MILLIPORE

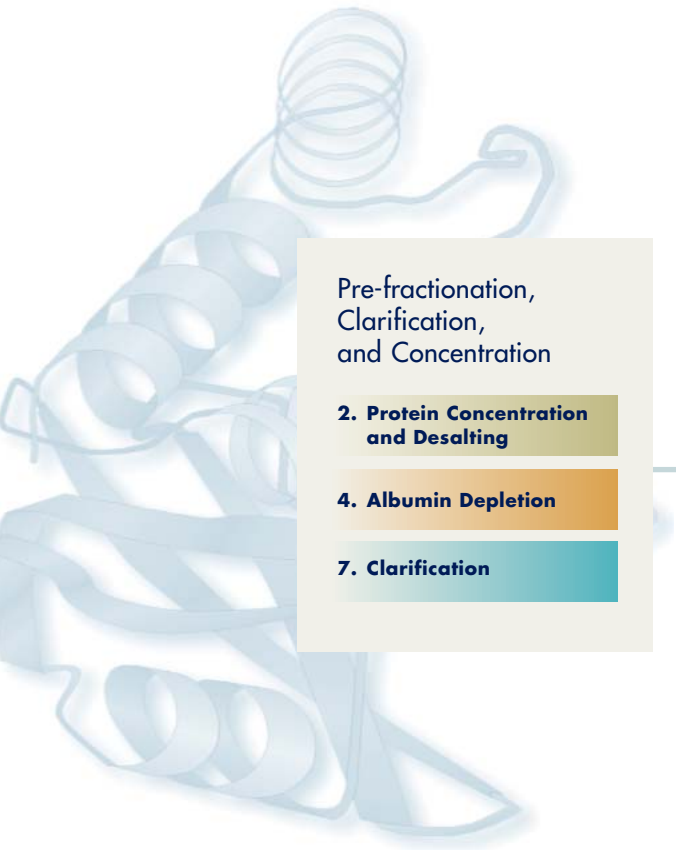
Proteins

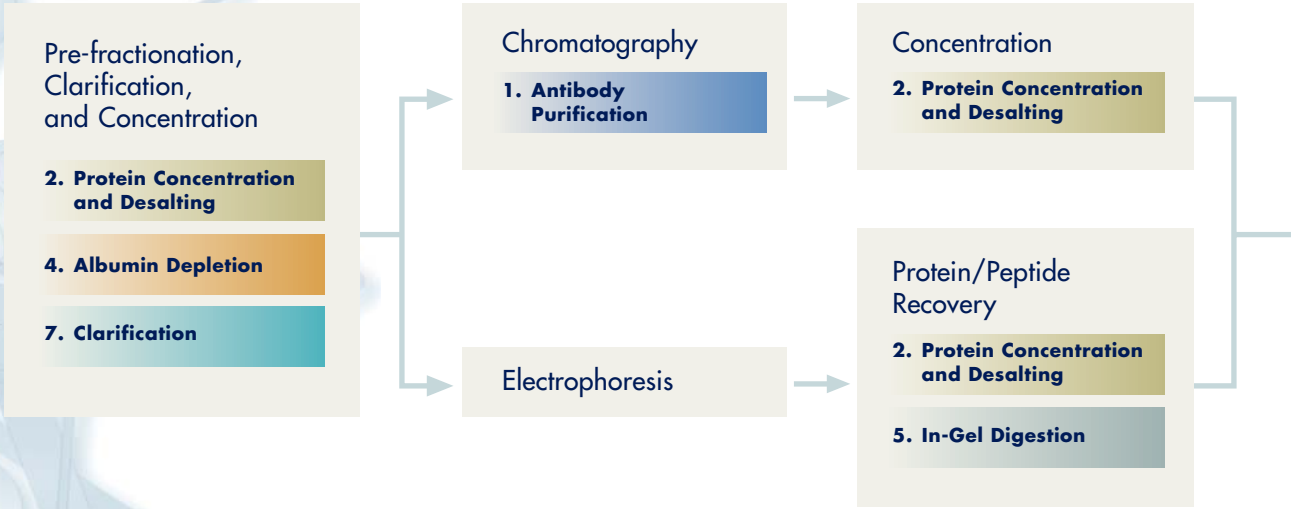
Application Guide

Purification, Concentration, and Analysis

Membranes and Disposable Devices

for Convenient, Reproducible Protein Sample Preparation





From Amicon® centrifugal devices to ZipTip® pipette tips,
there's a Millipore membrane or device to purify almost any protein sample.
Not sure which device is right for your application?
Contact Millipore or go to www.millipore.com/techservice.

Protein Identification

Immunodetection

3. Western Blotting

Protein Sequencing

3. Western Blotting

Mass Spectrometry

3. Western Blotting

6. Mass Spectrometry Sample Prep

Structural Analysis

NMR Analysis

2. Protein Concentration and Desalting

X-ray Analysis

2. Protein Concentration and Desalting

Functional Analysis

PTM Analysis

6. Mass Spectrometry Sample Prep

Cell Imaging

1. Antibody Purification

Table of Contents

Antibody Purification

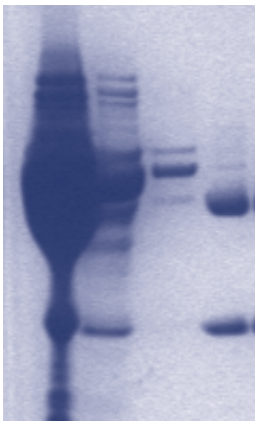
Montage Antibody Purification Kits

Montage Antibody Purification Kits

The fastest, easiest way to purify up to 20 mg of antibody from serum, ascites, or cell culture supernatants. Simply place a PROSEP® spin column in its centrifuge tube; spin to bind; wash; and elute. The entire procedure takes less than 60 minutes.

Each spin column can be reused up to 10 times. Columns are available prepacked with either Millipore's PROSEP-A or G media. They are also available in convenient kits that include Steriflip® devices for prefiltration (to maximize the life of the spin columns) and Amicon Ultra centrifugal filters for one-step desalting and concentration.

Mouse MAb Purification from Ascites



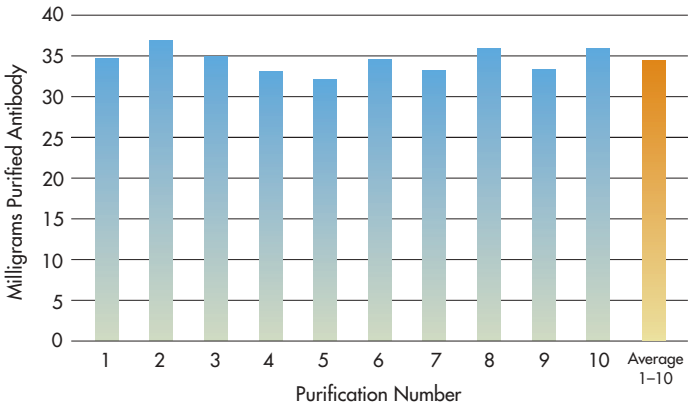
Lane 1: Ascites Unpurified, 10 µL
Lane 2: Flow Through Ascites, 10 µL
Lane 3: Wash, 10 µL
Lane 4: 5 µg Purified Antibody Load

Heavy Chain

Light Chain

Monoclonal mouse IgG was purified from ascitic fluid using the PROSEP-A spin column with Binding Buffer A and Elution Buffer B2 and analyzed using SDS-PAGE. (Ascitic fluid courtesy of Exalpha Biologicals.)

Rabbit IgG Purification Using a Regenerated Column



Rabbit IgG was purified 10 consecutive times on a regenerated PROSEP-A spin column.

Protein A/G Antibody Affinities

Species	Affinity for Protein A	Affinity for Protein G
Human	++	++
Horse	+	++
Cow	+	+
Pig	++	++
Sheep	+/–	+
Goat	+/–	+
Rabbit	++	++
Chicken	–	+/–
Hamster	+	++
Guinea pig	++	+
Rat	++	++
Mouse	++	++

Ordering Information

Description	Contents	Purifications	Catalogue No.
Montage Antibody Purification Kit with PROSEP-A media	Includes buffers and sample prep and concentration devices	20 samples	LSK2 ABA 20
Montage Antibody Purification Kit with PROSEP-G media	Includes buffers and sample prep and concentration devices	20 samples	LSK2 ABG 20
PROSEP-A Spin Columns	Spin columns only	60 samples	LSK2 ABA 60
PROSEP-G Spin Columns	Spin columns only	60 samples	LSK2 ABG 60

Additional Information

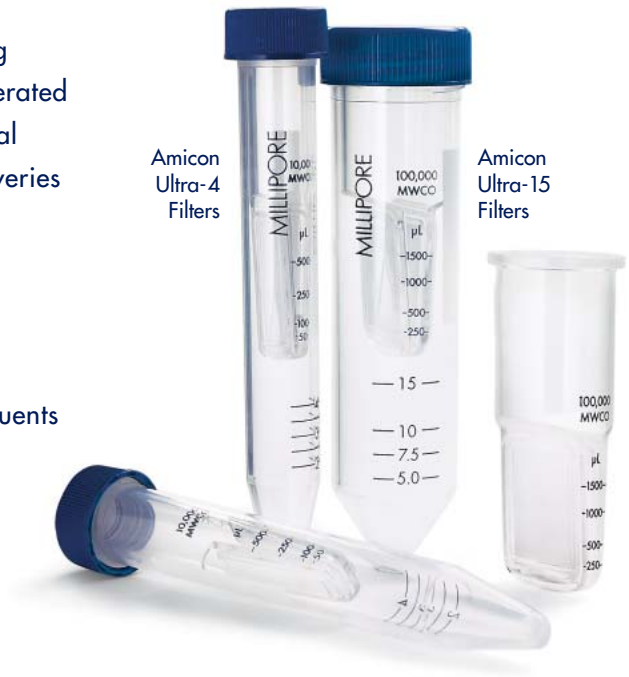
Data sheet (PF1232EN00)

Protein Concentration and Desalting

- Amicon Ultra Centrifugal Filters
- Microcon Centrifugal Filters
- Ultrafree-0.5 Centrifugal Filters
- Centricon Centrifugal Filters
- Centrilutor Micro-Electroeluter
- Centriplus Centrifugal Filters
- Centriprep Centrifugal Filters
- Centricon Plus Centrifugal Filters
- MultiScreen Filter Plate with Ultracel-10 Membrane
- Stirred Cells
- Ultrafiltration Discs

Amicon Ultra-4 and Amicon Ultra-15 Centrifugal Filters

The premier tools for concentration, desalting, and removing macromolecules and precipitates. Combines Ultracel (regenerated cellulose) low-binding ultrafiltration membrane with a vertical housing for fast sample processing and typical sample recoveries of >90%. Choose from 4 mL or 15 mL devices.



Use Amicon Ultra devices to:

- Desalt and exchange buffers
- Concentrate dilute or pre-purified proteins from column eluents
- Purify macromolecular components from tissue culture extracts or cell lysates
- Concentrate biological samples containing antibodies, antigens, or enzymes

High Retentate Recovery

Amicon Ultra-4 Filters

Membrane MWCO	Protein Solute	Protein Retentate Volume (mL)	Protein Retentate Recovery (%)
5,000	Cytochrome c, 12,400 daltons, (0.25 mg/mL)	0.09	94.00
10,000	Cytochrome c (as above)	0.20	95.00
30,000	BSA, 67,000 daltons (1 mg/mL)	0.20	95.00
50,000	BSA (as above)	0.08	94.00
100,000	IgG, 156,000 daltons (1 mg/mL)	0.34	91.00

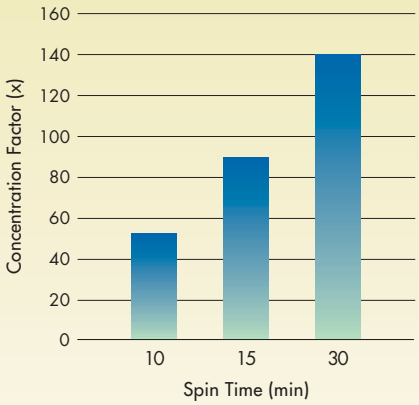
Typical recoveries for 4 mL starting volume in fixed angle rotor at 7500 x g at 25 °C. Spin times: 5K (20 min); 10 and 30K (10 min); 50K (5 min); 100K (15 min).

Amicon Ultra-15 Filters

Membrane MWCO	Protein Solute	Protein Retentate Volume (mL)	Protein Retentate Recovery (%)
5,000	Cytochrome c, 12,400 daltons, (0.25 mg/mL)	0.14	91.08
10,000	Cytochrome c (as above)	0.24	93.03
30,000	BSA, 67,000 daltons (1 mg/mL)	0.30	97.94
50,000	BSA (as above)	0.17	93.32
100,000	IgG, 156,000 daltons (1 mg/mL)	0.28	89.03

Typical recoveries for 15 mL starting volume in swinging bucket rotor at 4000 x g at 25 °C. Spin times: 5K (45 min); 10K and 100K (20 min); 30K (10 min); 50K (15 min).

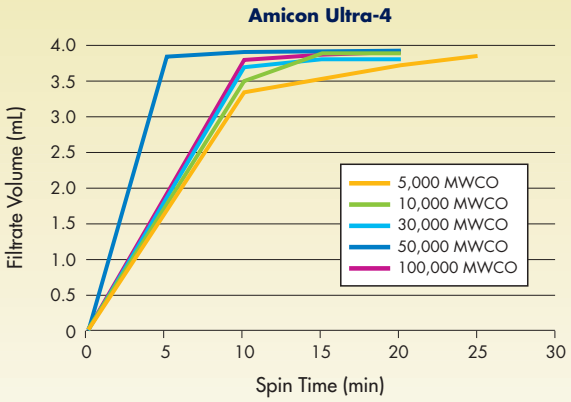
High Concentration Factors



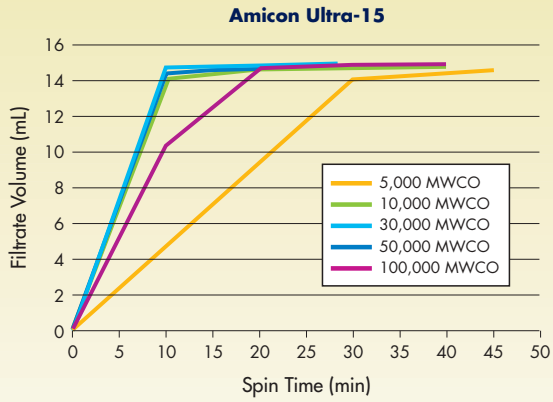
Performance shows results in an Amicon Ultra 4 mL device with a 4 mL starting sample of Cytochrome c, 12,400 daltons (0.25 mg/mL) at 3 spin times (10, 15, and 30 minutes).

Amicon Ultra achieves typical concentration factors of 80 – 100x.

Ultrafast Spin Times



Spin conditions: 4000 x g, swinging bucket rotor at 25 °C, 4 mL sample. 10K: Cytochrome c, 0.25 mg/mL; 30K: BSA, 1 mg/mL; 100K: IgG, 1mg/mL.



Spin conditions: 4000 x g, swinging bucket rotor at 25 °C, 15 mL sample. 10K: Cytochrome c, 0.25 mg/mL; 30K: BSA, 1 mg/mL; 100K: IgG, 1mg/mL.

Complex sample volumes of 4 or 15 mL can be concentrated or diafiltered in as few as 15 minutes.

Ordering Information

Description	NMWL*	Qty/Pk	Catalogue No.
Amicon Ultra-4 Filter Units are assembled with centrifuge tubes and caps	5,000	8	UFC8 005 08
		24	UFC8 005 24
		96	UFC8 005 96
	10,000	8	UFC8 010 08
		24	UFC8 010 24
		96	UFC8 010 96
	30,000	8	UFC8 030 08
		24	UFC8 030 24
		96	UFC8 030 96
	50,000	8	UFC8 050 08
		24	UFC8 050 24
		96	UFC8 050 96
	100,000	8	UFC8 100 08
		24	UFC8 100 24
		96	UFC8 100 96

Description	NMWL	Qty/Pk	Catalogue No.
Amicon Ultra-15 Filter Units are assembled with centrifuge tubes and caps	5,000	8	UFC9 005 08
		24	UFC9 005 24
		96	UFC9 005 96
	10,000	8	UFC9 010 08
		24	UFC9 010 24
		96	UFC9 010 96
	30,000	8	UFC9 030 08
		24	UFC9 030 24
		96	UFC9 030 96
	50,000	8	UFC9 050 08
		24	UFC9 050 24
		96	UFC9 050 96
	100,000	8	UFC9 100 08
		24	UFC9 100 24
		96	UFC9 100 96

*Nominal Molecular Weight Limit

Additional Information

Amicon Ultra brochure (FF1550EN00)

Desalting and buffer exchange application note (AN1050EN00)

Clinical protocol note (PC1050EN00)

Microcon Centrifugal Filters

Concentrate and desalt macromolecular solutions up to 500 µL using any centrifuge that can accept 1.5 mL tubes. The low-adsorption characteristics of the device's component parts, its YM membrane, and the inverted recovery spin, combine to yield unusually high recovery rates—typically >95% of the sample, with concentration factors as high as 100x.

- Maximum starting volume: 500 µL
- Typical sample concentration volume: 5 –15 µL
- Low-binding Ultracel-YM (regenerated cellulose) membrane
- Solute recoveries typically >95%

Typical Protein Recovery

		Retentate Recovery (%)				
Solute/Concentration	**Nominal MW**	**YM-3**	**YM-10**	**YM-30**	**YM-50**	**YM-100**
Bovine IgG Fraction II (1 mg/mL)	156,000	95	95	95	95	95
Bovine Serum Albumin (1 mg/mL)	67,000	95	95	95	90	50
Ovalbumin (1 mg/mL)	45,000	95	95	95	90	10
α-Chymotrypsinogen (1 mg/mL)	25,000	95	95	95	80	—
Cytochrome c (0.25 mg/mL)	12,400	95	95	90	10	—

Ordering Information

Description	**Membrane**	**NMWL**	**Qty/Pk***	**Catalogue No.**
Microcon Filter Units	YM-3	3,000	24	42403
			100	42404
	YM-10	10,000	24	42406
			100	42407
	YM-30	30,000	24	42409
			100	42410
	YM-50	50,000	24	42415
			100	42416
	YM-100	100,000	24	42412
			100	42413

*Additional package sizes available. Contact Millipore.

Additional Information

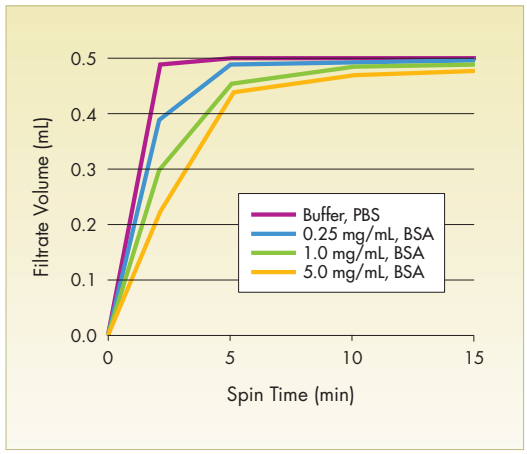
Data sheet (PF185)
Desalting and buffer exchange application note (AN001EN00)
Detergent removal protocol note (PC1000EN00)
Passivation protocol note (PC1001EN00)

Ultrafree-0.5 Centrifugal Filters

The vertical membrane configuration (parallel to the direction of the centrifugal force) reduces concentration polarization and provides high flow rates—even with particle-laden solutions. Concentrated protein is retrieved by pipette from a concentrate "pocket" located below the membrane surface.

- Maximum starting volume: 500 µL
- Concentrates most 500 µL solutions down to 20 µL in approximately 10 minutes
- Available with a range of high-flux Biomax™ (polyethersulfone) ultrafiltration (UF) membranes
- Filtrate and concentrate retrieval in one spin

Typical Flow Rates



Ordering Information

Description	Membrane	NMWL	Qty/Pk*	Catalogue No.
Ultrafree-0.5 Filter Units	Biomax-5	5,000	25 100	UFV5 BCC 25 UFV5 BCC 00
	Biomax-10	10,000	25 100	UFV5 BGC 25 UFV5 BGC 00
	Biomax-30	30,000	25 100	UFV5 BTK 25 UFV5 BTK 00
	Biomax-50	50,000	25 100	UFV5 BQK 25 UFV5 BQK 00
	Biomax-100	100,000	25 100	UFV5 BHK 25 UFV5 BHK 00

*Additional package sizes available. Contact Millipore.

Additional Information

Desalting and buffer exchange application note (AN001EN00)

Centricon Centrifugal Filters

Concentrate and desalt up to 2 mL of macromolecular solution quickly and easily with up to 80-fold sample enrichment with minimal solute loss due to adsorption. Designed for use in centrifuges with fixed-angle rotors.

- Maximum starting volume: 2 mL
- Typical sample concentration volume: 25–50 µL (depending on rotor angle)
- Low binding Ultracel-YM (regenerated cellulose) membrane
- Solute recoveries typically >95%

Typical Protein Recovery

		Retentate Recovery (%)				
Solute/Concentration	**Nominal MW**	**YM-3**	**YM-10**	**YM-30**	**YM-50**	**YM-100**
Bovine IgG Fraction II (1 mg/mL)	156,000	95	95	95	95	95
Bovine Serum Albumin (1 mg/mL)	67,000	95	95	95	95	35
Ovalbumin (1 mg/mL)	45,000	95	95	95	85	< 5
α-Chymotrypsinogen (1 mg/mL)	25,000	90	95	90	75	< 5
Cytochrome c (0.25 mg/mL)	12,400	95	95	85	15	< 5

Ordering Information

Description	**Membrane**	**NMWL**	**Qty/Pk***	**Catalogue No.**
Centricon Filter Units	YM-3	3,000	24	4202
			100	4203
	YM-10	10,000	24	4205
			100	4206
	YM-30	30,000	24	4208
			100	4209
	YM-50	50,000	24	4224
			100	4225
	YM-100	100,000	24	4211
			100	4212

*Additional package sizes available. Contact Millipore.

Additional Information

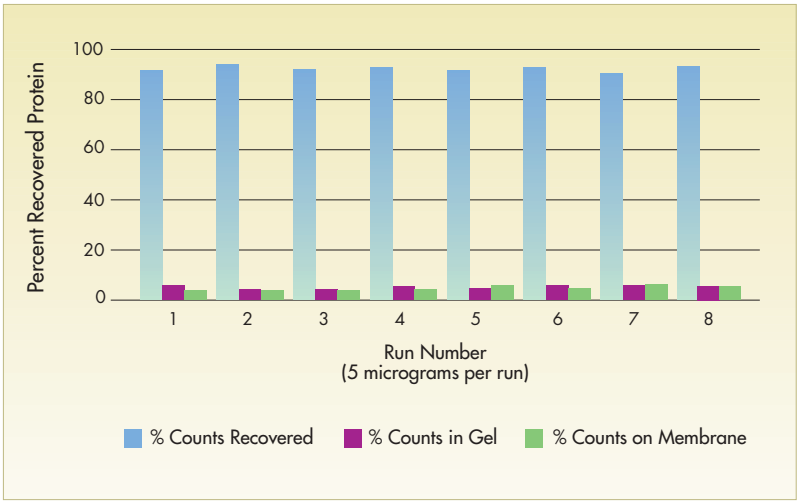
Data sheet (PF461EN00)
Desalting and buffer exchange application note (AN001EN00)
Detergent removal protocol note (PC1000EN00)
Passivation protocol note (PC1003EN00)

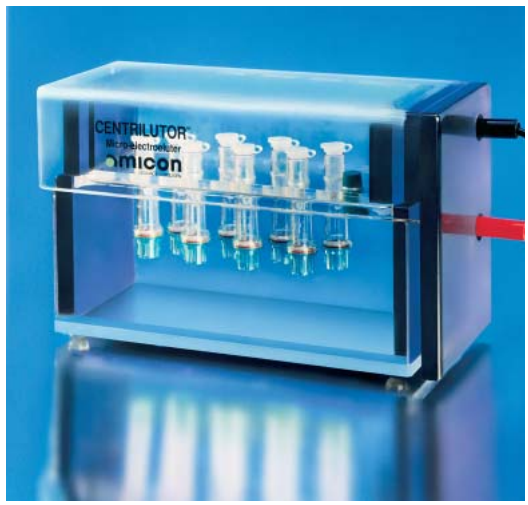
Centrilutor Micro-Electroeluter

Elute proteins from gel slices and then concentrate the samples using Centricon Centrifugal Devices. There is no additional handling of the sample once the gel slices are placed into the eluter.

- Fast, easy way to recover 1 – 25 µg of protein from gel slices
- Recovers >90% of protein from gel slices
- Uses Centricon centrifugal devices for sample concentration

High Recovery





Protein recovery from ^{125}I-labelled BSA.

Ordering Information

Description	Qty/Pk	Catalogue No.
Centrilutor Micro-Electroeluter	1	57015
Centrilutor sample tubes	100	57009

Additional Information

Data sheet (PF008EN00)
Using the Centrilutor application note (AN002EN00)
Methods to enhance operation of the Centrilutor tech note (TN058)

Centriplus Centrifugal Filters

Concentrate and desalt 10 – 15 mL of macromolecular solutions with up to 100-fold sample enrichment. Low-binding device components ensure minimal loss of solute.

- Starting volume: 10 – 15 mL
- Low binding Ultracel-YM (regenerated cellulose) membrane
- Highest recovery of sample with solute recoveries typically >95%
- Ideal for dilute (ng/mL to µg/mL range) protein solutions
- Invert spin method of concentrate retrieval maximizes recovery
- Universal compatibility with 50 mL centrifugal rotors
- Autoclavable

Typical Protein Recovery

		Retentate Recovery (%)				
Solute/Concentration	**Nominal MW**	**YM-3**	**YM-10**	**YM-30**	**YM-50**	**YM-100**
Bovine IgG Fraction II (1 mg/mL)	156,000	90	90	90	90	90
Bovine Serum Albumin (1 mg/mL)	67,000	95	95	95	95	10
Ovalbumin (1 mg/mL)	45,000	95	95	95	80	5
α-Chymotrypsinogen (1 mg/mL)	25,000	95	95	90	55	10
Cytochrome c (0.25 mg/mL)	12,400	95	95	75	10	7

Spin conditions: 10 mL samples spun at 3,000 x g in a swinging-bucket rotor; room temperature. Centrifugation time to concentrate samples to ~500 µL varies, depending on molecular size/shape and solute concentration.

Ordering Information

Description	**Membrane**	**NMWL**	**Qty/Pk***	**Catalogue No.**
Centriplus Filter Units	YM-3	3,000	8	4410
			24	4420
	YM-10	10,000	8	4411
			24	4421
	YM-30	30,000	8	4412
			24	4422
	YM-50	50,000	8	4413
			24	4423
	YM-100	100,000	8	4414
			24	4424

*Additional package sizes available. Contact Millipore.

Additional Information

Data sheet (PF462EN00)

Desalting and buffer exchange application note (AN001EN00)

Autoclaving protocol note (PC026EN00)

Centriprep Centrifugal Filters

Concentrate and desalt high solute biological samples in the 5–15 mL volume range. The devices are compatible with most centrifuges that accommodate 50 mL centrifuge tubes.

- For use with high solute samples
- Starting volume from 5–15 mL
- Low-binding Ultracel-YM (regenerated cellulose) membrane
- Fast sample processing with typical recovery of >90%
- Unique inverse flow mode of operation with large deadstop

Typical Protein Recovery

		Retentate Recovery (%)			
Solute/Concentration	**Nominal MW**	**YM-3**	**YM-10**	**YM-30**	**YM-50**
Bovine IgG Fraction II (1 mg/mL)	156,000	95	90	90	90
Bovine Serum Albumin (1 mg/mL)	67,000	95	90	90	90
Ovalbumin (1 mg/mL)	45,000	95	95	90	90
α-Chymotrypsinogen (1 mg/mL)	25,000	90	90	70	70
Cytochrome c (0.25 mg/mL)	12,400	90	85	15	10

Spin conditions: 15 mL starting volume at 25 °C in swinging-bucket rotor.

Ordering Information

Description	Membrane	NMWL	Qty/Pk*	Catalogue No.
Centriprep Filter Units	YM-3	3,000	24	4302
			96	4303
	YM-10	10,000	24	4304
			96	4305
	YM-30	30,000	24	4306
			96	4307
	YM-50	50,000	24	4310
			96	4311

*Additional package sizes available. Contact Millipore.

Centricon Plus Centrifugal Filters

Two devices allow you to rapidly process 20 to 70 mL volumes with a single spin. The devices are compatible with a variety of swinging-bucket rotors (visit www.millipore.com/rotorguide for complete information).

- Centricon Plus-20 device can concentrate most 20 mL solutions down to 150 µL in just 10 minutes
- Centricon Plus-70 device can concentrate most 70 mL solutions down to 350 µL in less than 25 minutes
- Typical recoveries are >90%

Typical Performance

With Ultracel PL Membrane

	Sample	NMWL	Concentration	Retentate Recovery (mL)	Retentate Recovery (%)	Concentration Factor
Centricon Plus-20 Filter Unit	Cytochrome c (12.5 kD)	10 K	0.25 mg/mL	0.81	96	28x
	BSA (67 kD)	30 K	1 mg/mL	0.23	91	86x
	IgG (156 kD)	30 K	1 mg/mL	0.22	87	90x
Centricon Plus-70 Filter Unit	Cytochrome c (12.5 kD)	10 K	0.25 mg/mL	0.52	94	135x
	BSA (67 kD)	30 K	0.25 mg/mL	0.30	96	234x
	IgG (156 kD)	100 K	1 mg/mL	0.24	91	292x

Ordering Information

Description	Membrane	NMWL	Qty/Pk	Catalogue No.
Centricon Plus-20 Filter Units	Ultracel-PL	10,000*	2	UFC2 LGC 02
			8	UFC2 LGC 08
		30,000*	2	UFC2 LTK 02
			8	UFC2 LTK 08
	Biomax-PB	5,000*	2	UFC2 BCC 02
			8	UFC2 BCC 08
		100,000	2	UFC2 BHK 02
			8	UFC2 BHK 08
Centricon Plus-70 Filter Units	Biomax-PB	5,000	8	UFC7 005 08
	Ultracel-PL	10,000	8	UFC7 010 08
		30,000	8	UFC7 030 08
		100,000	8	UFC7 100 08

*Additional package sizes available. Contact Millipore.

Additional Information

Centricon Plus-70 data sheet (PF460EN00)

Desalting and buffer exchange application note (AN001EN00)

MultiScreen Filter Plate with Ultracel-10 Membrane

The first automation-compatible, high throughput ultrafiltration plate for protein purification. 10,000 NMWL Ultracel ultrafiltration membrane (regenerated cellulose) provides low non-specific binding and high protein recovery.

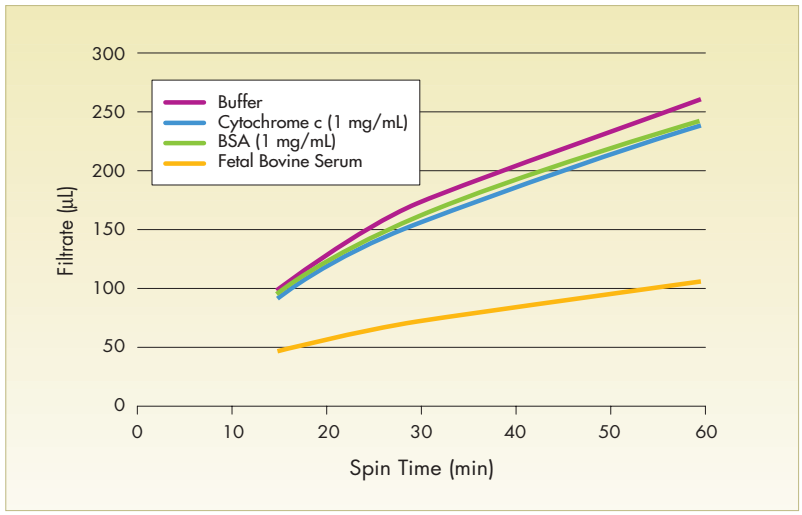
- Fast, easy centrifugal protocol
- Ideally suited for instrumentation and liquid handling equipment
- Uniform performance from well to well
- Processes from 50 to 500 µL
- Compatible with standard microtiter receiver plates (300 µL, 0.7 mL deep well, 150 µL conical bottom)
- 95% typical retention of Cytochrome c

Protein Rejection

Membrane NMWL	Protein Solute	Typical Protein Retention
10,000	Cytochrome c, 12,400 daltons (1 mg/mL)	95%
10,000	BSA, 67,000 daltons (1 mg/mL)	99%

300 µL sample spun at 2000 x g in swinging bucket rotor

Flow Rates



300 µL sample spun at 2000 x g in swinging bucket rotor

Additional Information

Data sheet (PF2050EN00)

Guidelines for concentration and desalting protocol note (PC1025EN00)

Concentration of cell lysate protocol note (PC2411EN00)

Ordering Information

Description	Qty/Pk	Catalogue No.
MultiScreen Filter Plate with Ultracel-10 membrane	2	MAUF 010 02
	10	MAUF 010 10

Stirred Cells

Series 8000 Stirred Cell

Concentrate, diafilter, and exchange buffers for macromolecule solutions including proteins, enzymes, antibodies and viruses.

Series 8000 Stirred Cells

- Five different sizes handle volumes from 3 mL to 400 mL
- High flow rates with solutions up to 10% macrosolute concentration

High-Output Stirred Cell

- 2 L volume
- For 150 mm disc filters
- Large membrane area


High-Output Stirred Cell

Solvent-Resistant Stirred Cells

- For 47 and 76 mm disc filters
- Borosilicate glass cylinder and PTFE components for broad chemical compatibility

Solvent-Resistant Stirred Cell

Series 8000 Models

	Model 8003	Model 8010	Model 8050	Model 8200	Model 8400
Maximum Process Volume	3 mL	10 mL	50 mL	200 mL	400 mL
Minimum Process Volume	0.075 mL	1.0 mL	2.5 mL	5.0 mL	10.0 mL
Membrane Diameter	25 mm	25 mm	44.5 mm	63.5 mm	76 mm
Effective Membrane Area	0.9 cm^2	4.1 cm^2	13.4 cm^2	28.7 cm^2	41.8 cm^2
Hold-up Volume	0.07 mL	0.2 mL	0.5 mL	1.2 mL	1.5 mL

Ordering Information

Description		Catalogue No.
Series 8000 Stirred Cells	Model 8003	5125
	Model 8010	5121
	Model 8050	5122
	Model 8200	5123
	Model 8400	5124
High-Output Stirred Cell	115 V/60 Hz	5111
	230 V/50 Hz	5112
Solvent-Resistant Stirred Cells	For 47 mm membranes	XFUF 047 01
	For 76 mm membranes	XFUF 076 01

Additional Information

Series 8000 Stirred Cells data sheet (PF1050EN00)

Series 8000 Stirred Cells tech note (TN067)

Ultrafiltration Discs

Choose the ultrafiltration membrane that's right for your application.

High Recovery Ultracel Ultrafiltration Membranes

- The hydrophilic, tight microstructure assures the highest possible retention with the lowest possible adsorption of protein, DNA or other macromolecules
- For use when concentrating or desalting extremely dilute solutions or whenever your sample is hydrophobic

High Flow Biomax® and Amicon PM Ultrafiltration Membranes

- The open microstructure provides extremely fast separation capability for serum, plasma, or conditioned tissue culture media.
- For use when concentrating and desalting more concentrated samples or whenever you need to concentrate faster

Amicon YC Ultrafiltration Membranes

- A high-flow hydrophilic membrane for concentrating low molecular weight peptides, nucleotides, carbohydrates and antibiotics.
- For maximum solute recovery; lowest cut-off membrane available in the Millipore range of ultrafilters

Ordering Information

Ultracel YM Ultrafiltration Discs

Regenerated Cellulose

		NMWL				
Filter Diameter	**Qty/Pk**	**1,000**	**3,000**	**10,000**	**30,000**	**100,000**
14 mm	100	40422	40423	40424	40428	—
25 mm	10	13312	13412	13612	13712	14412
44.5 mm	10	13322	13422	13622	13722	14422AM
63.5 mm	10	13332	13432	13632	13732	14432
76 mm	10	13342	13442AM	13642	13742	14442AM
90 mm	5	13351AM	13451	13651	13751	14451
150 mm	5	13361	13461AM	13661AM	13761	14461

Ultracel PL Ultrafiltration Discs

Regenerated Cellulose

		NMWL					
Filter Diameter	**Qty/Pk**	**1,000**	**3,000**	**5,000**	**10,000**	**30,000**	**100,000**
25 mm	10	PLAC 025 10	PLBC 025 10	PLCC 025 10	PLGC 025 10	PLTK 025 10	PLHK 025 10
44.5 mm	10	PLAC 043 10	PLBC 043 10	PLCC 043 10	PLGC 043 10	PLTK 043 10	PLHK 043 10
47 mm	10	PLAC 047 10	PLBC 047 10	PLCC 047 10	PLGC 047 10	PLTK 047 10	PLHK 047 10
63.5 mm	10	PLAC 062 10	PLBC 062 10	PLCC 062 10	PLGC 062 10	PLTK 062 10	PLHK 062 10
76 mm	10	PLAC 076 10	PLBC 076 10	PLCC 076 10	PLGC 076 10	PLTK 076 10	PLHK 076 10
90 mm	5	PLAC 090 05	PLBC 090 05	PLCC 090 05	PLGC 090 05	PLTK 090 05	PLHK 090 05
150 mm	5	PLAC 150 05	PLBC 150 05	PLCC 150 05	PLGC 150 05	PLTK 150 05	PLHK 150 05

Biomax PB Ultrafiltration Discs

Polyethersulfone

		NMWL						
Filter Diameter	**Qty/Pk**	**5,000**	**10,000**	**30,000**	**50,000**	**100,000**	**300,000**	**500,000**
25 mm	10	PBCC 025 10	PBGC 025 10	PBTK 025 10	PBQK 025 10	PBHK 025 10	PBMK 025 10	PBVK 025 10
44.5 mm	10	PBCC 043 10	PBGC 043 10	PBTK 043 10	PBQK 043 10	PBHK 043 10	PBMK 043 10	PBVK 043 10
47 mm	10	PBCC 047 10	PBGC 047 10	PBTK 047 10	PBQK 047 10	PBHK 047 10	PBMK 047 10	PBVK 047 10
63.5 mm	10	PBCC 062 10	PBGC 062 10	PBTK 062 10	PBQK 062 10	PBHK 062 10	PBMK 062 10	PBVK 062 10
76 mm	10	PBCC 076 10	PBGC 076 10	PBTK 076 10	PBQK 076 10	PBHK 076 10	PBMK 076 10	PBVK 076 10
90 mm	5	PBCC 090 05	PBGC 090 05	PBTK 090 05	PBQK 090 05	PBHK 090 05	PBMK 090 05	PBVK 090 05
150 mm	5	PBCC 150 05	PBGC 150 05	PBTK 150 05	PBQK 150 05	PBHK 150 05	PBMK 150 05	PBVK 150 05

Amicon PM Ultrafiltration Discs

Polyethersulfone

		NMWL	
Filter Diameter	**Qty/Pk**	**10,000**	**30,000**
25 mm	10	13112	13212
44.5 mm	10	13122	13222
63.5 mm	10	13132	13232
76 mm	10	13142	13242
90 mm	5	13151	13251
150 mm	5	13161	13261

Amicon YC Ultrafiltration Discs

Cellulose Acetate

		NMWL
Filter Diameter	**Qty/Pk**	**500**
25 mm	10	13012
44.5 mm	10	13022
63.5 mm	10	13032
76 mm	10	13042
90 mm	5	13051
150 mm	5	13061

Additional Information

Tech note (TN1000ENUS)

Western Blotting

Immobilon-P Transfer Membrane
(for general protein blotting)

Immobilon-P^{SQ} Transfer Membrane
(for protein <20 kDa)

Immobilon-FL Transfer Membrane
(for fluorescent probes)

Immobilon Transfer Membranes

Immobilon Transfer Membranes are robust, versatile PVDF substrates for a variety of applications, including westerns, dot/slot blots, protein sequencing, and MS analysis.

Superior Handling

Unlike traditional blotting membranes, Immobilon membranes won't crack or curl, and they can be cut without fracturing. They are also compatible with a variety of detection chemistries, including radioactive, chromogenic, chemiluminescent, fluorescent, and chemifluorescent techniques.

Excellent Protein Binding and High Signal

Immobilon membranes have high protein adsorption, so you won't lose proteins during reprobing. In addition, the membrane's open pore structure makes it easy to access bound proteins and remove unbound probes, which can increase background.

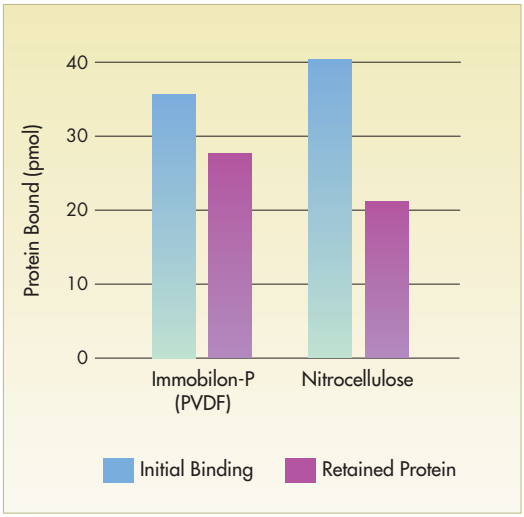
Three Membrane Types

- **Immobilon-P** membrane (0.45 µm) is recommended for western, dot, and slot blotting with proteins >20 kDa.
- **Immobilon-P^{SQ}** membrane has a smaller pore size (0.2 µm), so it is recommended for blotting and sequencing proteins <20 kDa.
- **Immobilon-FL** membrane (0.45 µm) exhibits very low autofluorescence, so it is ideal for fluorescent immunodetection.

New!

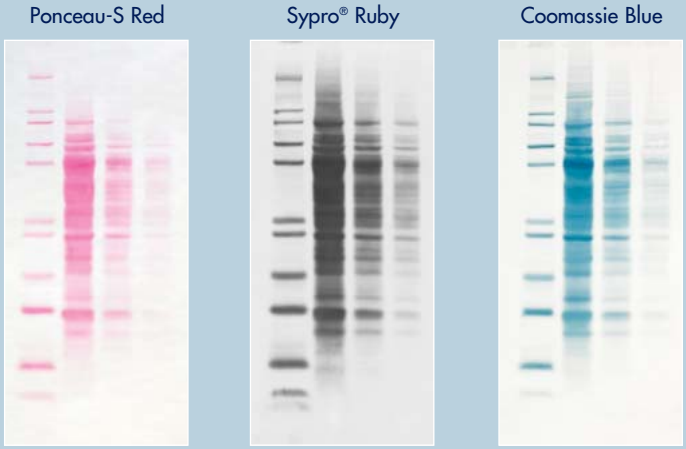
Rapid Immunodetection

Our Rapid Immunodetection Procedure eliminates the need for blocking the membrane. The rapid procedure also has shorter, and fewer, wash steps than traditional procedures. As a result, it reduces detection times by as much as 2 hours without compromising sensitivity or specificity.



Unlike nitrocellulose, Immobilon Transfer Membranes tolerate the high concentrations of methanol used in transfer buffers and ionic dyes without shrinking or altering the electrophoretic bands.

Compatible with a Variety of Stains



Protein detection on Immobilon-P membrane. Lanes (left to right): molecular weight standards, 20, 5, and 1.25 µg calf liver protein.

Ordering Information

Immobilon-P Transfer Membrane (0.45 µm)

Type	Size	Qty/Pk	Catalogue No.
Cut Sheet	7 x 8.4 cm	50	IPVH 078 50
	8 x 10 cm	10	IPVH 081 00
	8.5 x 13.5 cm	10	IPVH 081 30
	9 x 12 cm	10	IPVH 091 20
	10 x 10 cm	10	IPVH 101 00
	15 x 15 cm	10	IPVH 151 50
	20 x 20 cm	10	IPVH 202 00
	26 x 26 cm	10	IPVH 304 F0
Roll	26.5 x 375 cm	1	IPVH 000 10

Immobilon-P^{SQ} Transfer Membrane (0.2 µm)

Type	Size	Qty/Pk	Catalogue No.
Cut Sheet	7 x 8.4 cm	10	ISEQ 078 50
	8 x 10 cm	10	ISEQ 081 00
	8.5 x 13.5 cm	10	ISEQ 081 30
	9 x 12 cm	10	ISEQ 091 20
	10 x 10 cm	10	ISEQ 101 00
	15 x 15 cm	10	ISEQ 151 50
	20 x 20 cm	10	ISEQ 202 00
	26 x 26 cm	10	ISEQ 262 60
Roll	26.5 x 375 cm	1	ISEQ 000 10

Immobilon-FL Transfer Membrane (0.45 µm)

Contact Millipore for ordering information

Additional Information

Protein blotting handbook (TP001EN00)

Rapid immunodetection tech note (TN051)

Visit **www.millipore.com/immobilon** to view additional technical information and qualify for a sample.

Albumin Depletion

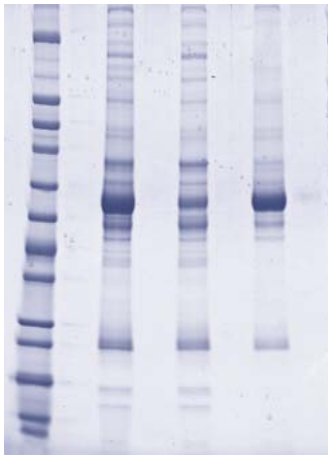
Montage Albumin Deplete Kit

Montage Albumin Deplete Kit

The presence of albumin in serum or plasma samples can decrease the resolution of 1DE, 2DE, chromatography, or mass spectrometry. The Montage Albumin Deplete Kit significantly improves the resolution of these separations by removing >65% of albumin from typical serum samples.

- Easy, 15-minute protocol
- Comes ready-to-use with prepared reagents and pre-packed columns
- Lower non-specific binding than traditional albumin depletion methods
- Can be used for multiple species without protocol change

Effective Depletion of Albumin from Human Plasma



Lane 1: Molecular Weight Markers
Lane 3: Unprocessed Plasma
Lane 5: Flow-through (Albumin-depleted) Plasma
Lane 7: Bound Fraction

Human plasma sample (20 µL) was diluted with 180 µL of equilibration buffer and processed with the Montage Albumin Deplete Kit. Samples of the flow-through and bound fractions were then separated by 1D SDS-PAGE and stained with colloidal Coomassie blue. To accurately assess albumin removal, all sample loads were volume normalized to the undepleted starting sample.

Radial immunodifussion assay revealed 85% albumin reduction.
Gel densitometry revealed 10% non-specific protein binding to the resin.

Typical Human Albumin Depletion

Measured by Radial Immunodiffusion Assay

Human Plasma Volume (µL)	Albumin Depletion (%)
20	85
50	75
75	65
100	58

Typical Animal Albumin Depletion

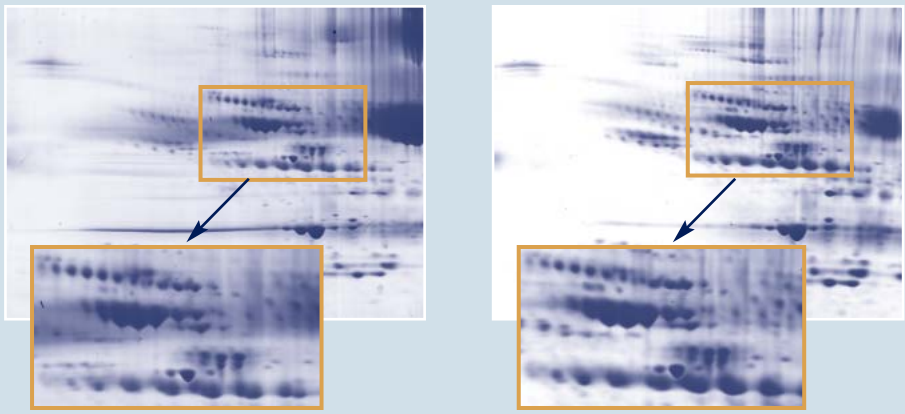
Measured by Gel Densitometry

Species	Albumin Depletion (%)	Non-Specific Binding (%)
Mouse	42.0	18.7
Rat	65.0	17.8
Bovine	39.0	9.7
Rabbit	46.0	12.1

Increased Protein Visualization

A 20 µL plasma sample was dissolved in IPG loading buffer and analyzed by 2DE (left). The same plasma sample was then processed using the Montage Albumin Deplete Kit and analyzed (right).

Magnification of selected gel regions demonstrates the increased visualization of lower abundance proteins achieved with the Montage Albumin Deplete Kit.



Ordering Information

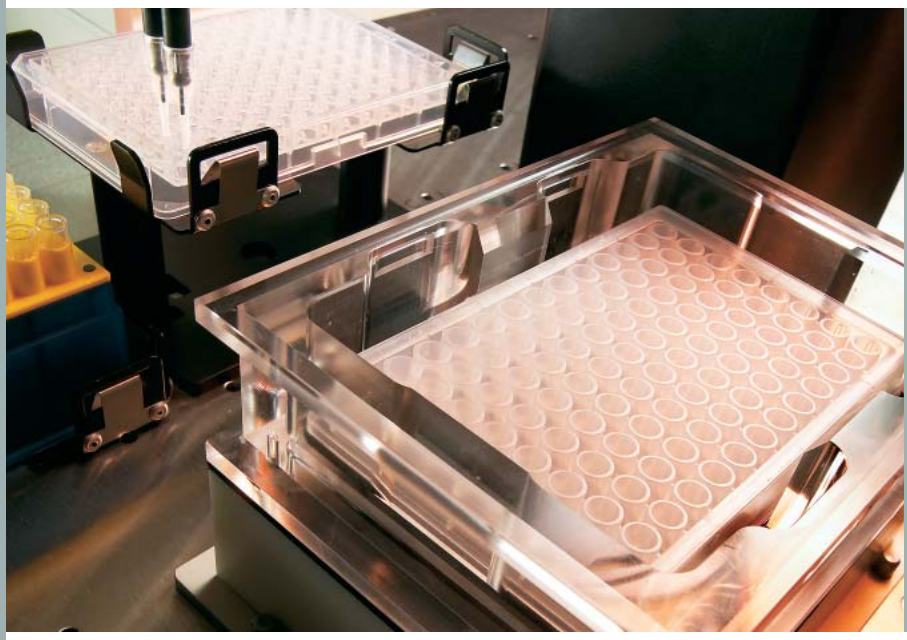
Description	Qty/Pk	Catalogue No.
Montage Albumin Deplete Kit	4 samples	LSKA D00 04
	24 samples	LSKA D00 24

Additional Information

Data sheet (PF1770EN00)

Visit **www.millipore.com/montage** to view additional technical information and qualify for a sample.

In-Gel Digestion



Montage In-Gel Digest$_{ZP}$ Kit

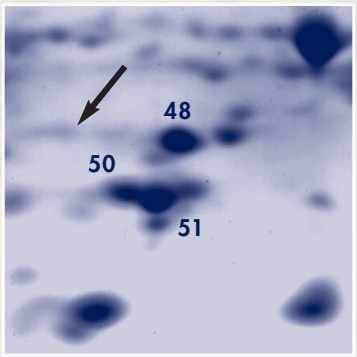
MALDIspot Kit

Montage In-Gel Digest$_{ZP}$ Kit

A complete kit that includes reagents and the unique ZipPlate micro-SPE plate for in-gel digestion and MS sample preparation.

- Prepared, quality-controlled reagents save time and minimize the variability inherent in on-site reagent formulation
- Vacuum-based protocol eliminates tedious pipetting and sample transfers
- ZipPlate micro-SPE Plate eliminates transfer steps that can reduce sensitivity
- Includes Promega's Modified Trypsin, the laboratory standard for protein digestion

Identify Low Abundance Proteins

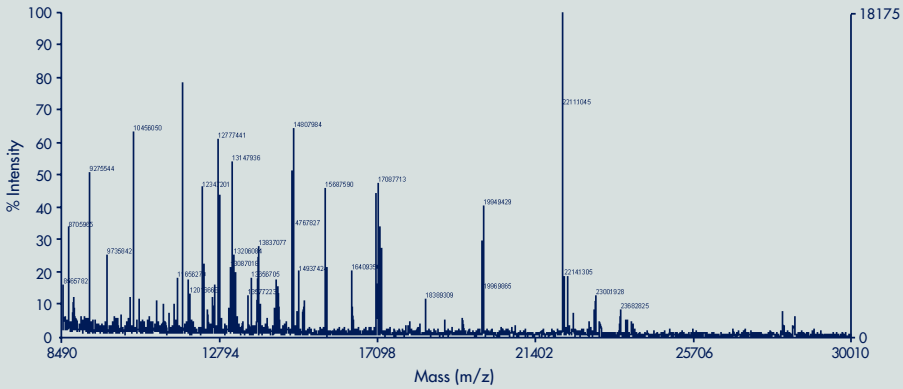


	Spot 48	Spot 50	Spot 51	Blank 11 (at arrow)
Protein ID	Adenylate kinase	Speroxide dismutase	Peptidyl-prolyl cis-trans isomerase B	Transcriptional regulatory protein baeR
Mascot Score	96	49	42	56
Coverage (%)	50	40	42	32

Detail from *E. coli* gel map. The area of the gel shown above contained no visible spots, but it did contain a low abundant protein that was successfully identified using ZipPlate micro-SPE plate prior to MS. The visible spots on the gel were also successfully identified.

Eliminate Sample Transfers, Improve Sensitivity

In-gel digestion and purification of 100 fmol BSA using a ZipPlate plate. ProteinProspector search identified BSA with 9 out of 13 matched peptides and MOWSE score 2598. Spectrum acquired on an AB Voyager™ STE Biospectrometry™ Workstation in reflector mode (spectrum shown is not deisotoped).



Ordering Information

Description	Qty/Pk	Catalogue No.
Montage In-Gel Digest$_{ZP}$ Kit	1 x 96 gel digests	LSKG DZP 96
MALDIspot Kit	1 x 96 gel digests	LSKZ PMS 96

MALDIspot Kit

Accessory MALDIspot Kit allows direct elution onto targets for Voyager-DE™ Workstations and the QSTAR® System with oMALDI™ Source from Applied Biosystems.

Additional Information

MALDIspot Kit data sheet (PF890EN00)

MS sample prep data sheet (PF1234EN00)

ZipPlate protocol notes (TN5721EN00, TN5722EN00, TN5723EN00)

Mass Spectrometry Sample Prep

ZipTip Pipette Tips

ZipPlate micro-SPE Plate

ZipTip Pipette Tips

Detergents, salts, and other buffer components can adversely affect the accuracy and reproducibility of mass analysis if they're not removed during sample preparation.

ZipTip Pipette Tips contain 10 µL of chromatography media fixed at their tip, which allows contaminants to be washed away in seconds. Concentrated, purified samples can then be eluted in MS-compatible buffer.

Resins for a Variety of Applications

Resin	Application
C18	Desalting/concentratng peptides and proteins Step-fractionation of complex peptide mixtures
C4	Desalting and concentrating proteins
SCX	Removing detergent Concentrating peptides from organic solutions
MC	Enriching phosphopeptides

Ordering Information

Description	Resin	Qty/Pk*	Catalogue No.
ZipTip$_{C18}$ Pipette Tip	C18	96	ZTC1 8S0 96
ZipTip$_{\mu\text{-}C18}$ Pipette Tip	Micro-bed of C18	96	ZTC1 8M0 96
ZipTip$_{\mu\text{-}C18}$ Pipette Tip**	Micro-bed of C18	96	ZTC1 8P0 96
ZipTip$_{C4}$ Pipette Tip	C4	96	ZTC0 4S0 96
ZipTip$_{SCX}$ Pipette Tip	Strong cation exchange	96	ZTSC XS0 96
ZipTip$_{MC}$ Pipette Tip	Metal chelate	96	ZT0M CS0 96

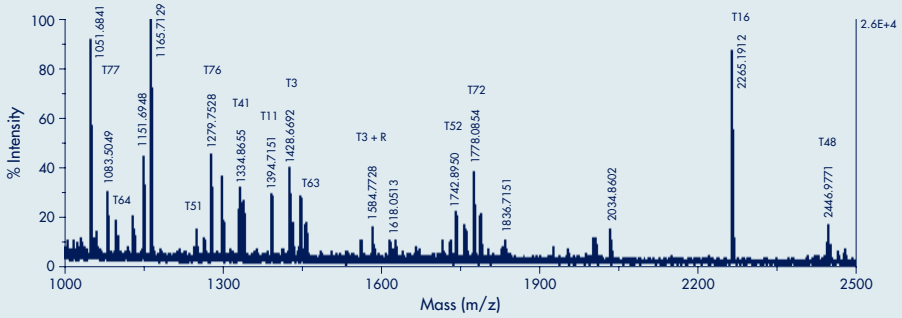
*Additional package sizes available. Contact Millipore.
**Compatible with PerkinElmer MultiPROBE® Workstation

ZipPlate micro-SPE Plate

The first device of its kind to integrate digestion, desalting, and sample concentration. The plate contains 300 nanoliters of C18 media immobilized at the bottom of each of the 96 wells.

- Included in Montage In-Gel Digest$_{ZP}$ Kits and sold separately
- Destain, digest, and concentrate with no sample transfers
- Integrated reaction chamber and C18 cleanup eliminates steps, minimizes peptide loss and improves sensitivity
- C18 micro-chromatography bed provides predictable scale-up from ZipTip and allows elution in MS-compatible buffer
- Standard 96-well format is compatible with all liquid handling systems

MALDI-TOF spectrum of 1 fmol of *E. coli* beta-galactosidase digest concentrated using ZipPlate micro-SPE Plate and transferred to a target using MALDIspot Kit. Tryptic fragment numbers from database matching are indicated. Sequence coverage was 14%. Spectrum was acquired on AB Voyager STR Biospectrometry Workstation. Data courtesy of Cheryl Murphy, Applied Biosystems.



Ordering Information

Description	Qty/Pk	Catalogue No.
ZipPlate micro-SPE Plate	10 x 96 wells	ZPC1 800 10
MALDIspot Kit	1 x 96 gel digests	LSKZ PMS 96

Additional Information

MS sample prep data sheet (PF1234EN00)

Visit **www.millipore.com/ziptip** to view additional technical information and qualify for a sample.

Clarification

Ultrafree-MC Centrifugal Filters

Ultrafree-CL Centrifugal Filters

Sterile Filtration Products

Non-Sterile Millex Filter Units

Ultrafree-MC Centrifugal Filters

For sample clarification with low hold-up

- Maximum starting volume: 500 µL
- Hold-up volume: <5 µL

Ordering Information

Membrane Type	Pore Size (µm)	Sterility	Qty/Pk	Catalogue No.
Durapore® (PVDF)	0.1	Non-sterile	25	UFC3 0VV 25
			100	UFC3 0VV 00
	0.22	Non-sterile	25	UFC3 0GV 25
			100	UFC3 0GV 00
	0.45	Non-sterile	25	UFC3 0HV 25
			100	UFC3 0HV 00
	0.65	Non-sterile	25	UFC3 0DV 25
			100	UFC3 0DV 00
	5.0	Non-sterile	100	UFC3 0SV 00
Hydrophilic PTFE	0.22	Non-sterile	25	UFC3 0LG 25
	0.45	Non-sterile	25	UFC3 0LH 25

Additional Information

Separating bound from unbound label tech note (TN1018EN00)

Ultrafree-CL Centrifugal Filters

For sample clarification with high recovery

- Maximum starting volume: 2 mL
- Hold-up volume: <10 µL

Ordering Information

Membrane Type	Pore Size (µm)	Sterility	Qty/Pk	Catalogue No.
Durapore (PVDF)	0.1	Non-sterile	25	UFC4 0VV 25
			100	UFC4 0VV 00
	0.22	Non-sterile	25	UFC4 0GV 25
			100	UFC4 0GV 00
	0.45	Non-sterile	25	UFC4 0HV 25
			100	UFC4 0HV 00
	0.65	Non-sterile	25	UFC4 0DV 25
	5.0	Non-sterile	25	UFC4 0SV 25
Hydrophilic PTFE	0.22	Non-sterile	25	UFC4 0LG 25
	0.45	Non-sterile	25	UFC4 0LH 25

Additional Tools
for Protein Research

Sterile Filtration

Millipore offers a variety of disposable devices for sterilizing or clarifying from 1 mL to 30 L of tissue culture media, buffers, additives, and other aqueous solutions.

Stericup® Filter Cups with Millipore Express® PLUS Membrane

- Our fastest PES filter cups ever
- Low protein binding
- No-tip, easy-grip design

Millex Syringe Filters

- The laboratory standard for over 30 years
- Available with Millipore Express membrane and ultra-low protein binding Durapore membrane
- Now available in 33 mm diameter for faster flow with higher burst pressure

Steriflip® Filter Devices

- Conveniently filter and collect samples in a 50 mL centrifuge tube

Stericap™ PLUS Bottletop Filters

- No adapter needed for most bottles
- Rapidly filters up to 10 L
- Higher throughput than competitive devices

Non-Sterile Millex Filter Units

These syringe-driven filter units are used for general filtration, for clarifying samples, and for removing particulates prior to chromatography. They feature solvent-resistant housings and a choice of membranes that are compatible with aqueous solutions, organic solutions, or both.

- 4, 13, 25, and 33 mm diameters
- HPLC-certified filters
- Ion-chromatography-certified filters
- Automation-compatible filters
- Filters with prefiltration material for particle-laden solutions
- Hydrophilic PTFE, hydrophobic PTFE, PVDF, PES, mixed esters of cellulose, nylon, and glass fiber filter materials

Bookmarks

The world of protein research changes every day. And so does millipore.com. We're continually adding new content and new functionality.

Millipore life sciences home page
www.millipore.com
(on the banner, under "Applications")

Protein research products, protocols, posters, user guides
www.millipore.com/proteinresearch

On-line ordering
www.ictsl.net

Order tracking
www.ictsl.net

Stay up to date with our newsletter
www.millipore.com/protein

Technical Support

- Need to recover low molecular weight proteins but unsure which cut-off to use?
- Want advice on optimizing your Western blot?
- Not sure how to store samples eluted onto a MALDI target?

Millipore Technical Service Specialists have answers to these and many other questions concerning Millipore products and essential applications such as ultrafiltration, blotting, in-gel digestion, and MS sample prep.

To contact a Specialist, call your local office or submit a question at www.ictsl.net.

MILLIPORE

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