
Membrane design makes a difference.

Membrane	Pore Structure	Membrane Top	Membrane Bottom	Main Features
Millipore Express® PLUS PES (polyethersulfone)	 Asymmetric			<ul style="list-style-type: none"> • High flow rate • Low protein binding • Low volume retention

Protein Binding by Membrane Type



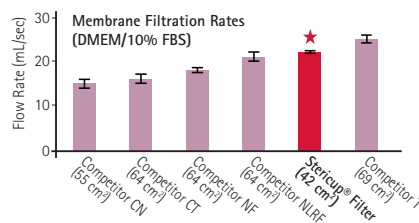
Low Protein Binding: Minimizes Protein Loss



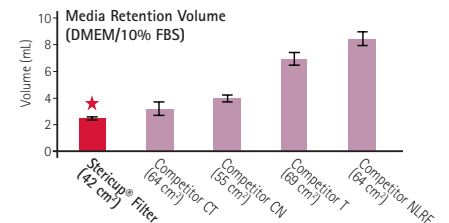
13 mm disks from were cut out from different filtration devices (n=3). Protein binding was quantified by incubating discs in 1 mL tracer (1 mg/mL goat IgG in PBS containing ¹²⁵I-goat IgG at 0.1 µCi/mL). After 2 h of shaking at RT, the tracer solution was aspirated. Disks were washed 3X in PBS then assayed for bound radioactivity.

Simply better Stericup® filters.

Faster filtration.



Lower retention volume.



500 mL of DMEM+10%FBS was filtered to completion through various 0.22 µm hydrophilic PES membrane filtration devices. Filtration rates and retention volumes were calculated (n=3).

For Stericup® filter order information, see page 10.

Steriflip® Filter Units

No sample transfer, just connect your tube and filter

The Steriflip® filter unit eliminates messy pouring during sample transfer. Directly attach the unit to a 50 mL centrifuge tube containing your sample, flip it over, and apply vacuum. The filtrate collects in the attached 50 mL centrifuge tube. Steriflip® filters come in different pore sizes that are ideal for cell isolation. These include nylon net filters in 40, 60 and 100 µm pore sizes, which are ideal for stem cell, cardiomyocyte, neurological and skeletal tissue applications. The vacuum-assisted, closed system ensures sample sterility while enabling fast separation of large volumes of cellular material for efficient recoveries.

Features & Benefits

- Eliminates messy sample transfer via a simple vacuum-assisted, closed system
- Isolate cells from cellular debris using any of the various pore-sized nylon net filters
- Ideal for sterilizing small batches of culture media
- Attaches to any standard 50 mL centrifuge tube, eliminating unnecessary materials, time and risk of spillage

Applications

Sterilization of Aqueous Solutions (up to 50 mL), Sterile Filtration of Small Batches of Culture Media, Sterile Filtration of Buffers with High Value Protein or Small Molecule Components, Cell Isolation



Specifications

Materials	
Device	MBS/Polypropylene
Membrane	As indicated in table
Inlet Fittings	Double lead thread with vacuum port
Outlet Fittings	Double lead thread for 50 mL centrifuge tube
Filtration Area, cm ²	7
Process Volume, mL	50
Hold-up Volume, µL	600
Maximum Operating Temperature, °C	45
Sterilization Method	Gamma irradiation

Ordering Information

Description	Pore Size (µm)	Qty/Pk*	Catalogue No.
Units with fast flow and low protein binding Millipore Express® (PES) membrane			
Steriflip®-GP Filter Unit	0.22	25	SCGP00525
Units with very low protein binding Durapore® (PVDF) membrane			
Steriflip®-GV Filter Unit	0.22	25	SE1M179M6
Steriflip®-HV Filter Unit	0.45	25	SE1M003M00
Unit with nylon net filter			
Steriflip®-NY Filter Unit	20.0	25	SCNY00020
	40.0	25	SCNY00040
	60.0	25	SCNY00060
	100.0	25	SCNY00100
Accessories			
Steriflip® Funnel Attachment, non-sterile		25	SC50FL025

*Each box of 25 filter units includes one centrifuge tube stand.

For more information visit: www.merckmillipore.com/cellculture

Stericap™ PLUS Universal Bottle-Top Filter Device

Fast large-volume filtration into any sized bottle



The Stericap™ PLUS Universal Bottle-Top Filter Device with Millipore Express® PLUS membrane provides fast vacuum filtration and low protein binding without the need for a prefilter in most cases. It filters quickly, without clogging, even viscous solutions typical of serum-containing media. This non-cytotoxic, non-pyrogenic device can be used to fill any vacuum-rated bottle or other container with an inner neck diameter of 20 to 67 mm. This allows maximum versatility, capacity, speed, and flowthrough efficiency when you need to filter larger volumes into containers with openings of various sizes.

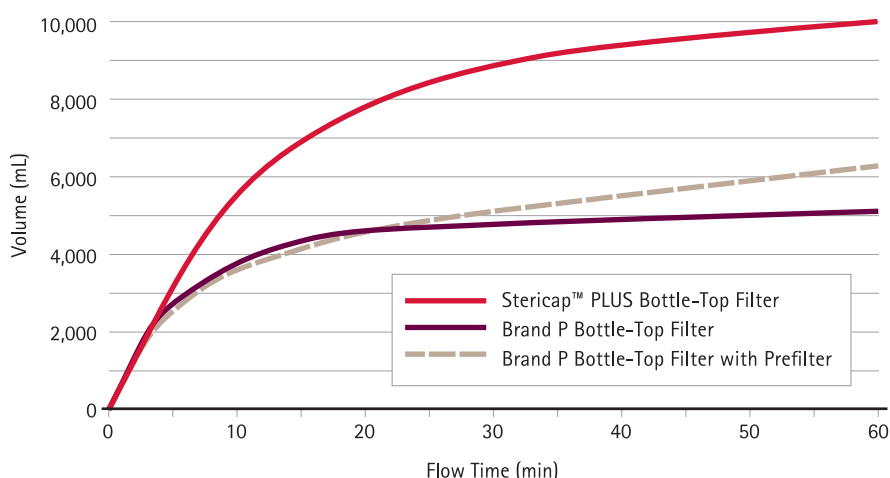
Features & Benefits

- Millipore Express® PLUS membrane for fastest flow rates and low protein binding
- Fits any vacuum-rated bottle from 20 to 67 mm in diameter for maximum flexibility
- High volume capacity for larger and less frequent preparation steps
- Easy flow control button so the filter can be easily transferred from bottle to bottle without turning off the vacuum each time
- Free of cytotoxic and pyrogenic contaminants for robust cell culture and sensitive downstream applications

Applications

Sterilization of Aqueous Solutions, Media Preparation, Buffer Preparation

Product Performance



High Flow and High Throughput

In an in-house study, reconstituted Dulbecco's Modified Eagles Medium (DMEM) with 10% fetal bovine serum was filtered through Stericap™ PLUS devices (n = 3) and competitive bottle-top devices (n = 2 each). The data show the average flow times.

Specifications

Materials	
Housing	Styrene/Polypropylene/Polyethylene
Membrane (Millipore Express® PLUS)	Polyethersulfone
Pore Size (µm)	0.22
Connections	
Inlet Connection	Hose barb
Outlet Connection	Universal bottle top
Vent	Needle valve with female Luer-Lok®
Vacuum Port	Hose barb
Filtration Area, cm²	40
Maximum Operating Vacuum	635 mm Hg (25" Hg)
Sterilization	Gamma irradiation

Ordering Information

Description	Qty/Pk	Catalogue No.
Stericap™ PLUS Filter Unit	10	SCGPCAPRE

For more information visit: www.merckmillipore.com/cellculture

Steripak™ Filter Units

Largest laboratory-scale, bottle-top filtration

Steripak™-GP filter units are designed for larger scale, pressure-driven filtration of tissue culture media with or without serum. Each filter is for a single use and is not autoclavable. The filter units come in two sizes with the smaller unit able to filter up to 10 L and the larger up to 20 L.

Features & Benefits

- Millipore Express® PLUS membrane for fastest flow rates and low protein binding
- Larger scale, pressure-driven filtration device for faster flow rates speeds

time-consuming, large-volume filtrations

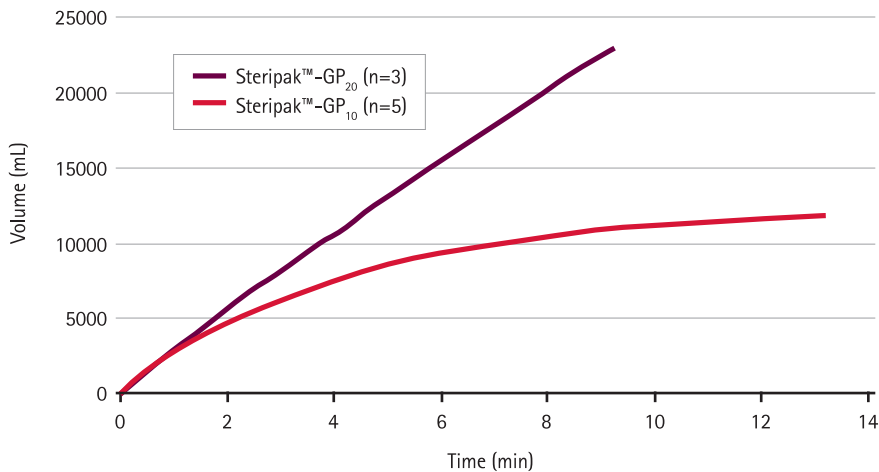
- 10 L and 20 L capacity sizes for maximum laboratory-scale filtration options
- Manually operated top air vent to prevent air lock stop of flow
- Filling bell for cleaner filling environment around the opening of the receptacle bottle

Applications

Sterilization of Aqueous Solutions, Media Preparation, Buffer Preparation



Product Performance



Steripak™ filters deliver fast flow and high throughput. Data show typical flow rates and throughput for 100 cm² (Steripak™-GP₁₀) and 200 cm² (Steripak™-GP₂₀) filters using tissue culture medium with 10% serum at 25 psi (1.7 bar).

Specifications

Materials of Construction	
Housing	SAN
Membrane	Polyethersulfone
Inlet Connection	6 mm (1/4 in.) stepped Hose Barb
Outlet Fittings	6 mm (1/4 in.) stepped Hose Barb and filling bell
Pressure, bar (psi)	Forward: 5.2 (75); Reverse: 0.35 (5)

Ordering Information

Description	Filter Area (cm ²)	Qty/Pk	Catalogue No.
Steripak™-GP ₁₀ Filter Unit	100	3	SPGPM10RJ
Steripak™-GP ₂₀ Filter Unit	200	3	SPGPM20RJ

For more information visit: www.merckmillipore.com/cellculture

Sterivex™ Filter Units

Compact design ideal for large-volume filtration using positive pressure



Filter-sterilize volumes up to 1,000 mL or 2,000 mL, using Sterivex™ pressure-driven filter units (capacity depends on the type of membrane used in the device). With three different membrane options and a variety of outlet connection options, Sterivex™ filters can fit virtually any workflow and dispense into nearly any storage container. Sterivex™ filters work with syringes, peristaltic pumps or pressure vessels and eliminate the risk of contamination associated with decanting or pipetting.

Features & Benefits

- Works with a variety of pressure devices including syringes, peristaltic pumps and pressure vessels
- Comes in multiple membrane types to suit your application needs with capacities up to 2 L

Applications

Sterilization of Aqueous Solutions

Specifications

Materials	
Device	Eastar®
Membrane	As indicated in table
Inlet Fittings	Female Luer-Lok® with upstream vent
Filtration Area, cm ²	10
Process Volume, mL	2000
Hold-up Volume, µL	200
Maximum Operating Temperature, °C	45
Maximum Inlet Pressure, bar (psi)	3.1 (45)
Sterilization Method	Gamma irradiation

Ordering Information

Description	Process Volume (mL)	Outlet Type	Qty/Pk	Catalogue No.
Units with fast flow and low protein binding 0.22 µm Millipore Express® (PES) membrane for sterilization of aqueous solutions; supplied sterile				
Sterivex™-GP Filter Unit	2000	Filling bell	10	SVGPB1010
		Male Luer-Lok®	15	SVGPL10RC
		Male nipple	15	SVGPO1015
		Male nipple	50	SVGPO1050
Units with very low protein binding 0.22 µm Durapore® (PVDF) membrane for sterilization of aqueous solutions; supplied sterile				
Sterivex™-GV Filter Unit	1000	Filling bell	10	SVGVB1010
		Male Luer-Lok®	15	SVGVL10RC
		Male nipple	15	SVGVO1015
		Male nipple	50	SVGVO10RS
Units with very low protein binding 0.45 µm Durapore® (PVDF) membrane for clarification of aqueous solutions; supplied sterile				
Sterivex™-HV Filter Unit	1000	Filling bell	10	SVHVB1010
		Male Luer-Lok®	15	SVHVL10RC
		Male nipple	15	SVHV01015
		Male nipple	50	SVHV010RS

For more information visit: www.merckmillipore.com/cellculture

Sterile 33 mm Millex® Filters

20% more filter surface than 25 mm filters for significantly higher flow rate and throughput

Millex® syringe filters provide convenient sterilization of small volumes and are ideal for solutions such as antibiotics and tissue culture additives. Their unsurpassed quality and consistency of results have led to the development of many sample preparation methods that specify Millex® filters. Now sterile Millex® filter units are available in larger 33 mm housing with either MCE, PVDF or PES membranes for increased filtration performance and ease of use.



33 mm Millex® Filter Advantages

Faster flow rate for greater throughput

The larger filter surface area increases flow rate and throughput. It also makes it easier to filter solutions because it reduces the pressure required to empty the syringe.

Exceptionally high fluid recovery

In addition to improving filtration throughput, Millex® 33 mm filters also have an exceptionally low hold-up volume (less than 100 µL) despite the large size of the membrane surface area and housing, so there is minimal sample loss within the device during filtration.

Ultra-low protein binding maximizes recovery and accuracy

Whether you choose to use the fastest flow, low-protein-binding Millipore Express® PLUS (PES) membrane-containing Millex® 33 mm filters or the ultra-low protein binding version containing our Durapore® PVDF membrane, you will be assured maximum recovery of soluble proteins, such as serum components typically added to cell culture media.

Preserving these additives translates into consistently intact, sterile cell culture media, ensuring reproducible cell growth, behavior and downstream results.

Higher pressure rating for speed and reduced risk of bursts

Millex® filters have a very high maximum housing pressure of 10.5 bar (150 psig), which means you can filter solutions faster than before and practically eliminate the risk of bursts due to overpressurizing the fluid flow, which can often happen with syringe filtration.

Color-coded for instant visual identification

The color-coded band on the Millex® housing clearly indicates which membrane is inside, so you don't have to read labels or risk confusing similar-sized devices on the bench.

Automated ISO certified cleanroom manufacture

Millex® filters are manufactured in a closed, controlled environment using an automated process. Human hands, which can introduce variability, never touch the filter during assembly. A Certificate of Quality included in each box describes our quality standards in detail.

Choice of membranes

Millex® 33 mm filters are available with three membranes:

- Millipore Express® PLUS (PES) membrane
- Durapore® (PVDF) membrane
- Mixed cellulose esters (MCE) membrane

For sterile Millex® filter ordering information, see page 20.

Sterile Millex® Syringe Filter Selection Guide

Research Applications

Tissue culture media and additives / Buffers / DMSO / Biological solutions

Medical Applications

Drugs / Vitamins / Clinical solutions

Membrane	Pore Size (µm)	Diameter (mm)	Process Volume (hold-up)	Housing and Sterilization Method	CE	(M)	50 units/pk	100 units/pk	250 units/pk	1,000 units/pk
Durapore® (PVDF) Membrane Lowest binding membrane for protein-rich solutions	0.1 µm Sterile Filtration & Mycoplasma removal	33 mm	100 mL (<100 µL)	Modified Acrylic, RS	●		SLV033RS			
						●	SLVM33RS			
	0.22 µm Sterile Filtration	33 mm	100 mL (<100 µL)	Modified Acrylic, RS	●		SLGV033RS		SLGV033RB	SLGV033RK
						●	SLGVM33RS			
					13 mm	100 mL (<100 µL)	HDPE, EO			
	0.45 µm Clarification of sterile solutions	33 mm	100 mL (<100 µL)	Modified Acrylic, RS			SLHV033RS		SLHV033RB	SLHV033RK
						●	SLHVM33RS			
					13 mm	100 mL (<100 µL)	HDPE, EO			
	5.0 µm Clarification of Sterile Solutions	25 mm	100 mL (<100 µL)	PVC, EO			SLSV025LS			
4 mm					100 mL (<100 µL)	HDPE, EO				
Millipore Express® PLUS (PES) Membrane Fast flow and low binding for cell culture media preparation	0.22 µm Sterile Filtration	33 mm	200 mL (<100 µL)	Modified Acrylic, RS	●		SLGP033RS		SLGP033RB	SLGP033RK
						●	SLGPM33RS			
	0.45 µm Clarification of sterile solutions	33 mm	200 mL (<100 µL)	Modified Acrylic, RS			SLMP025SS		SLHP033RB	
						●	SLMPL25SS*			
						●	SLHP033RS			
MF-Millipore™ (MCE) Membrane Most referenced general purpose membrane	0.22 µm Sterile Filtration	33 mm	100 mL (<100 µL)	Modified Acrylic, RS	●		SLGS033SS		SLGS033SB*	
						●	SLGSM33SS			
	0.45 µm Clarification of sterile solutions	33 mm	100 mL (<100 µL)	Modified Acrylic, RS			SLGSV255F SLGL0250S*		SLHA033SB	
						●	SLHA033SS			
						●	SLHAM33SS			
						●	SLAA033SS			
0.80 µm Clarification of sterile solutions	33 mm	100 mL (<100 µL)	Modified Acrylic, RS			SLAA033SS		SLAA033SB		
					●	SLAAM33SS				
PTFE, Hydrophilic Broad chemical compatibility	0.2 µm Sterile Filtration of DMSO	13 mm	10 mL (<25 µL)	HDPE, EO				SLLG013SL		
		25 mm	100 mL (<100 µL)	HDPE, EO			SLLG025SS			

CE = CE Marked, (M) = Medical device, * Male Luer-Lok®

HDPE = High-density polyethylene, PVC = Polyvinyl chloride, RS = Radiosterilized, EO = Ethylene Oxide-treated

Sterile Millex® Syringe Filter Selection Guide

Venting and Gas Filtration

Sterile filtering gases / Venting sterile containers / In-line vacuum pump protection / Transducer protection

Membrane	Pore Size (µm)	Diameter (mm)	Housing and Sterilization Method	Inlet Connection	Outlet Connection	10 units/pk	25 units/pk	50 units/pk	100 units/pk				
Durapore® (PVDF) Membrane Super hydrophobic membrane for transducer protection	0.22 µm	25 mm	PVC, EO	FLL	MLS			SLGVS25PS					
								SE2M407H0**					
								SE2M407H0**					
					MLL			SLGVS25US					
								SLGVS25XS					
				SPIKE			SLGVS25XS						
								SLGVS25LS					
Fluoropore™ (PTFE) Membrane Hydrophobic chemistry for gas filtration	0.20 µm	25 mm	PVC, EO	FLL	MLS			SLFG025LS					
								SLFG25BS					
								SLFGN25VS					
					Needle								
					MLS			SLFG02550					
	0.20 µm	50 mm	PP, Autoclavable	SHB	SHB	SHB	SLFG05010						
							1/8 in. NPTM				SLFG55010		
							SHB (latex)				1/8 in. NPTM	SLFG65010	SLFG65000
							1/8 in. NPTM				1/8 in. NPTM	SLFG75010	SLFG75000
							SHB (silicone)				SHB (silicone)	SLFG85010	SLFG85000
	0.45 µm	50 mm	PP, Autoclavable	SHB	SHB	SLFH05010			SLFH05000				
	1.0 µm	50 mm	PP, Autoclavable	SHB	SHB	SLFA05010			SLFA05000				

**Solvent resistant housing

PVC = Polyvinyl Chloride, PP = Polypropylene, EO = Ethylene Oxide

FLL = Female Luer-Lok® outlet, FLS = Female Luer-slip™, MLL = Male Luer-Lok® outlet, MLS = Male Luer-slip™, SHB = Stepped Hose Barb

Sterile Millex® Syringe Filters for Liquid and Air Sterilization

Faster flow rates and higher recoveries



Available in 4, 13, 25, 33, and 50 mm diameters with a variety of membranes, Millex® sterile syringe filters are ideal for sterilizing organic solvents, aqueous solutions or air/gas. Many sample preparation methods specify Millex® filters because of their unsurpassed quality and consistency. Millex® filters not only feature minimal hold-up volume and faster flow rates, but they also withstand higher operating pressures and are chemically compatible with a range of samples and solvents to minimize leaching of extractable impurities. Millex® filters are produced in a controlled, automated environment with the highest quality standards. Sterile devices come with a certificate of quality, with select devices marked for medical applications.

- Medical Device-rated devices in some countries including vented devices for direct patient care
- Specialized filter units to protect hemodialysis transducers from blood and moisture and for vacuum line protection
- Low extractables and low absorption membranes for minimum sample losses
- Faster flow rates and higher operating pressures for high performance needs

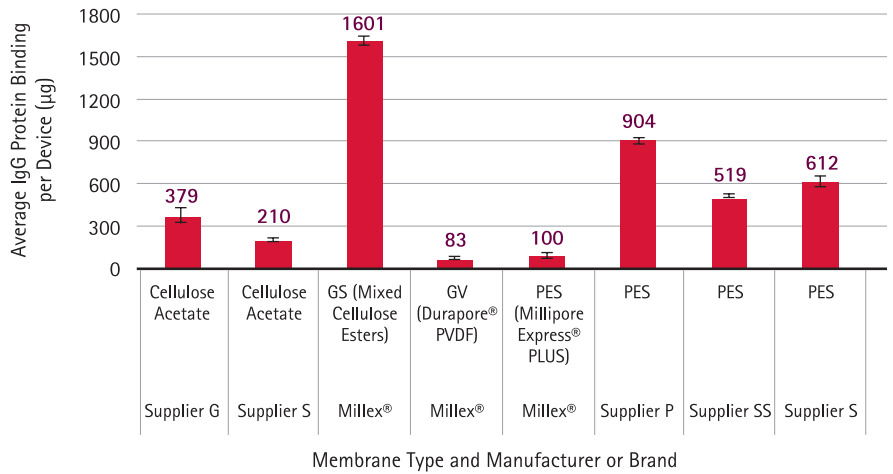
Applications

Sterilization of Aqueous Solutions, Organic Solvents and Gases, Filtration of High Value Protein or Small Molecule Components, Select Medical Device Applications (Some Including Direct Patient Care Depending on Country/Region)

Features & Benefits

- Tailored to a variety of applications based on membrane type, housing and validation rating

Product Performance

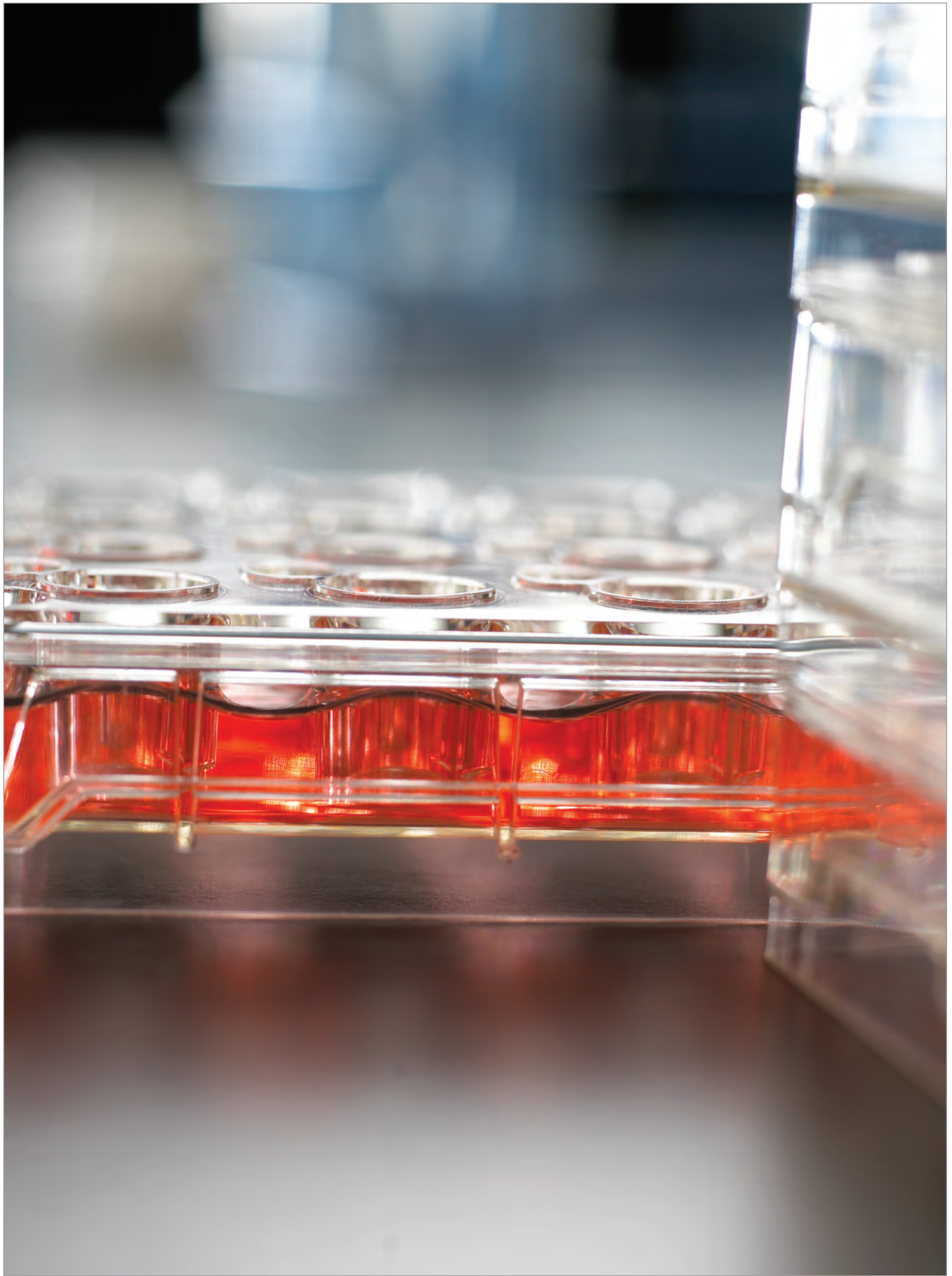


Millex® filters with PVDF and PES membranes exhibit significantly less protein binding than other syringe filters. Membrane disks cut from various syringe filters were offered a 1 mg/mL tracer solution (1 mg/mL goat IgG in PBS with 0.1 µCi/mL of ¹²⁵I-goat IgG). The chart shows the amount of protein bound after two hours of shaking and three washes with PBS.

Ordering Information

Description	Pore Size (µm)	Type	Process Volume	Hold-up Volume	Sterilization Method	Qty/Pk	Catalogue No.
4 mm Diameter							
Durapore® (PVDF) Membrane	0.22	GV	1 mL		EO	100	SLGV004SL
	0.45	HV	1 mL		EO	100	SLHV004SL
13 mm Diameter							
Hydrophilic PTFE Membrane	0.22	LG	10 mL		EO	100	SLLG013SL
Durapore® (PVDF) Membrane	0.22	GV	10 mL		EO	100	SLGV013SL
	0.45	HV	10 mL		EO	100	SLHV013SL
25 mm Diameter							
Durapore® (PVDF) Membrane	5	SV	100 mL		EO	50	SLSV025LS
Millipore Express® (PES) Membrane	0.22	GP	100 mL		EO	50	SLMP025SS
Millipore Express® (PES) Membrane with male Luer-Lok® outlet	0.22	GP	100 mL		EO	50	SLMPL25SS
Mixed Cellulose Esters (MCE) Membrane with male Luer-Lok® outlet	0.22	OR	100 mL		EO	50	SLGL025OS
Mixed Cellulose Esters (MCE) Membrane with vented inlet	0.22	GS	100 mL		EO	50	SLGSV255F
Mixed Cellulose Esters (MCE) Membrane	0.8	AA	100 mL		EO	50	SLAAV255F
Hydrophilic PTFE Membrane	0.22	LG	100 mL		EO	50	SLLG025SS
Glass Filter for Prefiltration	NA	AP	100 mL		Autoclavable	50	SLAP02550
33 mm Diameter							
Millipore Express® PLUS (PES) Membrane Fast flow and low binding for cell culture media preparation	0.22	GP	200 mL		RS	50	SLGP033RS
						250	SLGP033RB
						1000	SLGP033RK
	0.45	GP	200 mL		RS	50	SLHP033RS
					250	SLHP033RB	
Durapore® (PVDF) Membrane Lowest binding membrane for protein rich solutions	0.1	W	100 mL		RS	50	SLV033RS
						250	SLGV033RS
	0.22	GV	100 mL		RS	250	SLGV033RB
						1000	SLGV033RK
	0.45	GV	100 mL		RS	50	SLHV033RS
					250	SLHV033RB	
					1000	SLHV033RK	
Mixed Cellulose Esters (MCE) Membrane Most referenced general purpose membrane	0.22	GS	100 mL		EO	50	SLGS033SS
						250	SLGS033SB
	0.45	HA	100 mL		EO	50	SLHA033SS
						250	SLHA033SB
0.8	AA	100 mL		EO	50	SLAA033SS	
					250	SLAA033SB	

For more information visit: www.merckmillipore.com/cellculture



Cellular Sample Preparation



Prepare

page 9

Grow

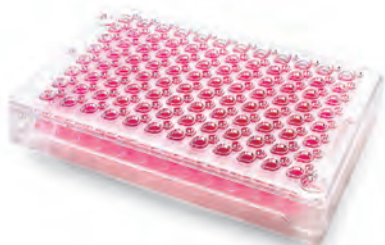
Not only do our cell culture devices and surfaces provide the most convenient, reliable, analysis-ready cell cultures, but they also yield cell growth, structure, and function that more closely mimic what occurs *in vivo*. Spend less time growing cells and fumbling with clumsy devices and more time on your research.

Analyze

page 33

Millicell® 24 & 96-Well Cell Culture Insert Plates

Membrane-based culture for optimum growth and differentiation



Millicell® plates are optimized to grow and sustain high integrity cell monolayers. Cells grown on Millicell® plate membranes grow better than on plastic because the cells are nourished from both the apical and basolateral sides. Cell growth and function more closely mimic what occurs in vivo. Millicell® plates are designed for analysis as well as cell growth and can be used manually or with automated cell seeding, feeding and washing systems.

Features & Benefits

- Compatible with seed-and-feed systems
- Works with automated liquid handling systems and span pipettes
- Basolateral and apical access to cells
- Transepithelial electrical resistance (TEER) measurement systems available

Applications

Cell Growth, Feeding, Cell Analysis

Specifications

Sterility	Sterile
Dimensions (l x w x h) (mm)	128 x 84.8 x 26.2
Filtration Area (cm ²), 24 well	0.7
Filtration Area (cm ²), 96 well	0.12

Ordering Information

Description	Media	Chemistry	Device Material	Configuration	Pore Size (µm)	Qty/Pk	Catalogue No.
Millicell®-24-Well Plates and Accessories							
Millicell®-24 Cell Culture Insert Plate, polycarbonate	Isopore	Polycarbonate	Polystyrene	24 well	0.4	1	PSHT01R1
					0.4	5	PSHT01R5
					3.0	1	PSST010R1
					3.0	5	PSST010R5
					5.0	1	PSMT010R1
					5.0	5	PSMT010R5
					8.0	1	PSET010R1
					8.0	5	PSET010R5
Millicell®-24 Cell Culture Insert Plate, polyethylene terephthalate	NA	Polyethylene Terephthalate	Polystyrene	24 well	1.0	1	PSRP010R1
					1.0	5	PSRP010R5
24-Well Receiver Tray with Lid	NA	NA	Polystyrene	24 well	NA	5	PSMW010R5
Single-Well Receiver Tray with Lid	NA	NA	Polystyrene	1 well	NA	5	PSSW010R5
Millicell®-96-Well Plates and Accessories							
Millicell®-96 Cell Culture Insert Plate, polycarbonate	Isopore	Polycarbonate	Polystyrene	96 well/ Single well feeder	0.4	1	PSHT004R1
						5	PSHT004R5
				96 well/ 96 well feeder	0.4	5	PSHT004S5
Millicell®-96 Cell Culture Insert Plate, polyethylene terephthalate	NA	Polyethylene terephthalate	Polystyrene	96 well/ Single well feeder	1.0	1	PSRP004R1
						5	PSRP004R5
96-Well Feeder/Transport Tray with Lid	NA	NA	Polystyrene	96 well	NA	5	MACAC0R55

For more information visit: www.merckmillipore.com/cellculture

Millicell® Cell Culture Inserts

Optimized cell growth, attachment and differentiation

With Millicell® inserts, adherent 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 design allows easier basolateral access than other hanging inserts with less risk of contamination
- Available in 5 pore sizes and 3 diameters
- 1 µm pore size is optically transparent for better visualization by microscopy

Features & Benefits

- For co-culturing and permeability assays

Applications

Cell Attachment, Cell Growth, Cell Differentiation, Immunocytochemistry

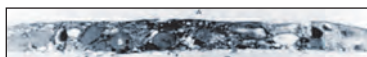


Product Performance

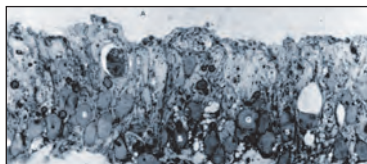
Plastic



Filter



Filter & RBM



Cells grow better on a membrane than on plastic because they are nourished from both the apical and basolateral sides. A comparison between Sertoli cells grown on plastic and on a Millicell® membrane impregnated with reconstituted basement membrane (RBM) demonstrates that cells grown on Millicell® membrane (bottom) form tall columnar monolayers with ovoid or pyramidal nuclei.

Ordering Information

Description	Media	Chemistry	Pore Size (µm)	Configuration	Filtration Area, (cm ²)	Qty/Pk	Catalogue No.
Millicell® Standing Inserts							
Organotypic Insert	Biopore™	Hydrophilic PTFE	0.4	6 well	4.2	50	PICMORG50
HA Insert	MF-Millipore®	Mixed Cellulose Esters	0.45	24 well	0.6	50	PIHA01250
				6 well	4.2	50	PIHA03050
CM Insert	Biopore™	Hydrophilic PTFE	0.4	6 well	4.2	50	PICM01250
				24 well	0.6	50	PICM03050
PCF Insert	Isopore™	Polycarbonate	0.4	24 well	0.6	50	PIHP01250
				6 well	4.2	50	PIHP03050
				24 well	0.6	50	PITP01250
				24 well	0.6	50	PIXP01250
				24 well	0.6	50	PI8P01250
Millicell® Hanging Inserts							
PET Insert (Polyethylene terphthalate)		PET	0.4	6 well	4.5	48	PIHT30R48
				6 well	4.5	48	PIRP30R48
				6 well	4.5	48	PISP30R48
				6 well	4.5	48	PIMP30R48
				6 well	4.5	48	PIEP30R48
				12 well	1.1	48	PIHT15R48
				12 well	1.1	48	PIRP15R48
				12 well	1.1	48	PISP15R48
				12 well	1.1	48	PIMP15R48
				12 well	1.1	48	PIEP15R48
				24 well	0.33	48	PIHT12R48
				24 well	0.33	48	PIRP12R48
				24 well	0.33	48	PISP12R48
				24 well	0.33	48	PIMP12R48
				24 well	0.33	48	PIEP12R48

For more information visit: www.merckmillipore.com/cellculture

Millicell® EZ SLIDES

From culture to analysis all in one EZ SLIDE



Simplify your cell analysis by using the multi-chamber Millicell® EZ SLIDE to culture, fix, stain and view your samples all in one device. There's no need to remove the medium chamber from the slide prior to fixing or staining. Easily remove wells without worrying about breaking slides or harming cells. Acquire data simply and quickly with Millicell® EZ SLIDES.

Features & Benefits

- Breakable tabs for easy well removal
- No adhesive used to attach wells to slide
- No leaky wells
- Polypropylene wells allow for fixing and staining with wells still attached
- Slide holder protects slide from damage

Applications

Cell Growth, Immunocytochemistry of Fixed or Live Cells, Microscopy

Specifications

Chamber Capacity	4-Well Unit	8-Well Unit
Growing Area per Well, cm ²	1.7	0.7
Media Volume Range, mL	0.5-1.7	0.2-0.7
Materials	Component	Material
	Lid	Polystyrene
	Wells	Polypropylene
	Slide	Glass
	Slide holder	Polystyrene
Sterilization Compatibility	Ethylene oxide	

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell® EZ SLIDE, 4-well glass	16	PEZGS0416
	96	PEZGS0496
Millicell® EZ SLIDE, 8-well glass	16	PEZGS0816
	96	PEZGS0896
Millicell® EZ SLIDE Microscope Slide Holder	1	PEZXMSH01
Millicell® EZ SLIDE, unprinted 4-well glass (without pink ink), non-sterile	16	PEZGUP0416
Millicell® EZ SLIDE, with confocal cover slip, non-sterile (4-well, 16/pk)	16	PEZCON0416

For more information visit: www.merckmillipore.com/cellculture

Millicell® HY Multilayer Culture Flasks

High throughput culture flasks

We can't make your cells grow any faster, but with our flasks, you'll spend less time in the hood. When growing large numbers of cells, you need a high throughput flask to save space and time. Each Millicell® HY (high yield) flask provides a consistent, quality growth environment across all layers, with the same volume of media in each layer. Recovering cells is as easy as growing them. With easy access to pipetting or pouring, Millicell® HY flasks deliver reproducible, high yields of healthy cells. Plus, they've been tested for use with stem cells.

Features & Benefits

- Consistent, high cell yields and viability
- Same media requirements (volume per unit area) as traditional T-flasks
- Uniform culture conditions without media leaking or spillover between layers

Applications

Cell Growth



Specifications

Materials	Material	
Flask	Polystyrene	
Cap	High density polyethylene	
Cap Vent	0.2 µm polypropylene	
Dimensions	T-600	T-1000
Length, cm	22.2	22.2
Width, cm	12	12
Height (excluding cap), cm	3.2	5.1
Height (including cap), cm	5.5	7.4
Surface area, cm ²	596.4	984.4
Media Volume, mL	120-180	200-300
Sterilization Compatibility	Ethylene oxide	

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell® HY Flask T-600, sterile	16	PFHYS0616
Millicell® HY Flask T-1000, sterile	8	PFHYS1008

For more information visit: www.merckmillipore.com/cellculture

ECM Proteins and Coated Plates

Meet cell type-specific needs for growth and adhesion



Studies show that anchorage-dependent cells growing on extracellular matrix (ECM) proteins undergo more efficient plating, have a higher proliferation rate, reach a higher density, and require lower serum and growth factor concentrations—demonstrating enhanced differentiation potential. We offer a wide variety of ECM proteins and coated cultureware to meet the individual needs of your cell line. Our ECM Cell Culture Optimization Array can help you determine the best coating and concentration for your particular cell type. You can choose from the convenience of precoated cultureware or the flexibility of making your own coatings with our ECM proteins and plates.

Features & Benefits

- ECM proteins available as stand-alone options for your own experimental designs
- Pre-coated cultureware and strips for maximum convenience and reproducibility
- Optimization array for easy ECM identification and optimal concentration determination

Applications

Enhancing Cell Adhesion for Difficult Cultures and Proliferation Studies, Cell Migration and Invasion Assays, Cell Survival and Differentiation Assays

Ordering Information

Description	Configuration	Surface Area (cm ²)	Media Volume (mL)	Sterility	Qty/Pk	Catalogue No.
Milliccoat™ ECM Coated Tissue Culture Plate						
Cell Culture Plate with Collagen I Coating	6 well	9.6	2.0-5.0	Non-sterile	5	PICL06P05
	24 well	1.9	0.5-1.0	Non-sterile	5	PICL24P05
Cell Culture Plate with Poly-D-Lysine Coating	6 well	9.6	2.0-5.0	Non-sterile	5	PIDL06P05
	24 well	1.9	0.5-1.0	Non-sterile	5	PIDL24P05
Cell Culture Plate with Fibronectin Coating	6 well	9.6	2.0-5.0	Non-sterile	5	PIFB06P05
	24 well	1.9	0.5-1.0	Non-sterile	5	PIFB24P05
Cell Culture Receiver Plate	6 well	9.5	1.9-4.3	Sterile	50	PIMWS0650
	12 well	3.8	0.9-1.8	Sterile	50	PIMWS1250
	24 well	1.9	0.6-1.6	Sterile	50	PIMWS2450

Ordering Information

Description	Configuration	Qty/Pk	Catalogue No.
Milliccoat™ ECM Coated Strips			
Milliccoat™ Human Fibronectin Coated Strips	96 well	1 plate	ECM101
Milliccoat™ Human Vitronectin Coated Strips	96 well	1 plate	ECM102
Milliccoat™ Human Laminin Coated Strips	96 well	1 plate	ECM103
Milliccoat™ Human Collagen Type I Coated Strips	96 well	1 plate	ECM104
Milliccoat™ Human Collagen Type IV Coated Strips	96 well	1 plate	ECM105
Milliccoat™ ECM Screening Kit, 1 ea. ECM101-ECM105	96 well	1 set	ECM205
ECM Cell Culture Optimization Arrays			
ECM Cell Culture Optimization Array (Colorimetric)	96 well	1 kit	ECM541
ECM Cell Culture Optimization Array (Colorimetric)	48 well	1 kit	ECM542
ECM Cell Culture Optimization Array (Fluorometric)	96 well	1 kit	ECM546
ECM Proteins: Collagen			
Human Collagen Type I		100 µg	CC050
Human Collagen Type II		100 µg	CC052

Ordering Information – Continued

Description	Qty/Pk	Catalogue No.
Human Collagen Type III	100 µg	CC054
Human Collagen Type IV	100 µg	CC076
Human Collagen Type V	100 µg	CC077
Collagen Type III, bovine purified protein	10 mg	CC078
Bovine Collagen Type IV	500 µg	CC083
Bovine Collagen Type VI	250 µg	CC086
Collagen Type I, rat tail	100 mg	08-115
ECM Proteins: Fibronectin		
Human Plasma Fibronectin Purified Protein	1 mg	FC010
Human Plasma Fibronectin Purified Protein	5 mg	FC010-5MG
Human Plasma Fibronectin Purified Protein	10 mg	FC010-10MG
Human Plasma Fibronectin Purified Protein	100 mg	FC010-100MG
Fibronectin 40 kDa α Chymotryptic Fragment (Heparin-binding region), Human purified	500 µg	F1903
Fibronectin 120 kDa α Chymotryptic Fragment (Cell Attachment region), Human purified	500 µg	F1904
Fibronectin, Bovine	500 µg	FC014
ECM Proteins: Laminin		
Laminin, mouse purified	1 mg	CC095
Human Merosin	500 µg	CC085
Human Laminin (pepsinized) Purified Protein	100 µg	AG56P
Rat Laminin-5	10 µg	CC145
ECM Proteins: Vitronectin		
Vitronectin, Human Purified Protein	100 µg	CC080
Vitronectin, human recombinant	500 µg	08-126
ECM Proteins: Tenascin		
Human Tenascin-C Purified Protein	100 µg	CC065
Chicken Tenascin	100 µg	CC115
Chicken Tenascin	50 µg	CC118
ECM Proteins: Additional Matrices		
ECL Cell Attachment Matrix	5 mg	08-110
Poly-D-Lysine solution, 1.0 mg/mL	20 mL	A-003-E
Chicken Extracellular Chondroitin Sulfate Proteoglycans	100 µg	CC117
Synthetic Laminin Peptide for Rat Neural Stem Cells	5 x 3 mg	SCR127

For more information visit: www.merckmillipore.com/cellculture

Millicell ERS-2 Volt-Ohm Meter and Accessories

Reliably measure integrity of epithelial monolayers



The Millicell® ERS-2 (Electrical Resistance System) reliably measures membrane potential and resistance of epithelial cells in culture. This device qualitatively measures cell monolayer health and quantitatively measures cell confluence. A silver/silver chloride (Ag/AgCl) pellet on each electrode tip measures voltage. Due to the small size of the electrodes, you can easily measure transepithelial voltage and the resistance of cells grown on microporous membranes. Accessories include a replacement (fixed) electrode set, adjustable electrode set and a specialized electrode set for use with Millicell®-96 cell culture insert plates.

Features & Benefits

- Portable instrument that fits into laminar flow hoods
- Measurements do not compromise sterility or damage cells on the membrane
- Widely cited and recommended in epithelial cell culture protocols

Applications

Measurement of Transepithelial Electrical Resistance (TEER), Cell Monolayer Health Assessment, Quantitative Measurement of Confluence

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell® ERS-2 Voltohmeter	1	MERS00002
Replacement Electrodes, 1 pair	1	MERSSTX01
Adjustable Electrodes, 1 pair	1	MERSSTX03
Specialized Electrodes (for Millicell® 96-well plate only), 1 pair	1	MERSSTX00
Replacement Test Electrodes, 1 pair	1	MERSSTX04
Replacement Battery, 6V NiMH 2200 mAH, 1 each	1	MERSBAT01

For more information visit: www.merckmillipore.com/cellculture

Scepter™ 2.0 Handheld Automated Cell Counter

Accurate cell counts in 30 seconds

While other automated counters consume bench space and rely on object recognition software, manual focusing, and clumsy loading chambers, the Scepter™ cell counter provides true automation without the error that accompanies vision-based systems. Using Coulter principle-based technology for the ultimate in accuracy, the Scepter™ cell counter does all the work and delivers reliable cell counts and cell size information in less than 30 seconds. The histogram output reflects heterogeneous cell populations, and you can adjust gating parameters to focus on the cells that interest you most. This system is intended for research use only and has been tested with cell types representative of those in use today.

Features & Benefits

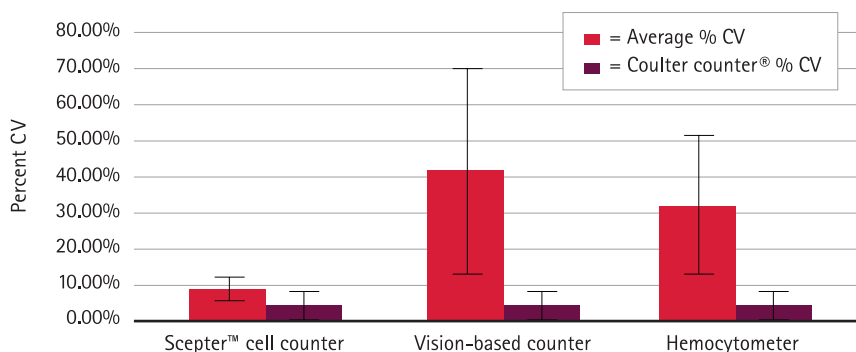
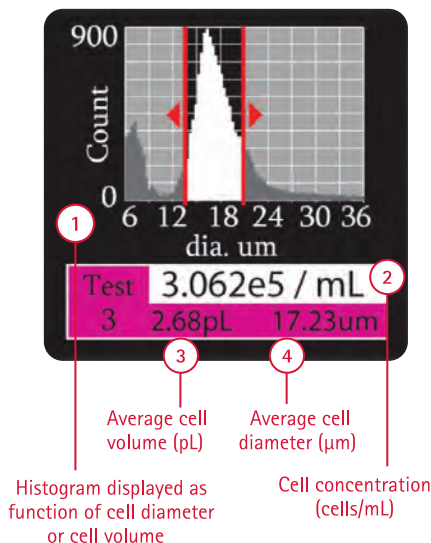
- The Scepter™ cell counter's screen displays multiple pieces of data
- Cell concentration for estimating culture density and readiness for testing or passaging
- Average cell size for cell health and behavior related to cell dimensions
- Average cell volume for cell health and behavior related to cell dimensions
- Histogram of size or volume distribution for mixed populations of cells and overall cell population health



Applications

Cell Health Monitoring, Checking Quality of Cultures, Ensuring Sample-to-Sample Consistency

Product Performance



The average percent coefficient of variation (CV) for each counting method shown was calculated using cell concentration measurements at 50,000 cells/mL samples of 19 different cell lines. The Scepter™ cell counter is more precise than vision-based counting and hemocytometry, and approaches the precision of the Coulter Counter® standard (maroon bars). Error bars represent standard deviation.

Ordering Information

Description	Qty/Pk	Catalogue No.
Scepter™ 2.0 Handheld Automated Cell Counter with 40 µm Scepter™ Sensors (50 Pack)	1	PHCC20040
Scepter™ 2.0 Handheld Automated Cell Counter with 60 µm Scepter™ Sensors (50 Pack)	1	PHCC20060
Includes:		
Scepter™ Cell Counter	1	
Downloadable Scepter™ Software	1	
O-Rings	2	
Scepter™ Test Beads	1	PHCCBEADS
Scepter™ USB Cable	1	PHCCABLE
Scepter™ Sensors, 60 µm	50	PHCC60050
	500	PHCC60500
Scepter™ Sensors, 40 µm	50	PHCC40050
	500	PHCC40500
Universal Power Adapter	1	PHCCPOWER
Scepter™ O-Ring Kit, includes 2 O-rings and 1 filter cover	1	PHCCOCLIP

For more information visit: www.merckmillipore.com/scepter



Cellular Sample Preparation



Prepare

page 9

Grow

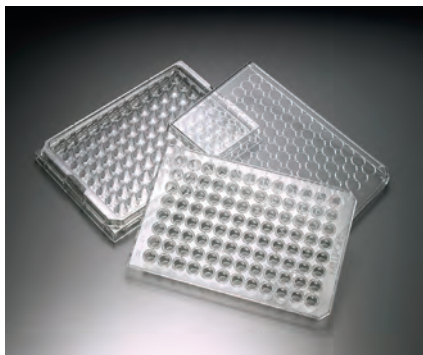
page 23

Analyze

For multidimensional analysis of cellular phenotypes with respect to time, space and changing conditions, we provide reagents, platforms and devices that successfully meld sophisticated technology with ease of use and optimization.

MultiScreen® Plates for Cell-Based Assays

High throughput assays for migration, invasion and more



Using filter plates for cell-based assays in life science and drug discovery research can decrease sample-to-sample variability, reduce background through more thorough washing, increase throughput and enable automation. MultiScreen® filter plates and kits are available in a range of pore sizes to support assays with suspension and adherent cell lines and support cell growth for co-culture and transmigration assays. MultiScreen® -MIC filter plates are designed for broad assay compatibility and are available in three membrane pore sizes. The 96-well plates increase throughput 4x over 24-well systems, without sacrificing membrane surface area.

Features & Benefits

- Incubate, filter, wash, and assay 96 samples simultaneously, saving time and money
- Range of membrane pore sizes and plate formats available for invasion, migration, and chemotaxis assays
- Proven protocols available
- Compatible with automated liquid handling systems

Applications

Cell Viability and Proliferation Assays, Migration Assays, Invasion Assays, Chemotaxis Assays, Whole Cell Incubation Assays, Whole Organism Assays, Conventional and Time-Resolved Fluorescent Detection

Specifications

Sterility	Sterile
Filtration area, cm²	0.28

Ordering Information

Description	Chemistry	Device Material	Configuration	Pore Size (µm)	Qty/Pk	Catalogue No.
MultiScreen®-MIC Plate	Polycarbonate	Styrene	96 well	3.0	10	MAMIC3S10
				5.0	10	MAMIC5S10
				8.0	10	MAMIC8S10
Accessories						
MultiScreen® 96-well Receiver Plate		Styrene	96 well		10	MAMCS9610
MultiScreen® Single-well Culture Tray		Styrene	1 well		10	MAMCS0110

For more information visit: www.merckmillipore.com/cellculture

Elispot MultiScreen[®]_{HTS} Filter Plates and Antibody Pairs

Improved spot recovery and spot definition

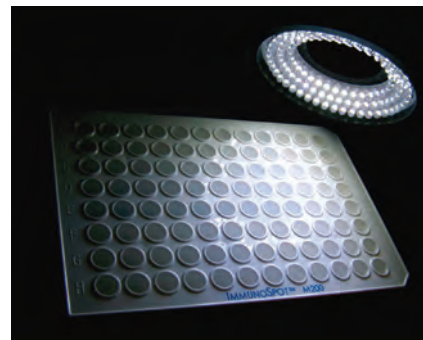
The Elispot (enzyme-linked immunospot) assay provides powerful detection of specific immune responses on a single cell level. Over the years, this assay has been optimized through the introduction of specifically designed antibodies, automated reader systems, and 96-well Elispot membrane plates. MultiScreen[®]_{HTS} filter plates provide high protein-binding capacity with low background staining, reliable sensitivity and high lot-to-lot reproducibility. The plates are designed for enhanced imaging on a range of systems including Zeiss and AID imaging devices. They also have a removable underdrain to allow for easy membrane access.

Features & Benefits

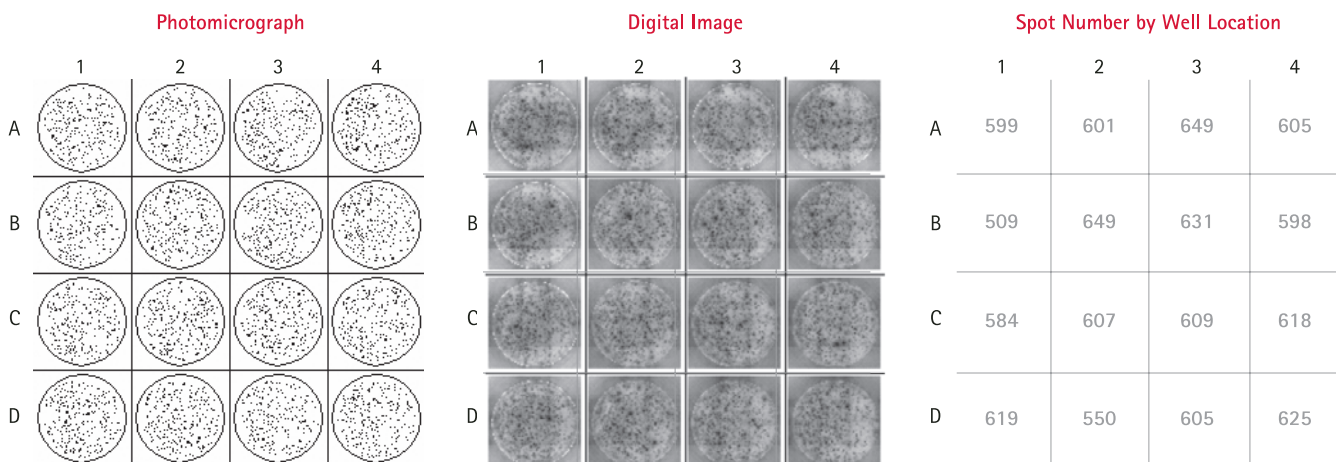
- Validated membranes
- Uniform spot morphology and distribution
- Easy membrane access
- Compatible with automation

Applications

Elispot Assays



Product Performance



Optimized membrane gives consistent results even in corner and edge wells. These images represent the number of cells secreting IFN- γ in response to PHA-L stimulation of Human Peripheral Blood Mononuclear cells (HPBMC). The wells were seeded with 50,000 cells and developed using BCIP/NBTplus substrate. The wells were imaged with the Zeiss KS Elispot imaging system. Typical MultiScreen[®]_{HTS}-IP filter plate variability expressed by coefficient of variation (% CV)* is less than 10%. * %CV = (SD/mean)*100

Ordering Information

Description	Chemistry	Sterility	Material	Color	Qty/Pk	Catalogue No.
MultiScreen[®]_{HTS} Filter Plates						
MultiScreen [®] _{HTS} -HA Filter Plate	Mixed Cellulose Esters	Sterile	Styrene	Clear	10	MSHAS4510
MultiScreen [®] _{HTS} -IP Filter Plate	Hydrophobic PVDF	Sterile	Acrylic	White	10	MSIPS4W10
		Non-Sterile	Acrylic	Clear	10	MSIPN4510
		Non-Sterile	Acrylic	White	50	MSIPN4W50
		Non-Sterile	Acrylic	Clear	50	MSIPN4550
		Sterile	Acrylic	Clear	10	MSIPS4510
MultiScreen[®] Filter Plates						
MultiScreen [®] -IP Filter Plate	Hydrophobic PVDF	Sterile	Acrylic	Clear	10	MAIPS4510
		Sterile	Acrylic	White	10	S2EM004M99

Ordering Information – Continued

Description	Chemistry	Sterility	Material	Color	Qty/Pk	Catalogue No.
MultiScreen®-IP Filter Plate w/o Underdrain	Hydrophobic PVDF	Sterile	Acrylic	White	10	MAIPSWU10
MultiScreen®-HA Filter Plate	Mixed Cellulose Esters	Sterile	Styrene	Clear	10	MAHAS4510
MultiScreen®_{HTS} 8-Well Strips						
MultiScreen® _{HTS} -IP Filter Plate 8-Well Strips	Hydrophobic PVDF	Non-Sterile	Acrylic	Clear	10	M8IPS4510
Accessories						
MultiScreen® Tool					1	MSPLRS096
Elipunch Kit					1	MELIPUNCH
MultiScreen® Sealing Tape, clear					100	MATAHCL00
MultiScreen® _{HTS} -Support Frame					10	M8IPFRAME
Elispot Matched Antibody Pairs						
IL-2 Elispot Antibody Pair, Mouse					1 kit	ELI-002-M
IL-4 Elispot Antibody Pair, Human					1 kit	ELI-004-H
IL-4 Elispot Antibody Pair, Mouse					1 kit	ELI-004-M
IL-5 Elispot Antibody Pair, Human					1 kit	ELI-006-H
IL-5 Elispot Antibody Pair, Mouse					1 kit	ELI-006-M
IL-6 Elispot Antibody Pair, Human					1 kit	ELI-008-H
IL-6 Elispot Antibody Pair, Mouse					1 kit	ELI-008-M
IL-10 Elispot Antibody Pair, Human					1 kit	ELI-010-H
GM-CSF Elispot Antibody Pair, Human					1 kit	ELI-012-H
IL-12p40 Elispot Antibody Pair, Mouse					1 kit	ELI-014-M
IFN γ Elispot Antibody Pair, Human					1 kit	ELI-016-H
IFN γ Elispot Antibody Pair, Mouse					1 kit	ELI-016-M
TNF α Elispot Antibody Pair, Human					1 kit	ELI-018-H
TNF α Elispot Antibody Pair, Mouse					1 kit	ELI-018-M

For more information visit: www.merckmillipore.com/cellculture

MultiScreen[®] plates for Elispot assays: State-of-the-art tools for functional immunology

The enzyme-linked immunospot (Elispot) assay detects soluble proteins secreted from single cells, on a membrane, using antibodies. Elispot assay sensitivity, ease of use, and cost make these ideal multifunctional T cell assays for the research, therapeutic, and diagnostic communities. While Elispot assays permit frequency determination for very rare events, data interpretation can become ambiguous when spot numbers in antigen-containing wells are low or spot counts in negative control wells are elevated. Thus, it is important to optimize basic assay parameters and reagents to maximize the signal-to-noise ratio.

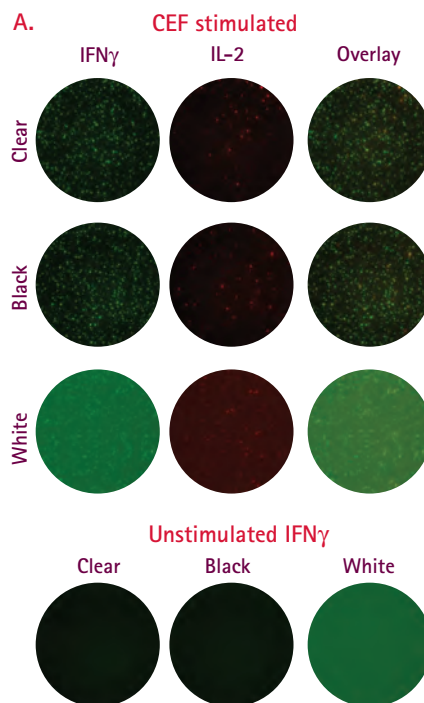
These parameters include (but are not limited to):

Choice of Plate (Membrane):

PVDF membrane plates are recommended over a mixed cellulose ester format, due to slightly improved binding of capture antibody and superior performance in spot detection, particularly for fluorescent applications. MultiScreen[®] plates for Elispot feature multiple advantages, including low background, lot-to-lot reproducibility, uniform spot distribution, automation compatibility and a removable underdrain for membrane access.

Negative/Positive Controls:

Negative controls routinely consist of cells cultured without stimuli, whereas polyclonal T-cell activators are commonly used as positive controls to confirm both cell and assay functionality.



B. Plate Evaluation – Total spots

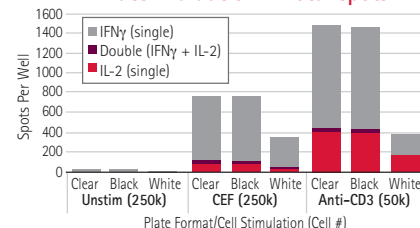


Figure 1. Dual color IFN γ /IL-2 fluorescent Elispot (FluoroSpot) assays were performed on total PBMC in three different MultiScreen[®] HTS plate formats (Clear, Black, and White). Spot clarity was roughly equivalent on the clear and black formats. By contrast, white plates showed high background signal, making spot detection difficult, particularly in the Green channel (IFN γ -FITC). A comparison of spot counts demonstrated a significant reduction in "spots counted" on white plates when compared to either black or clear formats.

Plate Organization/Edge Effects:

Medium evaporation from peripheral wells in prolonged cultures may impact overall assay performance. Where possible, the use of "media only" wells around the periphery of the true sample wells can minimize this effect.

Prewetting:

Prewetting the membrane is not universally applicable to all Elispots; its requirement is dependent on the inherent hydrophobicity of the capture antibody; therefore, the pre-wetting protocol should be optimized prior to application.

Coating Plates with Capture Antibody: To ensure performance while maximizing cost efficiency, it is critical to standardize the amount of capture antibody used per well. For optimal performance, we recommend initial titration of both the coating and detection antibodies in tandem.

For more information, including ordering information for MultiScreen[®] Elispot plates, visit: www.merckmillipore.com/elispot

MultiScreen®-Mesh Filter Plates with 96-Well Receiver Plate

For whole organism screening



This filter plate provides a complete system for culturing, testing and reading assay results in a one-step protocol. The system is ideal for target screening and other applications that evaluate the effect of new compounds on whole, multicellular organisms. The MultiScreen®-Mesh filter plate is optimized for compound and target identification in a 96-well format. The filter plate and 96-well tray fit together to provide a ready-to-use system for assays measuring paralysis, cytotoxicity, and death of multicellular organisms. Simply transfer parasites, nematodes or other multicellular organisms into the wells, treat with target compound, and measure the migration of the organisms.

Features & Benefits

- Multiple configurations and applications
- Chemical compatibility
- Automation-compatible
- Superior vacuum filtration and filtrate collection
- Plates are optically clear for use with an imaging microscope or other microscopic analysis

Applications

Whole Organism Screening

Specifications

Materials

Plate	Polystyrene
Filter	Nylon mesh

Ordering Information

Description	Pore Size (µm)	Sterility	Qty/Pk	Catalogue No.
MultiScreen®-MESH Plate	100	Non-sterile	10	MANM10010
	20	Non-sterile	10	MANMN2010
	40	Non-sterile	10	MANMN4010
	60	Non-sterile	10	MANMN6010
MultiScreen® 96-well Transport Receiver Plate	NA	Non-sterile	50	MATRNPS50
MultiScreen® Single-well Culture Tray	NA	Sterile	10	MAMCS0110
MultiScreen® 96-well Culture Tray	NA	Sterile	10	MAMCS9610

For more information visit: www.merckmillipore.com/cellculture

MultiScreen[®]_{HTS} Vacuum Manifold

Crosstalk-free for superior reproducibility

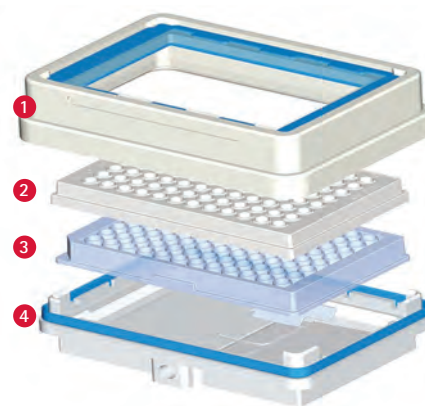
The MultiScreen[®]_{HTS} Vacuum Manifold is designed to improve filter-based assay performance and reliability. The manifold supports a wide variety of MultiScreen[®] platforms, including 96-well and 384-well filter plates for bioassays and deep-well Solvinert[™] filter plates for sample preparation.

The manifold configuration is easily adapted to accommodate filter-to-waste or collection assays. For those assays where filtrate collection is required, the MultiScreen[®]_{HTS} Vacuum Manifold incorporates DirectStack[™] technology. This feature eliminates gaps between flow directors and receiver wells to increase assay reliability and eliminate cross talk. The direct stacking of plates also makes vacuum initiation effortless.

The MultiScreen[®]_{HTS} Vacuum Manifold is also ideally suited for automation. The compact size of the manifold base is modeled on ANSI/SBS standards for microplates to fit most robot deck locations. The manifold collar is lightweight and features a groove for easy handling by robotic gripper systems. If additional precision is needed for placement of the collar during assembly/disassembly routines, a collar holder accessory is available.

- DirectStack[™] technology enables crosstalk-free filtrate collection
- Unique design removes hanging droplets, eliminating cross-contamination risk
- Configurations for deep-well or standard receiver plates
- ANSI/SBS-compliant footprint allows for easy robotic deck integration
- Solvent-resistant

DirectStack[™] Technology Improves Assay Reliability



1. Manifold Collar
2. MultiScreen[®]_{HTS} Filter Plate
3. Collection Plate
4. Manifold Base

Figure 1. Plate-on-plate stacking eliminates gaps between flow directors and receiver wells in applications that require filtrate collection.

Featured Application Notes and Technical Notes

Download from: www.merckmillipore.com

MultiScreen[®]_{HTS} Filter Plates: New Plate Design for Full Automation Compatibility Data Sheet; Lit No. PF1544EN00

High throughput MultiScreen[®]_{HTS} filter plates are specifically developed for use with automation. The 96-well plates are designed to standardized dimensions and meet ANSI/SBS 2004 plate specifications. They are fully compatible with automated gripper arms, stackers, bar code labels, and plate readers.

MultiScreen[®]_{HTS} Vacuum Manifold Data Sheet; Lit No. PF2014EN00

For MultiScreen[®]_{HTS} Vacuum Manifold ordering information, see page 40.

MultiScreen[®]_{HTS} Vacuum Manifold

For vacuum filtration of 96 and 384 samples



The MultiScreen[®]_{HTS} vacuum manifold with DirectStack™ technology provides enhanced performance for use with MultiScreen[®]_{HTS} 96- and 384-well filter plates as well as the High Volume and Solvinert™ filter plate families. Manifold components are resistant to solvents and suitable for use with automated or manual protocols. The manifold configuration is easily adapted to accommodate filter-to-waste or filtrate collection assays. For those assays where filtrate collection is required, the MultiScreen[®]_{HTS} Vacuum Manifold incorporates DirectStack™ technology. This feature eliminates gaps between flow

directors and receiver wells to increase assay reliability, eliminate crosstalk and facilitate vacuum initiation.

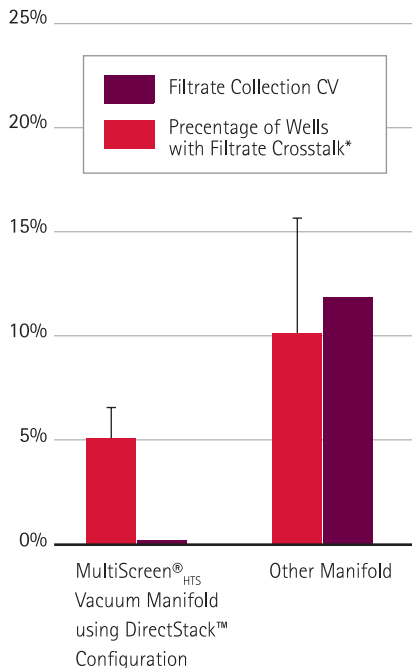
Features & Benefits

- DirectStack™ technology for crosstalk-free filtrate collection
- Configurations for deep-well or standard receiver plates
- ANSI/SBS compliant footprint allows for easy robotic deck integration

Applications

Vacuum Filtration of Multiwell Filter Plates, Automated Liquid Handling

Product Performance



MultiScreen[®]_{HTS} vacuum manifold with DirectStack™ feature enhances 384-well filter plate performance. Data shown are for MultiScreen[®]_{HTS} 384 well filter plates (n=4). %CV was determined by microplate spectrophotometer absorbance measurement of dye in aqueous buffer. Filtrate crosstalk was determined by filtering a checkerboard pattern of wells containing fluorescent dye or buffer only into a 384-well collection plate and measuring fluorescence using a Tecan Spectrafluor™ Plus plate reader.

*A filtrate crosstalk event is defined as any buffer-only well location with >2% fluorescent signal.

Ordering Information

Description	Qty/Pk	Catalogue No.
MultiScreen [®] _{HTS} Vacuum Manifold for Use with 96- and 384-well MultiScreen [®] _{HTS} Filter Plates as well as MultiScreen [®] _{HTS} Solvinert, Solvinert Deep Well and MultiScreen [®] _{HTS} High Volume Filter Plates		
MultiScreen [®] _{HTS} Vacuum Manifold Includes manifold base, standard collar, gaskets, gasket inserts, all tubing, valves, and pressure gauge	1	MSVMHTS00
Adapters for MultiScreen[®]_{HTS} Vacuum Manifold		
Deep Well Collar	1	MSVMHTS0D
High Volume Collar	1	MSVMHTSHV
Collar Holder, for automation	1	MSVMHTSOH

Ordering Information – Continued

Description	Qty/Pk	Catalogue No.
Replacement Parts		
Replacement Gasket Set	1	MSVMHTS04
On/Off Valve Kit	1	MSVMHTS06
Control Valve Kit	1	MSVMHTS10
Vacuum Gauge Kit	1	MSVMHTS07
Standard Collar with Gasket	1	MSVMHTS08
Replacement Tubing, 10 ft (3 m)	1	MSVMHTS09
MultiScreen[®]_{HTS} Vacuum Manifold for Use with Standard MultiScreen[®] (classic) Filter Plates		
MultiScreen [®] Vacuum Manifold 96-well	1	MAVM0960R
Includes manifold base, standard ring with gaskets, support grid, all tubing, valves and pressure gauge		
Vacuum Pump – Accessories		
Millex [®] -FG Filter Unit, 0.20 µm, hydrophobic PTFE, 50 mm	10	SLFG05010
Chemical Duty Pump, 100 V/50–60 Hz	1	WP6110060
Chemical Duty Pump, 115 V/60 Hz	1	WP6111560
Chemical Duty Pump, 220 V/50 Hz	1	WP6122050
Vacuum Filtering Flask, 1 L	1	XX1004705
No. 8 Stopper, 9.5 mm (3/8 in.) hole, silicone	5	XX2004718

For more information visit: www.merckmillipore.com/cellculture

Millicell[®] µ-Angiogenesis Activation and Inhibition Assay Kits

Easy-to-use slide-based assays

Studying how compounds affect angiogenesis, either to promote or inhibit new capillary tube formation, can lead to therapies affecting wound healing, tissue regeneration, cardiovascular disease, stroke, tumor progression, and more. The Millicell[®] µ-Angiogenesis activation and inhibition assay kits provide a powerful, quantitative platform for real-time monitoring of changes in tubule formation with unprecedented optical resolution.

Features & Benefits

- Continuous, live monitoring of cells as tubules form
- Even, flat slide surface prevents any liquid meniscus from forming, eliminating out-of-focus areas
- Full well visualization at low magnification
- Less reagent and cells needed, reducing costs and waste by up to 80%
- All-in-one slide used to grow, assay, and stain cells



Applications
Angiogenesis Assays

Specifications

Components	Contents	Part No.
Millicell [®] µ-Angiogenesis Slides	5	CS203030
Fibronogen Solution	1 x 1.5 mL vial	CS203035
Thrombin Solution	1 x 0.75 mL vial	CS203036
ITS Media Supplement	1 x 0.5 mL vial (100x)	CS203037
PMA (Phorbol 12-Myristate 13-Acetate)	1x 1.0 mg vial	CS203037
Calcein-AM	1 x 50 µg vial	CS202541

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell [®] µ-Angiogenesis Activation Assay Kit	1 kit	MMA130
Millicell [®] µ-Angiogenesis Inhibition Assay Kit	1 kit	MMA125

For more information visit: www.merckmillipore.com/cellculture

Millicell® μ -Migration Assay Kit

Stable gradient for quantitative, real-time, slide-based assays



Traditional multiwell (Boyden chamber) migration assays can have limitations, such as nonlinear, poorly established gradients, dependence on endpoint measurements and the inability to acquire images of the cells while they are migrating. The Millicell® μ - Migration Assay Kit overcomes these limitations. Its microfluidic, low-volume format promotes a stable concentration gradient. Designed for video microscopy assays, the slide is made from a plastic with high optical qualities similar to those of glass. At specific time intervals, images of the observation area can be acquired, allowing real-time monitoring and quantitative measurements of cell migration.

Features & Benefits

- Live cell tracking of single cell or cell population migration
- Establishes a stable and linear concentration gradient that lasts \geq 48 hours
- Helps distinguish chemotaxis from random movement through multiparametric analysis, including cell directionality and velocity
- Enhanced optical imaging of slow- and fast-migrating cells
- Analyze 3 chemoattractants in parallel for increased throughput and flexibility

Applications

Migration and Chemotaxis Assays

Specifications

Components	Contents	Part No.
Millicell® μ -Migration Slides	4	CS204500
Millicell® μ -Migration Caps and Plugs	48 each	CS204501
Human Collagen IV	1 x 100 μ g vial (1 mg/mL)	CS204498
Acetic Acid Buffer	1 x 1.5 mL vial (0.5 M)	CS204485
BSA Solution	1 x 100 μ L vial (30%)	CS204507
Beveled Pipette Tips: Fisherbrand® SureOne™	2 x 96-tip boxes	02-707-419

Ordering Information

Description	Qty/Pk	Catalogue No.
Millicell® μ -Migration Assay Kit	1 kit	MMA205

For more information visit: www.merckmillipore.com/cellculture

CellASIC® ONIX Microfluidic Platform

For dynamic environmental control over live cells

The easy-to-use CellASIC® ONIX Microfluidic Platform delivers precise control for live cell imaging experiments by facilitating long-term perfusion cell culture. The system integrates with your existing microscope system to enable dynamic time-lapse experiments never before possible. Cutting-edge microfluidics technology provides an improved cell culture microenvironment, exceptional quality for high magnification microscopy, and superior media switching capabilities.

Features & Benefits

- Preprogram dynamic inputs to the environment, including media, activators, inhibitors, detection reagents, gas mixture, and temperature for completely hands-free operation
- Software-driven flow switching with completely customizable flow rates that can change at preset time points

- Compatible with most inverted microscopes, enabling dynamic, live-cell microscopy experiments that cannot be done in static culture dishes
- Multiple application-specific plates enable a range of experimental designs
- Easy software setup using application-specific wizards to get you started immediately

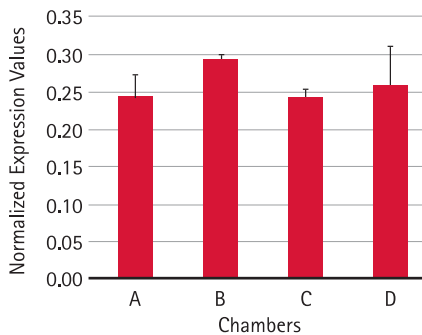


Applications

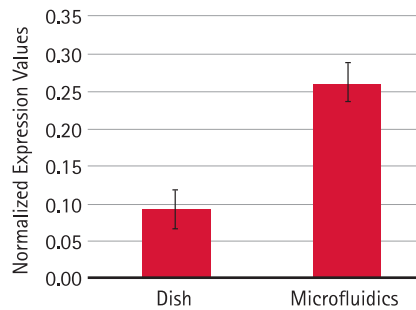
3D Cell Culture, Chemotaxis/Migration in Response to Chemogradient, Cell Response to Changing Media Conditions, Neural Stem Cell Imaging, Host-pathogen Interactions, Bacteria Single Cell Response, Yeast Single Cell Response, Hypoxic Conditions to Mimic Tumor Environments

Product Performance

A. Per Cell EGFR Expression (Microfluidics)



B. Per Cell EGFR Expression (Microfluidics vs. Petri Dish)



(A) Per-cell EGFR expression normalized to GAPDH expression and total number of cells per chamber.
(B) Comparison of per-cell EGFR expression of MCF-10A cells cultured in the CellASIC® ONIX System (M04S plate) vs. in standard Petri dish.

Specifications

Microscope Compatibility	Inverted microscope
Microscopy Techniques	Fluorescence, Brightfield, Phase Contrast, Confocal, TIRF, and DIC Microscopy
Imaging Substrate	#1.5 glass coverslip
Microfluidic Plate Footprint	96-well plate footprint
Number of Chambers	4 microfluidic cell culture chambers in parallel
Culture Time with CellASIC® ONIX Microfluidic Platform	1-3 days continuous
Cell Suspension Volume	5-10 µL (M04 CellASIC® ONIX Microfluidic Plates), 50 µL (B04/Y04/C04 CellASIC® ONIX Microfluidic Plates)
Number of Pressure Inputs	8 inputs
Output Pressure Range	0-10 ± 0.25 psi (0-70 ± 1.7 kPa)
Optical Transparency	Optically clear manifold and microfluidic plates
Optical Premixed Gas Input	Works with clean, dry, premixed gas containing air, CO ₂ , nitrogen and oxygen up to 25% regulated to between 45-55 psi (310-379 kPa)
Temperature Control Range	Room temp. to 40 °C
Rise Time (25 °C to 37 °C)	
Cooling Time (37 °C to 25 °C)	
Gas Consumption	3 mL/min ± 0.5 mL/min
Dimensions	310 mm Wide x 257 mm Deep x 163 mm High
Compatible Cell Types	
Adherent Cells	HeLa, CHO Cell, NIH-3T3, MCF-7, MCF-10A, PC-3, HUVEC, PC-12, HL-60, HT-29, Neuron Cells (Hippocampal/Cortical), Cardiomyocytes
Non-Adherent Cells	Macrophages, Lymphocytes, T Cell, Bacteria (<i>E. coli</i> , <i>B. subtilis</i> , Cyanobacteria, <i>M. smegmatis</i>), Yeast (<i>S. cerevisiae</i> , <i>S. pombe</i>), <i>Chlamydomonas</i>
ECM Coating Substrates Used	Fibronectin, Collagen, Matrigel® substrate, Poly-D-lysine, laminin, Poly-L-ornithine, Hydrogels

Ordering Information

Description	Qty/Pk	Catalogue No.
CellASIC® ONIX Microfluidic System Package: Includes CellASIC® ONIX Microfluidic Perfusion Controller, Manifold, Accessory Box, and CellASIC® ONIX FG Software	1	EV262
CellASIC® ONIX Microincubator Package for Temperature and Gas Control: Includes CellASIC® ONIX Microincubator Controller, Microincubator Manifold, and Accessory Box	1	MIC230
CellASIC® ONIX Tri-Gas Mixer: Compressed Air, CO ₂ , and Nitrogen Gas Mixer	1	GM230
B04A Microfluidic Plate for Bacteria Cells (4 Chambers)	5	B04A-03-5PK
C04A Microfluidic Plate for Chlamydomonas Cells (4 Chambers)	5	C04A-01-5PK
M04G Microfluidic Gradient Plate for Mammalian Cells (4 Chambers)	5	M04G-02-5PK
M04L Microfluidic Open-Top Plate for Mammalian Cells (4 Chambers)	5	M04L-03-5PK
M04S Microfluidic Switching Plate for Mammalian Cells (4 Chambers)	5	M04S-03-5PK
Y04C Microfluidic Plate for Haploid Yeast (4 Chambers)	5	Y04C-02-5PK
Y04D Microfluidic Plate for Diploid Yeast (4 Chambers)	5	Y04D-02-5PK
Accessory Box for CellASIC® ONIX Microfluidic Perfusion System	1	ABN2
Accessory Box for CellASIC® ONIX Microincubator Controller	1	ABI1
Replacement Gasket for F84-GL3 CellASIC® ONIX Manifold	1	F84-GL3-GK
Replacement Gasket for F84-HG3 CellASIC® ONIX Microincubator Manifold	1	F84-HG3-GK

For more information visit: www.merckmillipore.com/cellasic

Studying drug-induced cell death of 3D cell cultures using the CellASIC® ONIX Platform

Summary

The main objective in cell culture is eliciting cellular responses that match physiological responses as closely as possible. Current strategies for 3D cell culture include growing cells in a natural or synthetic 3D matrix, on biodegradable polymers, in a cross-linked hydrogel or in porous synthetic scaffolds consisting of interconnected voids in a woven mesh. However, even these advanced cell culture platforms, if subjected to static conditions of gas, nutrient medium and waste buildup, may dry out and are limited by the inefficient mass transport between the inside and outside of 3D cell structures.

To overcome the challenges of mass transport in 3D culture, we used a microfluidic platform to achieve perfusion-based microenvironment control and study drug-induced cell death of 3D cultures of MCF7 cells. We compared these results against a traditional chambered slide.

Compared to traditional slides, the microfluidic platform provided better imaging results and consistency of cell culture, while maintaining similar cell morphology and viability. In addition, microfluidics enables continuous media flow in and out of a 3D culture, increasing the efficiency with which cells can access nutrients and eliminate waste. This setup increases the longevity of 3D culture and allows one to design experiments to study dynamic cell responses to drug over time.

Materials and Methods

The CellASIC® ONIX Microfluidic platform is composed of a microfluidic system, which delivers a controlled perfusion of the cells, a microincubator controller, which provides the temperature and gas microenvironmental

conditions required for healthy cell culture, an application-specific microfluidic plate and manifold with recirculating heater. The plate and manifold were kept on the microscope, enabling live imaging of the cell culture.

Static culture. MCF7 cells in Matrigel® matrix were added to the wells of a Millicell® EZ SLIDE chambered slide. Once the matrix solidified, complete medium was added to each well. Cells were then incubated at 37 °C.

Automated microfluidic perfusion culture and drug treatment. MCF7 cells were suspended in ice-cold Matrigel® matrix

within the CellASIC® ONIX Microfluidic Chambers. The CellASIC® ONIX system was then programmed to follow a schedule of continuous medium flow throughout the experiment. After 96 h, two inlet wells were replaced with medium containing different concentrations of doxorubicin, and the protocol was resumed for another 48 h.

Automated, in-plate viability staining. The LIVE/DEAD® Viability Kit (Life Technologies) was prepared according to the manufacturer's protocol. In this assay, live cells, stained with Calcein-AM, fluoresce green, and dead cells, stained with EthD-1, fluoresce red. The

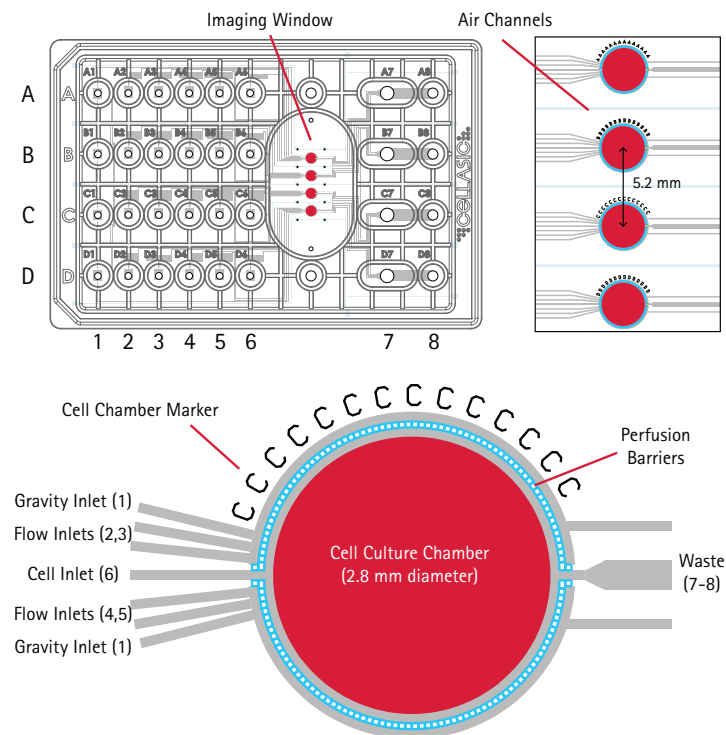


Figure 1. The microfluidic plate contains four independent flow units (A-D), each with four upstream solution inlets, a gravity flow inlet, a cell inlet, and two waste wells. Continuous flow of solutions from inlets 2-5 can create a dynamic exposure profile for imaging responses of live, 3D cultures.

plate was sealed to the manifold and placed on the lab bench, and a two-step protocol was created in order to flow live/dead stain, followed by PBS, into the cell chambers.

Results

Long-term 3D culture. MCF7 cells formed cell clusters after 24 h that maintained their morphology after 96 h of culture in both perfusion culture (Figure 2A, 2C) and in

static culture in the chambered slide (Figure 2B, 2D). Because cell cluster growth was limited by the height of the microfluidic plate chambers, more cells were in sharp focus in the same focal plane than were in focus in the chambered slide.

Drug-induced cell death. Cell viability was assessed using in-plate live/dead staining. We observed the expected increase in red staining with respect to increasing doxorubicin dose, indicating that the 3D cell clusters were being permeated by the drug as well as by the staining reagents (Figure 3).

Discussion

We have shown that it is possible to simultaneously maintain four, virtually hands-free, healthy, 3D cell cultures for several days using perfusion feeding. Further, we analyzed drug-induced cell death using hands-free, in-plate viability staining. This demonstrates that this platform enables the analysis of the response of individual cells within 3D culture over time. In addition, the microfluidic platform enables the culture of a larger number of cell clusters per focal plane, providing better imaging results. The ability to analyze more cell clusters at once, in parallel experiments, may provide increased statistical power to studies of cellular response and enable the routine use of 3D cultures for higher-throughput studies and screening.

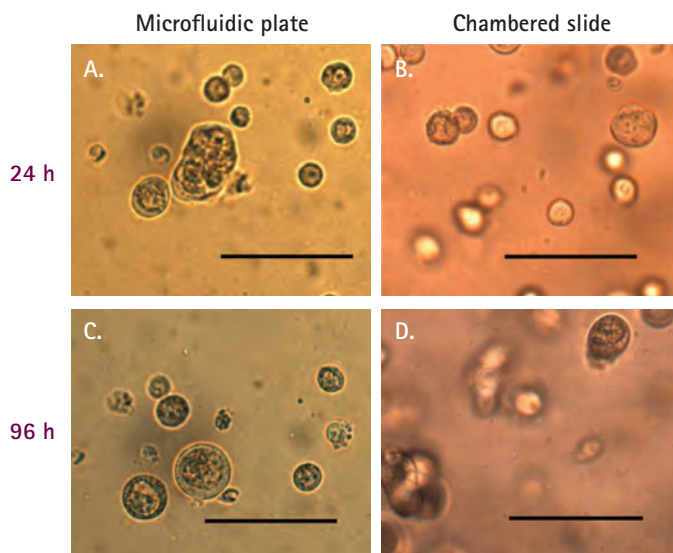


Figure 2. 3D cell cultures in sharp focus using the microfluidic platform (A,C). Static cultures in chambered slides (B,D) showed similar morphology but fewer cell clusters per focal plane. Scale bars = 100 μ m.

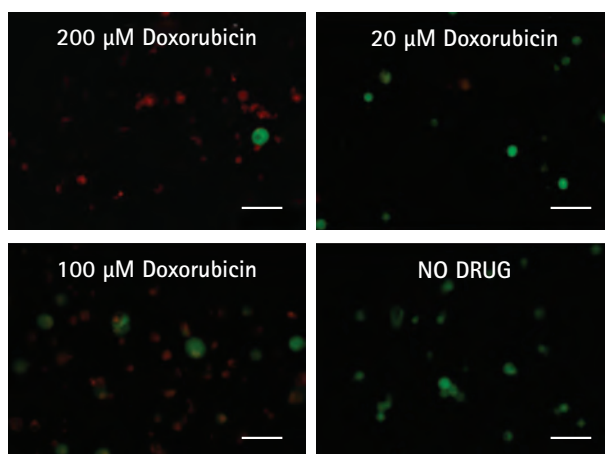


Figure 3. Dose-dependent MCF7 cell death upon doxorubicin treatment as measured by in-plate live/dead staining of 3D cultures. Scale bars = 100 μ m.

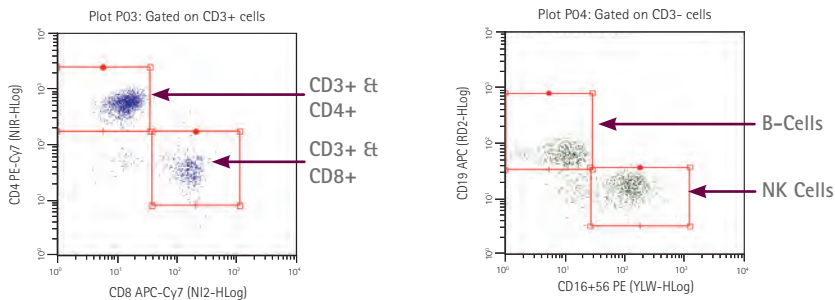
For product ordering information, see page 43.

Simple, scalable cellular analysis solutions: Muse[®] Cell Analyzer and guava easyCyte[™] Flow Cytometers.

You'll quickly find that guava easyCyte[™] microcapillary flow cytometers are simpler to operate and maintain than traditional sheath fluid-based instruments. They all use small sample volumes, generate minimal waste and have lower operating costs, enabling on-demand use in any lab environment. Equipped with insightful data acquisition and analysis software, guava easyCyte[™] instruments are available with single-load and high throughput options.



Immunological Phenotyping 6-Color Assay



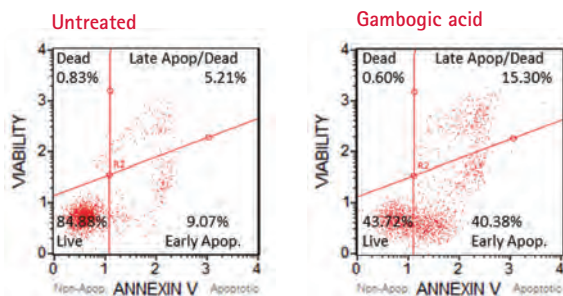
50 μ L adult human blood was stained for 15 minutes at room temperature with a cocktail containing CD3-FITC, CD16-PE, CD56-PE, CD45-PerCP-Cy5.5, CD4-PE-Cy7, CD19-APC, and CD8-APC-Cy7, lysed, fixed and analyzed on a guava easyCyte[™] 8HT system.

Learn more about guava easyCyte[™] flow cytometers at: www.merckmillipore.com/guava

With the Muse[®] Cell Analyzer, we've miniaturized flow cytometry and packed 3-parameter analysis into a compact, affordable instrument, bringing accurate cell analysis to every benchtop. Effortlessly acquire data with our optimized Muse[®] assays designed for immunology, cell health, apoptosis, and cell signaling studies.



Muse[®] Annexin V & Dead Cell Assay



Apoptotic impact of gambogic acid on Jurkat cells.

Learn more about the Muse[®] Cell Analyzer at: www.merckmillipore.com/muse

Cytometry without limits: Extend the range of your research



The Amnis® FlowSight® and ImageStream®X Mark II cytometers combine the speed, sensitivity, and phenotyping abilities of flow cytometry with the detailed imagery and functional insights of microscopy. This unique combination enables a broad range of applications that would be impossible using either technique alone.

Autophagy

During autophagy, cytoplasmic LC3 is processed and recruited to the outer membrane of autophagosomes. Cells undergoing autophagy can be identified by visualizing LC3 puncta and enumerating the spots within each cell using the Spot Count feature of the IDEAS software package:



Spot Count Scores

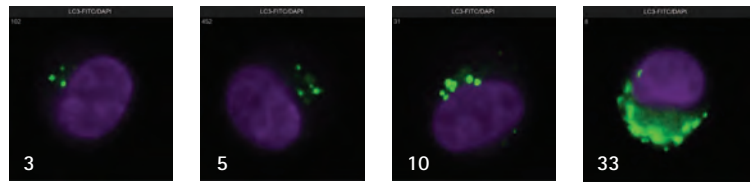
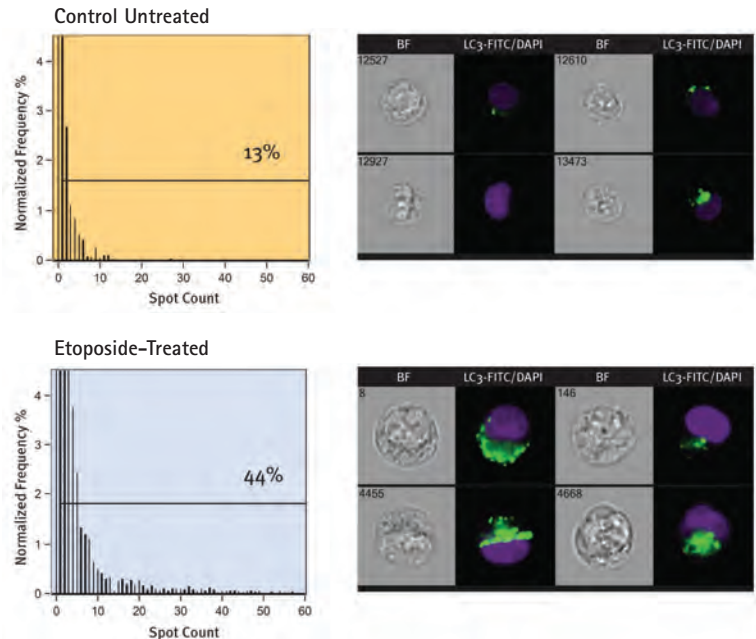


Figure 1. The IDEAS image processing software included with the ImageStream®X Mark II cytometer determines the Spot Count of every cell. In this example, cells with varying number of LC3-FITC spots are shown with their corresponding Spot Count.

Example: Autophagy in the Human CML Cell Line K562

Figure 2. K562 cells were treated with etoposide to induce autophagy. Representative brightfield and merged LC3-FITC (green) and DAPI (purple) images are shown for control and treated cells. The number of LC3 puncta was quantified for each cell using the Spot Count feature of the IDEAS software and each sample of over 10,000 cells was characterized by a Spot Count histogram. The percentage of cells exhibiting one or more puncta increased from 13% (control) to 44% (etoposide-treated).



For complete product information, visit: www.merckmillipore.com/amnis