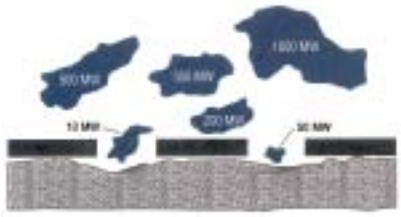
Dialysis and Ultrafiltration

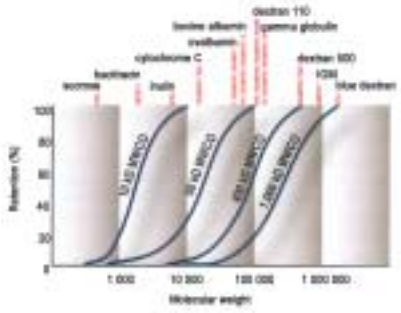
Dialysis is an easy and efficient technique to separate biomolecules according to their molecular weight, but also usefull for small bioactive compounds release or binding studies. Applications include :

Applications	Area	Biomolecule of interest
♦ desalting (removing salts) ♦ buffer exchange ♦ fractionation	biochemistry (synthesis, labeling, analysis) production (purification,...)	proteins lipids nucleic acids carbon hydrates
♦ drug binding studies ♦ drug release in cell models or organisms	pharmacology	drugs, ligands, cytokines...



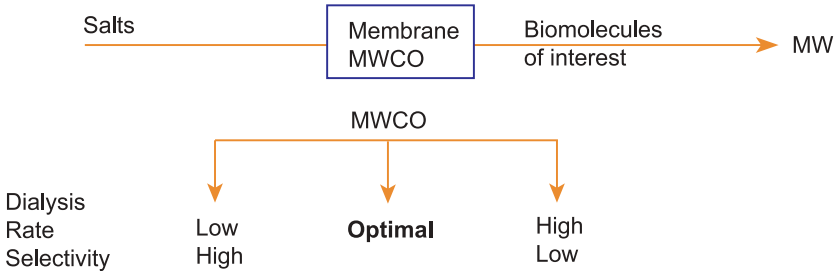
Membranes 200 MWCO most molecules with MW >200 200 Da MWCO

Dialysis is driven by a differential concentration gradient, discriminating biomolecules across a "semi-permeable" membrane. The membrane can be considered to display pores that retain molecules above a given size, and is permeable to small molecules. Membrane should be chosen with a Molecular Weight Cut-Off (MWCO) between the MW of molecules to recover in the sample compartment, and the MW of the molecules to remove (usually salts, by-products of reaction,...). See technical tip.



Solute retention of Spectrum UF membranes

- ♦ MWCO is defined for globular proteins (90% of molecules with MW=MWCO are retained), in given conditions (buffer, temperature,...). So, the membrane choice may depend on the **molecules shape, hydrophilicity**,... (see the table for nucleic acids with CelluSep). For effective dialysis, the ratio (MW of molecules to retain/MW of salt to remove) passed should be superior to 25.
- ♦ Also, the **dialysis rate** and the **selectivity** of molecules discrimination are affected near the MWCO. For quick desalting, the dialysis speed may be favored with MWCO far above MW of salts (closer to biomolecules), while for applications with small difference of MWs or with populations of dispersed molecules, the selectivity may be privileged by choosing a MWCO relatively close to small molecules to be removed.



Dialysis is performed by conventional tools as tubings, or flat sheets using a suitable support, or with specialized devices dedicated to applications for small samples, multiple samples, in vivo applications, equilibrium studies…

Selection guide

Application / sample / MWCO	Page	Products	Comments
0.5 ml to Liters	B102	CelluSep dialysis tubings	Highest **quality/price** membranes, ideal for standard pplications
0.5 ml to Liters / 100 à 1 000 000 da (reinforced,	B104	SpectraPor dialysis tubings and SpectraPor Sheets, Discs	**Largest choice** (cut-off, sizes...), special applications ultra cleaned membranes,...)
0.3-10 ml / 100 Da to 300 000 Da	B110	Float-A-lyser	**Ready-to-use** dialysis
0.5-3 ml / 100 Da to 300 000 Da	B111	DispoDialyser	For **sterile applications**
10-100 µl / 3 500 à 60 000 Da	B111	MicroDialyser	For **microvolumes**
0.1-3 ml / membrane choice	B112	FastDialyser	**Reusable** dialysis device
In vitro binding studies		inquire	Equilibrium dialysis
In vivo dialysis experimentation	B115	S/P in vivo dialysis follow filters	Cell **implants** Hollow fibers
Electro-elution (S dialysis)	B112	GebaFlex units and systems	
Concentration	B115	SpectraGel	**Concentrate** easily and quickly directly in the dialysis tubing!
DNA/RNA dialysis	B103	CelluSep H1 B108	**EDTA treated** membranes Biotech RC/CE
Multiple smal sample (1µl)	B185	UptiTip Chromalys	Combines Dialysis and SPE phase affinity !

Dialysis Tubings - CelluSep

CelluSep® Dialysis tubings are the best choice for dialysis, notably in Biology applications, for proteins and nucleic acids. They are regenerated cellulose membranes manufactured with high quality process for optimal and reproducible results.
T1, T2, T3 and T4 CelluSep® Dialysis Membranes suit classical dialysis applications, especially when attention is paid to very low adsorption of proteins, low impurities levels, good compatibilitie and economic cost. H1 CelluSep® Dialysis Membranes suit most exigent applications (minimal contaminants content, ready-to-use individual packages), and DNA desalting.

Accessories include CelluSep membrane closure clamps and Macro Filler funnels.

CelluSep membranes are provided with a complete documentation.
You can get also strong technical support at interbiotech@interchim.com

CelluSep® membranes Performances

- Protein adsorption
  (bovine serum albumin) ≤ 1 mg/cm²
- Retention
  (T = 10 hours, with T2 Membranes)
  Cytochrome C (12,3 KDa) 97%
  Vitamin B-12 (1355 Da) 59%

CelluSep® membranes technical datas

- Cadmium < 0,1 ppm
- Chromium < 0,1 ppm
- Copper < 0,1 ppm
- Iron 13,6 ppm
- Nickel < 0,1 ppm
- Zinc 6,24 - 12,9 ppm
- Lead 0,75 - 0,8 ppm

CelluSep® T1, T2, T3 et T4 membranes contain glycerol to prevent brittleness, and are packaged with a dessiccant to control humidity.

Which MWCO should I choose ?
How long should I dialyze ?
How many times should I change buffer ?
Which volume of dialysis buffer ?
How can I sterilize membranes ?
Do I need / how can I clean membranes ?
How can I concentrate dialyzed samples ?
...

CelluSep® T1, T2, T3 and T4 tubular dialysis membranes

- CelluSep® T1, T2, T3 et T4 membranes suit most dialysis applications
- Very low adsorptions of proteins
- Pure regenerated cellulose for low impurities levels
- Nominal Filter ratings : 3 500, 6 000 and 12 000 Daltons
- Economic
- Each package includes a detailed instructions manual and two clamps

CelluSep® T1Membranes - 3500 Da — **Nominal Filter rating : 4000-6000 MWCO**

Flat width	Ø dry	Vol/cm	Cat.#	Length
19 mm	12.1 mm	1.15	**T1-19-15**	15 m
46 mm	29.3 mm	6.74	**T1-46-15**	15 m

CelluSep® T2 Membranes - 6000 Da — **Nominal Filter rating : 6-8000 MWCO**

Flat width	Ø dry	Vol/cm	Cat.#	Length
10 mm	6.37 mm	0.32	**T2-10-15**	15 m
23 mm	14.6 mm	1.67	**T2-23-15**	15 m
25 mm	15.9 mm	1.98	**T2-25-15**	15 m
32 mm	20.4 mm	3.27	**T2-32-15**	15 m
40 mm	25.5 mm	5.10	**T2-40-15**	15 m
50 mm	31.8 mm	7.94	**T2-50-15**	15 m

CelluSep® T3 Membranes - 12000 Da — **Nominal Filter rating : 12-14000 MWCO**

Flat width	Ø dry	Vol/cm	Cat.#	Length
10 mm	6.37 mm	0.32	**T3-10-15**	15 m
25 mm	15.9 mm	1.98	**T3-25-15**	15 m
33 mm	21.0 mm	3.46	**T3-33-15**	15 m
45 mm	28.6 mm	6.42	**T3-45-15**	15 m
76 mm	48.4 mm	18.4	**T3-76-5**	5 m

CelluSep® T4 Membranes - 12000 Da/standard — **Nominal Filter rating : 12-14 000 MWCO)**
Standard grade (without accessories)

Flat width	Ø dry	Vol/cm	Cat.#	Length
10 mm	6.37 mm	0.32	**T4-10-30**	30 m
25 mm	15.9 mm	1.98	**T4-25-30**	30 m
33 mm	21.0 mm	3.46	**T4-33-30**	30 m
45 mm	28.6 mm	6.42	**T4-45-30**	30 m

CelluSep® H1 Membranes

High Grade

- Suits protein applications, and especially DNA/RNA applications
- Pre-treated for minimal contaminants content
- Ready-to-use individual-use packaged
- MWCO from 1 000 to 25 000 Daltons

CelluSep® H1 is ideal for sensitive applications where glycerol, sulfur compounds, or small amounts of heavy metals will interfere with subsequent steps. CelluSep® H1 membranes are EDTA pretreated and packaged wet in a preservative solution. Individual-use 50 cm packages avoid waste, contamination and restorage concerns.
CelluSep® H1 provides an efficient tool for DNA and RNA purification, allowing both dialysis and concentration (see SpectraGel).

With the important expansion of Molecular Biology and the subsequent need for nucleic acids and proteins samples desalting, dialysis membranes behavior and their high cleanness has become important. The size and the three-dimensional shape of a molecule determine whether it passes or not through a membrane.
For proteins, notably globular ones, Molecular Weight Cut-Off (MWCO) has become a convenient guide for determining which membrane to use.
Nucleic acids are routinely characterized by the length in base (single-stranded : ss) or pairs (double-stranded : ds), and they display far less tertiary structure than proteins. Choosing the appropriate membrane according to the length of DNA provides a superior alternative to the MW of the DNA fragment. The table below compares the nominal membrane MWCO for retention of various lengths of DNA (ss and ds).

CelluSep H1 tubings in Length of 50 cm

MWCO	Flat width	Ø dry	Vol/cm	Cat.# (5 u)	Cat.# (10 u)
1000	18 mm	11.5 mm	1.04	**H1-18-5**	**H1-18-10**
1000	38 mm	24.2 mm	4.59	**H1-38-5**	**H1-38-10**
1000	45 mm	28.6 mm	6.42	**H1-45-5**	**H1-45-10**
2000	18 mm	11.5 mm	1.04	**H2-18-5**	**H2-18-10**
2000	38 mm	24.2 mm	4.59	**H2-38-5**	**H2-38-10**
2000	45 mm	28.6 mm	6.42	**H2-45-5**	**H2-45-10**
5000	18 mm	11.5 mm	1.04	**H5-18-5**	**H5-18-10**
5000	20 mm	12.7 mm	1.27	**H5-20-5**	**H5-20-10**
5000	32 mm	19.1 mm	2.86	**H5-32-5**	**H5-32-10**
5000	40 mm	25.5 mm	5.10	**H5-40-5**	**H5-40-10**
10000	10 mm	6.37 mm	0.32	**H10-10-5**	**H10-10-10**
10000	25 mm	15.9 mm	1.98	**H10-25-5**	**H10-25-10**
10000	32 mm	20.4 mm	3.27	**H10-32-5**	**H10-32-10**
10000	40 mm	25.5 mm	5.10	**H10-40-5**	**H10-40-10**
15000	10 mm	6.37 mm	0.32	**H15-10-5**	**H15-10-10**
15000	25 mm	15.9 mm	1.98	**H15-25-5**	**H15-25-10**
15000	32 mm	20.4 mm	3.27	**H15-32-5**	**H15-32-10**
15000	45 mm	28.6 mm	6.42	**H15-45-5**	**H15-45-10**
25000	12 mm	7.62 mm	0.46	**H25-12-5**	**H25-12-10**
25000	25 mm	15.9 mm	1.98	**H25-25-5**	**H25-25-10**
25000	35 mm	22.3 mm	3.91	**H25-35-5**	**H25-35-10**
25000	40 mm	25.5 mm	5.10	**H25-40-5**	**H25-40-10**

CelluSep tubings H1 in rolls

MWCO	Flat width	Vol/cm	Cat.# (5 m)	Cat.# (10 m)
3500	19 mm	1.15		**R00141**
3500	46 mm	6.74		**R00171**
8000	12 mm	0.46	**R00180**	**R00181**
8000	24 mm	1.67	**R00190**	**R00191**
8000	32 mm	3.27	**R00200**	**R00201**
8000	40 mm	5.10	**R00210**	**R00211**
8000	50 mm	7.95	**R00310**	**R00311**
10000	12 mm	0.46	**R00320**	**R00321**
10000	24 mm	1.67	**R00330**	**R00331**
10000	32 mm	3.27	**R00340**	**R00341**
10000	45 mm	6.42	**R00350**	**R00351**
10000	50 mm	7.94	**R00360**	**R00361**
15000	12 mm	0.46	**R00370**	**R00371**
15000	25 mm	1.98	**R00380**	**R00381**
15000	34 mm	3.46	**R00390**	**R00391**
15000	45 mm	6.42	**R00400**	**R00401**

Technical tip

DNA analysis with CelluSep H1 membrane

% of retention - Single stranded DNA

MWCO	15-mer	35-mer	117-mer
2 000	1	0.95	0.93
5 000	0.95	0.93	0.90
10 000	0.50	0.82	0.82
15 000	0.50	0.82	0.82
25 000	0.39	0.74	0.68

% of retention - Double stranded DNA

MWCO	15-mer	35-mer	117-mer
2 000	0.94	1	1
5 000	0.93	1	1
10 000	0.91	1	1
15 000	0.90	0.95	1
25 000	0.82	0.86	1

MWCO of 2 000 and 5 000 allow desalting of any fragment size (ss or ds).
However, 10, 15 and 20 000 MWCO membranes provide a faster alternative when dialysing double-stranded nucleic acids.

Facilitates tubing handling with closures, openers
See accessories for Dialysis page B116

Separation techniques (Proteins)

Desalting / Dialysis, Ultrafiltration

Dialysis Membranes - Spectra/Por® tubings, sheets & discs

Spectra/Por® is the most trusted and used name in laboratory dialysis.
These membranes exist :

- In regenerated cellulose (RC), made of cellulose linters (Spectra/Por® 1.2.3.4), or natural cellulose and paper (Spectra/Por® 5.6.7), and with the high quality grade Biotech RC membranes.
- In cellulose acetate (CE), made from single compounds of pure cellulose, with the high quality grade for Biotech CE membranes.
- In PVDF (polyvinyldifluoride) (Spectra/Por® Type F)

- **Cellulose acetate** (CE) membranes don't have to be cleaned before use. CE membranes are sensitive to organic solvents. Strong polar solvents such as acetone, MEK or dioxane will damage the membrane. This membrane will tolerate exposure to lower alcohols (methanol, ethanol, and isopropanol) with out apparent damage, but with possible alteration of MWCO. The membrane should not be exposed to organic solvents at concentrations exceeding 5% in water. CE membranes exhibit hydrophilic and uniform molecular porous dialysis membranes.
- **Regenerated cellulose** (RC) membranes may be chosen in first intention with the benefit of their narrower pore size. It is better RC membranes could be cleaned before use, except for the Biotech grade.
- **Biotech RC membranes** and **Biotech CE membranes** are dedicated to most exigent applications. They are obtained by a process that eliminates the use of metal salts in manufacturing. No special precleaning is required, thanks to exceptional freedom from impurities such as sulfide and metal contaminants which are commonly found in standard dialysis membranes.
- **Sterilized membranes** are obtained by irradiation (available in Biotech RC and Biotech CE membranes)
- **PVDF** membranes (Spectra/Por® Type F) have a wide compatibility with various aqueous acids and bases and organic solvents, or resistance to heat. However protein adsorption is higher.

Selection guide

Spectra/Por® membranes :

Classic applications of dialysis	**First intention choice**
molecules >=20kDa	SpectraPor 2 SpectraPor 4 for lower pore density and dialysis kinetic SpectraPor 5 for reinforced membranes
molecules 10kDa - 20kDa	SpectraPor 1
molecules 3.5kDa - 10kDa	SpectraPor 3
Specific applications / requirements	
convenience of use	SpectraPor 6 / provided wet and ready to use Dispodialyzers SpectraPor 1.2.3.4 ready-to-use dialysis sacks
sterility / high purity	SpectraPor Biotech sterile
crystallography studies	SpectraPor 7 / minimal disulfide and metal traces, Metal and Sulfide removal solutions, Biotech CE and Biotech RC membranes
organic solvent containing buffers	SpectraPor F

Overview of Spectra/Por® Membranes

Membrane Type	Material	MWCO	pH Range	Temperature limit	Organic Solvent Resistance	Available Irradiated (sterile)	Dialysis rate
Spectra/Por® 1 are recommended for classic uses with biomolecules above 10kD (MWCO 6-8KDa)							
1	RC	6k to 8k	2 to 12	60°C	Many OK	No	High
Spectra/Por® 2 membranes are recommended for classic uses for proteins above 20KDa (MWCO 12-14KDa) or for quicker dialysis kinetics							
2	RC	12k to 14k	2 to 12	60°C	Many OK	No	High
Spectra/Por® 3 membranes are recommended for small biomolecules (MWCO 3.5KDa)							
3	RC	3.5k	2 to 12	60°C	Many OK	No	High
Spectra/Por® 4 membranes are similar to Spectra/Por® 2, but with lower pore density and dialysis kinetic							
4	RC	12k to 14k	2 to 12	60°C	Many OK	No	High
Spectra/Por® 5 membranes are reinforced membranes to withstand high pressure differentials, but dialysis is slower than either Spectra/Por® 2 or 4.							
5	RC	12k to 14k	2 to 12	60°C	Many OK	No	Moderate
Spectra/Por® 6 membranes are recommended when convenience of use, as they are in a variety of MWCOs from 1 to 50KDa.							
6	RC	1k to 50k	2 to 12	60°C	Many OK	No	High
Spectra/Por® 7 membranes are recommended for applications where impurities (metal, disulfides) may be crucial (i.e. before MS analysis, for enzyme activities, crystallizations...). Biotech membranes are an alternative choice.							
7	RC	1k to 50k	2 to 12	60°C	Many OK	No	High
Biotech RC and Biotech CE membranes are the most pure membranes available today. They are produced with sharp, rigidly controlled MWCOs, and provided wet and ready-to-use.							
Biotech CE	CE	100 to 300k	2 to 9	37°C	No	Yes	High
Biotech RC	RC	3.5k to 60k	2 to 12	60°C	Many OK	Yes	Highes
Spectra/Por® Type F Dialysis Membranes are recommended when a wide compatibility is desired with various aqueous acids and bases and organic solvents, or resistance to heat. However protein adsorption is higher.							
Type F	PVDF	80k to 2,000k	1 to 14	130°C	Most OK	No	Highest

Tel 33 (0)4 70 03 88 55 ♦ Hot line 33 (0)4 70 03 73 06 ♦ Fax 33 (0)4 70 03 82 60

Spectra/Por®1 Dialysis Membranes - MWCO 6-8 kDa

Spectra/Por® 1 Regenerated Cellulose (RC) are recommended for classic uses with biomolecules above 10kDa.

Cat.#	Flat Width mm	Diameter mm	Volume/Length mL/cm	Package Length m (ft)
409920	10	6.4	0.32	15 (50)
458210	23	14.6	1.7	30 (100)
265670	32	20.4	3.3	30 (100)
229660	40	25.5	5.1	30 (100)
367890	50	32	8.0	30 (100)
666210	100	64	32	15 (50)
O31550	120	76	46	15 (50)
834650	Flat sheets 240 mm x 240 mm, package of 25			
O31430	Flat discs, 33 mm diameter, package of 50			
O31420	Flat discs, 47 mm diameter, package of 50			
O31410	Flat discs, 100 mm diameter, package of 50			
382700	Ready-to-use dialysis sacks for 1 to 40 mL samples, package of 10			
802890	Ready-to-use dialysis sacks for 5 to 400 mL samples, package of 10			

Related product : CelluSepT2.

Need to clean your dialysis membranes ?
-> see page B115 heavy metal and Sulfide removal

Spectra/Por®2 RC Dialysis Membranes - MWCO 12-14 kDa

Spectra/Por®2 Regenerated Cellulose (RC) membranes are recommended for classic uses for proteins above 20KDa or for quicker dialysis kinetics.

Cat.#	Flat Width mm	Diameter mm	Volume/Length mL/cm	Package Length m (ft)
369160	6	3.8	0.1	15 (50)
216710	10	6.4	0.32	15 (50)
229900	25	16	2.0	15 (50)
220450	45	29	6.4	15 (50)
236260	105	67	34	15 (50)
25221R	120	76	46	15 (50)
904940	Flat sheets 200 mm x 200 mm, package of 25			
O31440	Flat discs, 33 mm diameter, package of 50			
982760	Flat discs, 47 mm diameter, package of 50			
983580	Flat discs, 100 mm diameter, package of 50			
O31560	Ready-to-use dialysis sacks for 1 to 40 mL samples, package of 10			
O31570	Ready-to-use dialysis sacks for 5 to 400 mL samples, package of 10			

Facilitates tubing handling with closures, openers
See accessories for Dialysis page B116

Related product : CelluSepT3.

Spectra/Por®3 RC Dialysis Membranes - MWCO 3.5 kDa

Spectra/Por® 3 Regenerated Cellulose (RC) membranes are recommended for small biomolecules.

Cat.#	Flat Width mm	Diameter mm	Volume/Length mL/cm	Package Length m (ft)
183290	18	11.5	1.0	15 (50)
195610	45	29	6.4	15 (50)
180510	54	34	9.3	15 (50)
467660	Flat sheets 108 mm x 108 mm, package of 25			
O31460	Flat discs, 33 mm diameter, package of 50			
169590	Flat discs, 47 mm diameter, package of 50			
O31450	Flat discs, 100 mm diameter, package of 50			
284290	Ready-to-use dialysis sacks for 1 to 40 mL samples, package of 10			
O31590	Ready-to-use dialysis sacks for 5 to 400 mL samples, package of 10			

Related product : CelluSepT1.

Spectra/Por®4 RC Dialysis Membranes - MWCO 12-14 kDa

Spectra/Por® 4 Regenerated Cellulose (RC) membranes are similar to Spectra/Por®2, but with lower dialysis kinetic.

Cat.#	Flat Width mm	Diameter mm	Volume/Length mL/cm	Package Length m (ft)
18868R	10	6.4	0.32	30 (100)
217740	25	16	2.0	30 (100)
22983R	32	20	3.3	30 (100)
19112R	45	29	6.4	30 (100)
390530	75	48	18	15 (50)
319480	Flat sheets 150 mm x 150 mm, package of 25			
548160	Flat discs, 33 mm diameter, package of 50			
O31480	Flat discs, 47 mm diameter, package of 50			
O31470	Flat discs, 100 mm diameter, package of 50			
O31580	Ready-to-use dialysis sacks for 1 to 40 mL samples, package of 10			
358320	Ready-to-use dialysis sacks for 5 to 400 mL samples, package of 10			

Related product : CelluSep T4.

Spectra/Por®5 RC Dialysis Membranes - MWCO 12-14 kDa

Spectra/Por® 5 Regenerated Cellulose (RC) membranes are reinforced membranes to withstand high pressure differentials, but dialysis is slower than either Spectra/Por® 2 or Spectra/Por® 4.

Cat.#	Flat Width mm	Diameter mm	Volume/Length mL/cm	Package Length m (ft)
O31640	65	41	13	15 (50)
726880	140	89	62	15 (50)
O31650	Flat sheets 275 mm x 275 mm, package of 25			

Spectra/Por®6 RC Dialysis Membranes

Spectra/Por® 6 Regenerated Cellulose (RC) membranes are recommended for convenience of use, because they are provided wet and ready-to-use in a variety of MWCOs from 1 to 50KDa. Spectra/Por® 6 Tubings :

Cat.#	MWCO	Flat Width mm	Diameter mm	Volume/Length mL/cm	Package Length m (ft)
263820	1k	18	11.5	1.0	10 (33)
338240	1k	38	24	4.6	10 (33)
22991R	1k	45	29	6.4	10 (33)
189840	2k	18	11.5	1.0	10 (33)
265110	2k	38	24	4.6	10 (33)
381580	2k	45	29	6.4	10 (33)
257730	3.5k	18	11.5	1.0	10 (33)
546530	3.5k	45	29	6.4	10 (33)
758720	3.5k	54	34	9.3	10 (33)
128056	8k	6	3.8	0.1	10 (33)
758730	8k	12	7.5	0.45y	10 (33)
128058	8k	18	11.5	1.0	10 (33)
750020	8k	24	15	1.8	10 (33)
923650	8k	32	20.4	3.3	10 (33)
O31520	8k	40	25.5	5.1	10 (33)
O31530	8k	50	32	8.0	10 (33)
128106	10k	6	3.8	0.1	10 (33)
19921R	10k	12	7.5	0.45	10 (33)
128118	10k	18	11.5	1.0	10 (33)
746980	10k	24	15	1.8	10 (33)
O31510	10k	32	20.4	3.3	10 (33)
800370	10k	45	29	6.4	10 (33)
128156	15k	6	3.8	0.1	10 (33)
O31500	15k	12	7.5	0.45	10 (33)
128158	15k	18	11.5	1.0	10 (33)
203450	15k	24	15	1.8	10 (33)
834710	15k	32	20.4	3.3	10 (33)
220330	15k	45	29	6.4	10 (33)
128206	25k	6	3.8	0.1	10 (33)
310780	25k	12	7.5	0.45	10 (33)
128218	25k	18	11.5	1.0	10 (33)
128224	25k	24	15	1.8	10 (33)
729580	25k	28	18	2.5	10 (33)
220340	25k	34	22	3.7	10 (33)
O31490	50k	10	6.4	0.32	10 (33)
314250	50k	12	7.5	0.45	10 (33)
314251	50k	28	18	2.5	10 (33)
401110	50k	34	22	3.7	10 (33)

You search an easy and quick way to concentrate your dialyzed sample ?
-> see page B115 Spectrogel #292600

Spectra/Por®7 RC Dialysis Membranes

Spectra/Por®7 Regenerated Cellulose (RC) membranes are recommended for applications where impurities (metal, disulfides) may be crucial (i.e. before MS analysis, for enzyme activities, crystallizations…). Biotech membranes are an alternative choice.
Spectra/Por® 7 Tubings :

Cat.#	MWCO	Flat Width mm	Diameter rmm	Volume/Length mL/cm	Package Lengthm (ft)
714160	1k	18	11.5	1.0	5 (16)
O30530	1k	38	24	4.6	5 (16)
O30540	1k	45	29	6.4	5 (16)
O30550	2k	18	11.5	1.0	5 (16)
O30560	2k	38	24	4.6	5 (16)
O30570	2k	45	29	6.4	5 (16)
728110	3.5k	18	11.5	1.0	5 (16)
130080	3.5k	45	29	6.4	5 (16)
920160	3.5k	54	34	9.3	5 (16)
128356	8k	6	3.8	0.1	5 (16)
O30580	8k	12	7.5	0.45	5 (16)
128358	8k	18	11.5	1.0	5 (16)
847770	8k	24	15	1.8	5 (16)
O30590	8k	32	20.4	3.3	5 (16)
O30600	8k	40	25.5	5.1	5 (16)
O30670	8k	50	32	8.0	5 (16)
128406	10k	6	3.8	0.1	5 (16)
BI1900	10k	12	7.5	0.45	5 (16)
128418	10k	18	11.5	1.0	5 (16)
679180	10k	24	15	1.8	5 (16)
756710	10k	32	20.4	3.3	5 (16)
756720	10k	45	29	6.4	5 (16)
128456	15k	6	3.8	0.1	5 (16)
O30610	15k	12	7.5	0.45	5 (16)
128458	15k	18	11.5	1.0	5 (16)
O30620	15k	24	15	1.8	5 (16)
317290	15k	32	20.4	3.3	5 (16)
O30630	15k	45	29	6.4	5 (16)
128506	25k	6	3.8	0.1	5 (16)
O30640	25k	12	7.5	0.45	5 (16)
128518	25k	18	11.5	1.0	5 (16)
128524	25k	24	15	1.8	5 (16)
412560	25k	28	18	2.5	5 (16)
O30650	25k	34	22	3.7	5 (16)
607910	50k	12	7.5	0.45	5 (16)
340830	50k	28	18	2.5	5 (16)
O30660	50k	34	22	3.7	5 (16)

Separation techniques (Proteins)

Desalting / Dialysis, Ultrafiltration

Spectra/Por® Biotech CE Dialysis Membranes

- An Ultra High Purity and Precise Separation Dialysis Membrane
- Fourteen precise MWCOs ranging from 100 Da to 1 000 K Da
- Hydrophilic and uniform molecular porous dialysis membranes
- No special chemical pre-cleaning required
- 6 diameters available (5 for sterile membranes)

These state-of-art Spectra/Por® Cellulose Ester (CE) dialysis membranes offer an excellent Molecular Weight Cut Off (MWCO) selectivity for separation of ionic species as well as macromolecules. The advanced manufacturing process provides CE dialysis membranes with an extremely high purity and features a biologically inert surface to yield an optimum sample recovery. The Spectra/Por® Biotech CE membranes are sensitive to organic solvents. Strong polar solvents such as acetone, MEK or dioxane will damage the membrane. This membrane will tolerate exposure to lower alcohols (methanol, ethanol, and isopropanol) without apparent damage, but with possible alteration of MWCO. The membrane should not be exposed to organic solvents at concentrations exceeding 5% in water.

CE Biotech membranes are supplied wet in 1% NaN_3 preservative, and in 10 m length (33ft).

Biotech CE catalog numbers

MWCO (Da)	8 mm Flat Width 5 mm Diameter 0.20 mL/cm length	10 mm Flat Width 6.4 mm Diameter 0.32 mL/cm length	12 mm Flat Width 7.5 mm Diameter 0.45 mL/cm length	16 mm Flat Width 10 mm Diameter 0.81 mL/cm length	24 mm Flat Width 15 mm Diameter 1.8 mL/cm length	31 mm Flat Width 20 mm Diameter 3.1 mL/cm length	MWCO
100	**824090**	**821950**	**965380**	**834720**	**963060**	**986620**	100
500	**828410**	**824100**	**210900**	**824520**	**960260**	**988440**	500
1k	**871000**	**851370**	**683250**	**824530**	**O30230**	**691350**	1k
2k	**828430**	**352620**	**O30240**	**816870**	**O30250**	**959760**	2k
3.5k	**181150**	**187540**	**187880**	**189670**	**190540**	**192600**	3.5k
5k	**881700**	**O30260**	**O30270**	**O30280**	**O30290**	**O30300**	5k
8k	**404250**	**O30310**	**O30320**	**962470**	**348120**	**O30330**	8k
10k	**875440**	**556950**	**171840**	**660010**	**557000**	**661070**	10k
15k	**O30340**	**342700**	**32450**	**O30350**	**O30360**	**O30370**	15k
25k	**O30380**	**445190**	**835200**	**822510**	**962480**	**O30390**	25k
50k	**O30400**	**560020**	**181480**	**967070**	**O30410**	**560030**	50k
100k	**683460**	**406860**	**181590**	**329200**	**203440**	**332760**	100k

Sterile Biotech CE Membranes

- Irradiated membrane, individually packaged in deionized water
- 25 pre-cut membrane tubing, 14 cm lengths for use with Spectra/Por® Closures
- 2, 4, 5, 10, and 20 mL sample volume sizes

CE Biotech membranes are supplied wet in 1% NaN_3 preservative, and in 10 m length (33ft).

Sterile Biotech CE catalog numbers

MWCO (Da)	8 mm Flat Width 2 mL Volume 5 mm Diameter	10 mm Flat Width 4 mL Volume 6.4 mm Diameter	12 mm Flat Width 5 mL Volume 7.5 mm Diameter	16 mm Flat Width 10 mL Volume 10 mm Diameter	24 mm Flat Width 20 mL Volume 15 mm Diameter	MWCO
100	**O29590**	**O29600**	**O29610**	**O29620**	**O29630**	100
500	**O29640**	**O29650**	**O29660**	**O29670**	**O29680**	500
1k	**O29690**	**O29700**	**O29710**	**O29720**	**O29730**	1k
2k	**O29740**	**O29750**	**O29760**	**O29770**	**O29780**	2k
3.5k	**O29790**	**O29800**	**O29810**	**O29820**	**O29830**	3.5k
8k	**O29890**	**O29900**	**O29910**	**O29920**	**O29930**	8k
10k	**O29940**	**O29950**	**O29960**	**O29970**	**O29980**	10k
25k	**O30040**	**O30050**	**O30060**	**O30070**	**O30080**	25k
50k	**O30090**	**O30100**	**O30110**	**O30120**	**O30130**	50k
100k	**O30140**	**O30150**	**O30160**	**O30170**	**O30180**	100k

Spectra/Por® Biotech RC Dialysis Membranes

- Regenerated Cellulose (RC) dialysis Membrane Tubing
- Ultra high purity
- No special precleaning required
- Precise MWCO

Spectra/Por® Biotech Regenerated Cellulose (RC) dialysis membranes are available in a variety of style for different applications. Rolls of dialysis tubing are available for most general dialysis applications. Irradiated tubing pieces are also available.

Spectra/Por® Biotech Regenerated Cellulose (RC) dialysis membranes are designed with a strictly controlled MWCO and offer exceptional freedom from impurities such as sulfide and metal contaminants which are commonly found in standard dialysis membranes. There are no special pre-cleaning treatments required for Biotech RC Membranes.
Supplied as dry membrane tubings with glycerol as a humectant in 15 m (soft) rolls.

Related products : CelluSep T1.2.3.

Biotech RC Dialysis Tubings

MWCO	4 mm Flat Width 3.8 mm Diameter 0.1 mL/cm length	8 mm Flat Width 5.7 mm Diameter 0.25 mL/cm length	10 mm Flat Width 7.5 mm Diameter 0.45 mL/cm length	16 mm Flat Width 14 mm Diameter 1.5 mL/cm length
3.5k	**O32500**	**O32510**	**O32520**	**O32530**
8k	**27750**	**O29410**	**989290**	**923340**
10k	**O29360**	**O29370**	**O29350**	**923100**
15k	**O29420**	**O31540**	**623250**	**624660**
25k	**O29380**	**O29400**	**909510**	**O29390**

Sterile Biotech RC Dialysis Tubings (pre-cutted)

Irradiated membrane, individually packaged in deionized water 25 pre-cut membrane tubing 14 cm lengths for use with Spectra/Por® closures 2, 5, 10, and 20 mL sample volume sizes.

MWCO	8 mm Flat Width 2 mL volume	12 mm Flat Width 5 mL volume	19 mm Flat Width 10 mL volume	25 mm Flat Width 20 mL volume
8k	**O29460**	**O29470**	**O29480**	**985570**
15k	**O29520**	**O29530**	**O29540**	**829870**

Spectra/Por® type F (PVDF) Dialysis Membranes

Spectra/Por® Type F Dialysis Membranes are recommended when a wide compatibility is desired with various aqueous acids or bases and organic solvents, or resistance to heat. Chemical compatibility is available on inquire. They can be steam autoclaved without affecting their performances, and can be heat sealed. However protein adsorption is higher.

SpectraPor® membranes are supplied wet in 0.1% NaN_3 preservative, in 10 m length (33ft). They should be refrigerated and not allowed to dry out.

MWCO	8 mm flat width 5 mm diameter 0.2 mL/cm lenght	12 mm flat width 7.5 mm diameter 0.45 mL/cm lenght	16 mm flat width 10 mm diameter 0.81 mL/cm lenght	24mm flat width 15 mm diameter 1.8 mL/cm lenght
250 k	**U35520**	**U35500**	**U35560**	**U35540**
500 k	**O33080**	**O30480**	**O33100**	**O33090**
1000 k	**U35530**	**U35510**	**U35570**	**U35550**

Separation techniques (Proteins)

Desalting / Dialysis, Ultrafiltration

Specialized devices Dialysis (Ready-to-use/small volume/Electro-elution)

Float-A-Lyzer®

Ultra-convenient unique floatable dialysis device for samples from 0.3 to 10 mL

Very easy to use and sure :
- No wash, no nods, no accessory to load or float
- No risk of leakage, or puncturing with syringe needles

Rapid dialysis :
- Optimal sample/membrane/buffer contact

Excellent and easy recovery :
- Open, pipet with the provided pipette

Large choice of sizes, cut-offs and membrane types :
- Exists in 6 volumes, 13 cutoffs, 2 membrane qualities

Versatile :
- Replaced access to sample, concentration is possible

Catalog references (10 units per box)

Spectra/Por® Float-A-Lyser with Biotech Cellulose Ester membranes

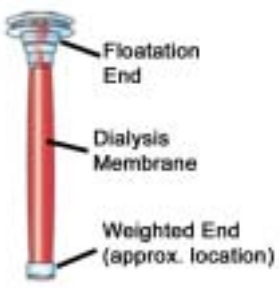
Cap color	Mbr type	Cut-off MWCO	Max. sample volume 300 µL	500 µL	1 mL	3 mL	5 mL	10 mL
Light Blue	CE	100	**883450**	**883460**	**883470**	**883480**	**883490**	**883500**
Amber	CE	500	**883510**	**O34290**	**883530**	**883570**	**883590**	**883600**
Violet	CE	1 000	**883160**	**883170**	**883180**	**883210**	**883230**	**883240**
Dark Green	CE	2 000	**883250**	**883260**	**883290**	**883310**	**883320**	**883330**
Black	CE	3 500	**883670**	**883680**	**883690**	**883700**	**883710**	**883720**
Pink	CE	5 000	**883730**	**883740**	**883750**	**883760**	**883770**	**883780**
Natural	CE	8 000	**883800**	**883820**	**883830**	**883860**	**883870**	**883880**
Yellow	CE	10 000	**874280**	**874300**	**874470**	**874490**	**874510**	**874530**
Orange	CE	15 000	**883900**	**883910**	**883920**	**883930**	**883940**	**883950**
Red	CE	25 000	**883960**	**883980**	**883990**	**884000**	**884010**	**884020**
Green	CE	50 000	**884030**	**884040**	**884050**	**884070**	**884080**	**884090**
Blue	CE	100 000	**884100**	**884140**	**884150**	**884160**	**884180**	**884190**

Spectra/Por® Float-A-Lyser with Biotech Regenerated Cellulose membranes

Black	RC	3 500	**884280**	**884290**	**884300**	**884310**	**884330**	**884340**
Natural	RC	8 000	**884390**	**884420**	**884430**	**884440**	**884450**	**884460**
Yellow	RC	10 000	**884470**	**884480**	**884490**	**884500**	**884510**	**884530**
Orange	RC	15 000	**884540**	**884550**	**884560**	**884570**	**884580**	**884590**
Red	RC	25 000	**884640**	**884660**	**884670**	**884710**	**884720**	**884760**

Dimensions

Volume	300 µL	500 µL	1 mL	3 mL	5 mL	10 mL
Total length	7 cm	8 cm	9 cm	9 cm	10 cm	16 cm
Diameter (cap diametre : 36 mm)	5 mm	5 mm	5 mm	10 mm	10 mm	10 mm



Technical tip

Float-A-Lyzer devices a designed to optimize dialysis efficiency, as well convenience of use.

The **membrane quality** is state of art (Biotech RC or CE), to avoid the need to wash, and to lower to minimal the content in contaminants that are noticeable in competitor dialysis devices. Float-A-Lyzer Dialysis Tube is individually packaged wet in .1% sodium azide preservative. Do not boil or soak prior to use. Just briefly rinse.
2 membrane types are available: **Regenerated Cellulose** ester (RC) is recommended for most applications, providing minimal protein adsorption, higher resistance to solvents (up 5%. Above see PVDF membranes). **Acetate Cellulose** may be preferred when heavy metals or sulfide contaminants are critical.
The tube volume, with optimal proportions, is free to move, **maximizing sample mixing** inside the tubing while its **membrane exchange large surface** is totally swept by buffer movements. Provided the buffer is agitate correctly (magnetic stirrer), the result is excellence in dialysis efficiency and rate.
Now, choose the **Molecular Weight Cut-Off** (MWCO), coded by a color for convenience, regarding the molecular weight of molecules to be removed and kept. MWCO are very precise, and range from 100 Daltons to 100 000, the greatest choice in the market ! Then choose the volume closest to your sample. For example, the MWCO 10Kda with 500µl and 3ml allow covering most applications of the lab.

Desalting protein or nucleic acids labeling reactions, buffer exchange before analysis, or purification polishing are made easy, while they can be **combined to a fast and convenient concentration step** without changing of recipient ! (See SpectraGel #292600 page 115).

Then, let's appreciate **how simple to use** is your Float-A-Lyzer :
Float-A-Lyzer are packaged individually, wet and thus ready-to-use. Rinse briefly the RC units. Label your sample on the cap. Open the cap, pipet the sample inside as you do in any tube, close the cap and put in a buffer tank, alone or several together: you do not need syringes, floats, weighing or supports! When you need to take an aliquot to check for dialysis completeness, or to perform a rapid test, or to add a reagent, that's simple as you never knew with other dialysis systems: open the cap, and pipette. Now, when it is time to recover the sample, use the provided pipette. Alternatively, maximal recovery may be obtained by a short centrifugation in a tube.
All these features together, Float-A-Lyzer are unique devices making the dialysis easier and more performing than you do with conventional tubings or other ready to use devices.

Tel 33 (0)4 70 03 88 55 ♦ Hot line 33 (0)4 70 03 73 06 ♦ Fax 33 (0)4 70 03 82 60

Dispodialyzer®

Spectra/Por® Dispodialyzer are sterile disposable dialysis devices.
Dispodialyzer shares most of the features of Float-A-Lyzer devices, but comes as sterile units without preservatives (wet in distilled sterile water).

- Wide Selection of MWCO : 100 to 100 000 Da
- Color coded caps
- Sample Volumes : 500 µL to 5 mL
- Dispodialyzers float upright without pontoons
- Pipettes for loading and unloading are included
- Irradiated (sterile) and individually pouched

Just open the easy-to-use dialysis tube, rinse, load your sample and screw the leak-proof cap in place. Allowing a small head space will ensure the Dispodialyzer floats vertically and remains fully immersed during dialysis. Dispodialyzer completely eliminate the need for membrane preparation, knot tying and tubing closures.

Dispodialyzers : ordering info (10 units per box)

Packaged 10 per box		Cellulose Ester Membranes			Regenerated Cellulose Membranes			
Cap Color	MWCO	Sample Volume 500 µL	1 mL	2 mL	500 µL	1 mL	2 mL	5 mL
Light Blue	100	**820190**	**408300**	**O32800**				
Amber	500	**820200**	**974620**	**987330**				
Violet	1k	**820220**	**168610**	**168640**				
Dark Green	2k	**O32680**	**O32760**	**222680**				
Black	3.5k	**O32690**	**342890**	**322940**				
Pink	5k	**820230**	**58370**	**420940**				
Clear	8k	**O32710**	**O32780**	**974830**	**O32640**	**673220**	**673230**	**673390**
Yellow	10k	**820240**	**374710**	**438170**	**759770**	**759800**	**759810**	**O32600**
Orange	15k	**O32720**	**213240**	**987520**	**O32650**	**654110**	**O32570**	**O32610**
Red	25k	**O32730**	**O32790**	**957650**	**O32660**	**O32550**	**O32580**	**O32620**
Green	50k	**O32740**	**914490**	**219280**				
Blue	100k	**568100**	**404880**	**219360**				

Dispodialyzer dimensions

Sample Volume	Maximum Volume Volume	Membrane Diameter	Exposed Membrane Length	Total Dialyzer Length
500 µL	600 µL	5 mm	2.0 cm	6.0 cm
1 mL	1.5 mL	5 mm	4.5 cm	8.5 cm
2 mL	2.2 mL	5 mm	8.5 cm	13 cm
5 mL	6.5 mL	5 mm	8.5 cm	12 cm

MicroDispodialyzer®

This device is the micro-brother of the Float-A-Lyzer : as convenient and performing, but for dialyzing micro-volumes of 100 down to 10 µL !

The membrane, made of Biotech Regenerated Cellulose, forms a well glued to the upper plastic holder/floater/cap, which maximizes the membrane surface to sample volume, and thus the dialysis rate.

Total Length : 2.9 cm
Cap Diameter : 3.6 cm

MicroDispodialyzer® ordering info (12 units per box)

Volume	Molecular Weight Cut-Off 3.5KD	8kD	15kD	25kD
10 µL	**905120**	**874540**	**905280**	**905290**
50 µL	**761920**	**761930**	**762000**	**905300**
100 µL	**761850**	**761900**	**761910**	**905320**

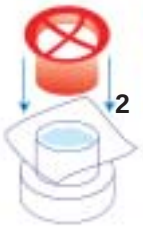
Separation techniques (Proteins)

Desalting / Dialysis, Ultrafiltration

Note : Multiple FastDialyzer can be used in the same beaker, depending on the size of the beaker.

Fill well with sample

1. Apply the sample in the bottom wel
Sample volume must be between 50 µl and the maximum depending on the model. The chamber should contain a bubble that help to mix the sample during dialysis.



Push to assemble

2. Assembly
Set a 2.5 x 2.5 cm2 square membrane on the bottom chamber, and push the top part to fix the membrane

Stir & tumble

3. Dialysis
Put the device in buffer under constant agitation. Allow the dialysis to occur at least 30 min (0.1 µl) or more depending on the sample type and size.

Perforate membrane and aspirate sample

3. Recover the sample
The sample can be removed by aspiration with a syringe through a needle (puncture the membrane), or a micropipette though a tip.

Related products : PBS (Powder Pack, or Tabs)

FastDialyzer™ : dialysis & desalting

FastDialyzer are convenient re-usable dialysis units : FastDialyzer are :

- work fast : most equilibration times average 1 hour with simple dialysis of salts or buffer exchange.
- You may choose your own membranes (and MWCO) "right off the shelf" to use with a FastDialyzer.
- Easy to use : The FastDialyzer method of loading and unloading sample is easy, efficient, and helps prevent sample loss.
- Reusable and rugged, which reduces cost and minimizes bio-hazardous waste.
- Available in a range of convenient volumes : 0.1 mL, 0.5 mL, 1.0 mL and 5 mL.

Designation	Cat.#	Qty
FastDialyzer 0.1 ml	**FD100-1**	1 u
	FD100-3	3 u
FastDialyzer 0.5 ml	**FD500-1**	1 u
	FD500-3	3 u
FastDialyzer 1 ml	**FD1000-1**	1 u
	FD1000-3	3 u
FastDialyzer 5 ml	**AA9890**	1 u
Mix of FastDialyzers (1 unit each of 0.1 ml, 0.5 ml and 1 ml)	**FD999-3**	1 u

FastDialyzers units can be cleaned by glassware washing machines and laboratory detergents, and with Ultrasonic cleaners.

CelluSep® Membrane Squares

CelluSep® membranes are available pre-cutted in 55 x 55 mm squares for using with FastDialyzers. One square suits to 5 ml FastDialyzer (1dialysis procedure), and to 1 ml, 0.5 ml, and 0.1 ml FastDialyzers (each square may be cut in 4 pieces). A brief rinse in distilled water is recommended before use.

Note : One also may used CelluSep dialysis tubings 25-50 mm flat width) that can be cut adequately.

F3 Membrane, 12-14K MWCO	55 mm x 55 mm	10/pk	**BA0891**
F2 Membrane, 6-8K MWCO	55 mm x 55 mm	10/pk	**BA0901**
F1 Membrane, 3.5K MWCO	55 mm x 55 mm	10/pk	**BA0911**

Technical tip

Electro-Dialysis is the transport of ions through a semi-permeable membrane as a result of an electrical driving force. Applications include removing salts from water or protein from aqueous solutions, but also separating electrolyte from cations and anions, or cations from anions.

Most dialysis membranes described above can be used in several electro-dialysis systems. Now, GebaFlex modules are the most convenient dialysis devices since they are ready-to-use in standard electrophoresis system (do not need frame or joints to fit) making electrophoresis gel pieces so easy and efficient.

GeBaFlex Dialysis and Electro-elution system

2 applications in one device !

The GeBAflex generation technology combines high performance in :

- Electro-elution of biologic macromolecules from polyacrylamide or agarose gels
- Dialysis of small-volume samples.

GeBAflex-tube is based on a single one used eppendorf-like tube, for rapid extraction of Protein, RNA, DNA and their complexes from any gel matrix, and for convenient and rapid dialysis of small-volume sample as low as 50 µl up to 3 ml. The sample (protein or nucleic acid, extract, reaction mixture or electrophoresis gel piece) is pipetted into the device that is placed in a dialysis tank or an electrophoresis chamber. That's easy ! The high quality hemipermeable membrane allows undesired small molecules to be removed from sample, while big molecules of interest are retained inside the GeBAflex chamber.

Separation techniques (Proteins)

Desalting / Dialysis, Ultrafiltration

General Benefits :

- 3 MWCOs
- Molecular Biology grade
- Cost effective
- Scalable / High Throughput
- 3 volumes (50 µl to 3 mL)
- Easy to use (loading and unloading)
- no need for cleaning or autoclaving
- no additional accessories needed

Applications

Proteins | **Nucleic acids**

DIALYSIS

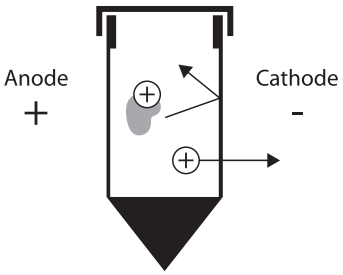
Desalting , Buffer exchange,...

Benefits :

- small-volume sample as low as 50-800 µL
- High Recovery : > 97%
- Easy to use : no need accessories, quick
- Convenient loading and un bading of sample
- Repeated access to sample
- Cost effective

EXTRACTION

ElectroElution, Molecular Size exclusion, Concentration...



Benefits :

- Suits low starting material : 1 to 25 µg of proteins and nucleic acids.
- High Recovery : Protein > 90%
  RNA or DNA > 95%.
- No residual salts (suits MALDI-MS)...
- ElectroElution : compatible with any horizontal electrophoresis system
- Suits DNA and oligonucleotides >20 bp, RNA, Proteins >3500 MW

Product characteristics :

- Dialysis membranes are made of ultra-clean Regenerated Cellulose (6-8000 and 12-14000 MWCO), or cellulose ester (3 500 MWCO) : there is no need to wash them, even for most demanding applications (i.e. cristallography) because they are sulfure and metal free.
- GeBAflex-tubes are provided with floating rack (Dialysis kits), or with supporting tray and floating rack (Extraction kits)
- GeBAflex-tubes suits for volumes ranging from 50 µl to 3 ml. 3 dialysis chamber sizes are available : MINI [10-250 µl], MIDI [50-800 µl], MAXI [100 µl-1 ml (with an adaptator cap) or 2-3 ml (standard cap)]

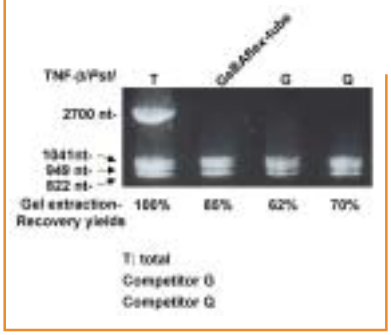
Separation techniques (Proteins)

Desalting / Dialysis, Ultrafiltration

Scale up system for HTS.

Technical tip

GeBAflex yields superior recovery in DNA or Protein recovery from gel slices



* Include buffers, supporting tray, floating rack, handbook
§ By changing the maxi GeBAflex-tube cap (two caps are provided with the kit) one can easily adjust the dialysis volume between 100-2 000 and 100-3 000 µL.

GeBAflex-tube kits for EXTRACTION by Electroelution

MacroBiomolecules can be rapidly extracted from electrophoresis gels, as well as complex samples (i.e. including particles) with GeBAflex tubes. The dialysis chamber accommodates 10-250 µl sample or 0.4 x 1.1 cm gel slice (miniGeBA) .The GeBAflex tube(s) can be assembled on a tray to support it (them) adequately in standard electrophoresis horizontal tanks. High throughput electroelution is possible : for example, 24 samples (or multiples of 24) are extracted simultaneously, typically in 80 min/50 kDa proteins, in one electrophoresis unit !

Downstream applications of electroelution with GeBAflex from electrophoresis gels include :

Applications

Proteins

- Mass spectrometry analysis (MW determination, structural characterization and identification)
- HPLC analysis for peptide sequencing
- Peptide mapping
- Purification of very small Protein quantities
- Recovery of gel-purified proteins for immunization of laboratory animals
- Recover proteins run on isoelectric focusing gels and simultaneously remove ampholytes

DNA or RNA

- RNA structure mapping
- Purification of RNA transcripts
- Removal of RNA contamination from in vitro transcription RNA

MWCO	GeBAflex-tube Extraction kits * MINI (10-250 µL)		MIDI (50-800 µL)		MAXI (100-3000 µL) §	
3 500			**U2707O**	10 u	**AA7400**	5 u
			U2707Z	20 u	**AA7401**	15 u
6 000- 8 000	**AZ3890**	10 u	**U2708O**	10 u	**AA7420**	5 u
	AZ3891	30 u	**U2708Z**	30 u	**AA7421**	15 u
12 000-14 000	**AZ3900**	10 u			**AA7410**	5 u
	AZ3901	30 u			**AA7411**	15 u

GeBAflex-tube kits for DIALYSIS

GeBAflex-tube provides easy to handle and performing system for dialysis, buffer exchange and desalting of small samples volume. MacroBiomolecules are rapidly dialyzed and recovered with high yield. High Throughput dialysis is possible, using trays to support GeBaflex tubes in on dialysis tank.
Applications : up and down stream applications of dialysis with GeBAflex include :

Applications

Proteins

- Desalting of modified proteins (i.e. amino termini de-blockage, enzyme cleavage, Biotinylation, labeling, conjugations)
- Buffer exchange before biochemistry
- Removal of urea from recombinant proteins
- Recombinant proteins, proteins extracts (SDS removal)

DNA or RNA

- Desalting
- Labeling
- Removal of ethidium bromide from nucleic acid samples
- Radioactive and fluorescent sequencing
- Protein-nucleic acids complexes formation and analysis

MWCO	GeBAflex-tube Dialysis kits * MINI (10-250 µL)		MIDI (50-800 µL)		MAXI (100-3000 µL) §	
3 500	**U2707A**	10 u	**AA740A**	5 u		
			U2707B *	30 u	**AA740B**	15 u
6 000 - 8 000	**AZ389A**	10 u	**U2708A**	10 u	**AA742A**	5 u
	AZ389B	30 u	**U2708B ***	30 u	**AA742B**	15 u
12 000 - 14 000	**AZ390A**	10 u			**AA741A**	5 u
	AZ390B	30 u			**AA741B**	15 u

* Include floating rack, handbook.
Items U2707B and U2708B are available as economic packaging (without box and floating rack) : #U2707D (MIDI, 3500MWCO, 30 tubes) and #U2708D (MIDI, 6-800MWCO, 30tubes)
§ By changing the maxi GeBAflex-tube cap (two caps are provided with the kit) one can easily adjust the dialysis volume between 100-2000 and 100-3000 µL.

Accessories

Supporting tray Midi (for 1-4 GeBAflex-tubes)	**BI2921**	20 units
Floating rack Midi (for 1-4 GeBAflex-tubes)	**BI2931**	20 units
Precipitation Buffer (TCA)	**BI2941**	20 x 21 mL
Extraction Buffer (Kac)	**BI2943**	20 x 3 mL
MS Buffer	**BI2926**	20 x 3 mL
MS Buffer	**BI2927**	5 mL

Spectra/Por® in vivo Microdialysis

Perform in vivo localized recovery or dispensing micro quantities (down cubic mm³ of fluid).

Applications :

- In vivo delivery (i.e. localized delivery in brain for the evaluation of neuropeptides transmitters)
- Metabolic experiments (i.e. by using radioisotope techniques in combination with analytical chemistry)
- Analysis of compounds within the extracellular space

Cat.#	Product	Qty
O30860	Spectra/Por® in *vivo* Microdialysis Hollow Fibers, MWCO 13 kDa	20 u
964120	Spectra/Por® in vivo Microdialysis Hollow Fibers, MWCO 18 kDa	20 u

Accessory products for Dialysis (Concentration & dialysis, Membrane cleaning)

Spectra-Gel® Absorbent

Concentrate easily your dialyzed samples !

Concentration, when required after dialysis, is often a hassle, loose time and material, whatever it is performed by ultrafiltration (i.e. with proteins), or precipitation (i.e. with DNAs). Now, SpectraGel offers a convenient and efficient alternative !

- Highly efficient concentration
- Easy to use, quick
- No additional recipient or step

This gel, based on polyacrylate/polyalcohol, absorbs water through the dialysis membrane, up to 1000 times its weight, concentrating the sample in its dialysis bag. It is compatible with all dialysis membranes, whatever the cut off is. Used with FloatA-Lyzer MWCO 15Kda, a volume of 5mL is reduced to 0.5 mL within 90 min with 10 g of SpectraGel.

SpectraGel offers several advantages over PEG based alternatives :

- Do not stick to dialysis bag and is thus easier to handle, greatly facilitating the sample recovery from dialysis bag,
- Do not contaminate the sample, that may interfere with following analysis (MS, Crystallography,...) with low molecular weight compounds.

SpectraGel also compares favorably with ultrafiltration (no pressure of centrifuge needed, no additional recipient and transfer improving sample recovery) or precipitation (gain time, no additional step, better yield,...).

Product	Cat.#	Qty
Spectra/Gel Absorbent	**292600**	500 g

Heavy Metals Cleaning

The Spectra/Por® Heavy Metals Cleaning solution can be used to remove the heavy metal contamination found in traditional regenerated cellulose membranes. This chelating wash can be used to remove these heavy metals in situations where they would interfere with later analysis of the dialysate or the retentate, especially where they would interfere with protein function. A cleaning kit allows to clean several hundred feets of tubing.

Product	Cat.#	Qty
Heavy Metals Cleaning reagent	**905700**	250 ml

Sulfide Removal

Spectra/Por® series 1 through 6 contain about 0.1% sulfur remaining from the manufacturing process. This may be removed if its presence might interfere with the subsequent use of the dialysate or retentate. A sulfide removal kit allows to clean several hundred feets of tubing.

Product	Cat.#	Qty
Sulfide Removal reagent (solutions A and B)	**26530R**	1 kit

Cleaning procedure :
1/ wash with cleaning reagent diluted 1:9 with water
2/ 5min soaking
3/wash with water for several minutes

Note : Trace elements found in Spectra/Por® RC series 1 through 6 are (ppm) : Calcium < 0.02, Chromium 0.1–0.2, Copper 0.8–1.2, Iron 20–60, Lead 2.0–6.0, Magnesium 0.1–0.3, Nickel 1.3–1.7, and Zinc 1.5–5.0.

Note : For ease of use, we recommend Spectra/Por® 7 membranes, which are already treated to remove the contaminants, or BioTech membranes which are made from chemically pure cellulose, or type F (PVDF) membrane which are devoided of sulfides and heavy metals.
Cleaning procedure : 1/ wash with solution A (1:2 in water) for 1min at 80°C, 2/ wash in water for 2 min at 60°C, 3/ wash with solution B (4 mL/100 mL water).

Separation techniques (Proteins)

Desalting / Dialysis, Ultrafiltration

Closures for Tubings

Tubing standard Closures

Magnetic Weighted Closures

♦ Complete submersion of the dialysis tubing into the buffer chamber wcomposed with a regular, non-weighted Closure

♦ A slow spin movement of the dialysis tubing occurs when used in conjunction with a magnetic stir plate. No additional stir bar is required in order to maintain continuous motion of the dialysis tubing

♦ Not for use with CE or PVDF tubing

Cat.#	Description	Sealing Width
804330	Magnetic Weighted Closures	23 mm
821970	Magnetic Weighted Closures	35 mm
822480	Magnetic Weighted Closures	55 mm
822500	Magnetic Weighted Closures	75 mm

Tubing standard closures : cellu.Sep® clamps

These clamps seal the tubing by a simple pressure and remain locked during dialysis until the user opens it. They avoid the hassle of making and checking knots, reducing the risk of loosing sample.
The clamps are made of resistant and inert polyamide 6.6 (NYLON), and do not float, for an optimal dialysis. Cut tubular membrane to length and clamp at one end, slip the open end onto the polypropylene funnel and secure with the silicone loop fastener.
Open snap cap, fill with sample, and hang in container. Funnels are supported by a three-notched universal hanger that fits over the edge of common vessels.

Description - max membrane width	Length	Cat.#	Qty
Cellu.Sep® Locking clamp - 46 mm	65 mm	**CB-1050**	10 u
Cellu.Sep® Locking clamp - 65 mm	90 mm	**CB-1070**	10 u
Cellu.Sep® Locking clamp - 105 mm	130 mm	**CB-10100**	10 u

Filler funnels

Description	Cat.#	Qty
Macro filler funnels	**P58480**	5 u
For 23 mm, 25 mm, 32 mm, 40 mm and 45 mm flat widths. Package of five funnels and two silicone loops		
Mini filler funnel	**P58490**	5 u
For 10 mm and 19 mm flat widths. Package of five funnels and two silicone loops		
Silicone loops	**P58500**	10 u

Dialysis Reservoir

Cat.#	Description	Vol (mL)	Ht (cm)	Dia (cm)
O30510	Dialysis Reservoir with Stir Bar	600 *	12.5	11.5
966180	Dialysis Reservoir with Stir Bar	1,800 **	30	11.5

* accommodate membrane tubings with a flat width of less than 16 mm and sealing closure width less than 75 mm.
** accommodate membrane tubings with the flat width of less than 80 mm and sealing closure width less than 75 mm.

Micro Dialysis systems

Spectra/Por® MicroDialyzers systems

For Rapid Dialysis of Micro-Volume Samples.

Spectra/Por® MicroDialyzers offer a wide range of features to enhance conventional dialysis methods of micro volumes. They are excellent for simultaneous micro sample applications from 24 to 620 µL. Each unit is designed to increase dialysis efficiency and maximize sample recovery. Speed and precise control of the dialysis process are the key features of these systems. Similar to conventional methods, the Spectra/Por® MicroDialyzers works by separation of the sample to be dialyzed by a semi-permeable membrane. Framed membranes are available to accommodate all sizes of MicroDialyzers in MWCO ranging from 100 Da to 100 KDa.

	Spectra/Por® Microdialysers			
Cat.#	10 x 230 µl O30920	10 x 620 µl 272750	16 x 230 µl O30940	96 x 560 µl O30960
Number of Samples	10	10	16	96
Nominal Sample Volume (µL)	150	500	150	150
Maximum Sample Volume (µL)	230	620	230	560
Minimum Sample Volume (µL)	24	65	24	24
Mbr Surf. Area / Sample (square mm)	65	65	24	24
Reservoir Volume (mL)	32	34	34	112
Dialyzer Dimensions LxWxH (cm)	6.4 x 6.4 x 4.0	12.7 x 6.4 x 4.0	12.7 x 6.4 x 4.0	15.2 x 13.3 x 4.0
ChamberVolume (mL)	30	32	34	112

Features :

- Maximum concentration differential due to continuous dialysis buffer exchange
- Easy-to-use snap clamps to prevent leakage
- Compatibility with multichannel pipettors for quick and precise sample handling
- Negligible sample loss and dilution effects due to small membrane surface area
- Units completely disassembly for easy cleaning
- Pre-cut, framed Spectra/Por® membranes are available for all systems
- Labeled wells for easy sample identification

Tel 33 (0)4 70 03 88 55 ♦ Hot line 33 (0)4 70 03 73 06 ♦ Fax 33 (0)4 70 03 82 60

Spectra/Por® CE Membrane Frames For MicroDialyzers

Cellulose Ester (CE) membranes are bound to frames according to the size of the MicroDialyzers.
10 membranes frames/package, each being individually packed in 1% sodium azide.

MWCO (Da)	Cat.# Use with 10 wells dialyzers	Use with 5, 12, and 16 wells dialyzers	Use with 96 wells dialyzers
100	**O31680**	**O31810**	**O31940**
500	**O31690**	**O31820**	**O31950**
1K	**O31700**	**O31830**	**O31960**
2K	**O31710**	**O31840**	**831230**
3.5K	**O31720**	**O31850**	**O31970**
5K	**O31730**	**O31860**	**O31980**
8K	**O31740**	**O31870**	**O31990**
10K	**O31750**	**O31880**	**O32000**
15K	**O31760**	**O31890**	**O32010**
25K	**O31770**	**O31900**	**O32020**
50K	**O31780**	**O31910**	**O32030**
100K	**O31790**	**O31920**	**O32040**

Microdialyser accessories

Description	Cat.#
10-Sample Well Plate, 150 µl	**O30970**
10-Sample Well Plate, 500 µl	**O30980**
16-Sample Well Plate, 150 µL	**O30990**
96-Sample Well Plate, 150 µL	**O31000**
Sample O-ring (for 150 µL), 20/pkg	**O31010**
Sample O-ring (for 500 µL), 20/pkg	**O31020**
Replacement Kit for Spectra/Por® 150 µL/500 µL MicroDialyzer: 2 Luer Fittings, 2 Three-way Valves, 20 of 150 µL O-rings, 10 of 500 µL O-rings, and 2 Dialysis Chamber O-rings	**974800**

Applications :

- Desalting of macromolecular solutions
- Sanitary and multiple micro-dialysis
- Buffer and pH change
- Viruses purification after a sucrose gradient
- Binding studies of fatty acids on proteins
- Preparation of diluted protein for electrophoresis or PEG for an approximate ten-fold concentration
- Dialysis of toxic or radioactive samples

Please inquire for other dialysis systems !
i.e. MacroDialyzer system is equivalent to MicroDialyzer but for larger volumes (1 to 100 ml), suiting especially to equilibrium dialysis

Ultrafiltration

Ultrafiltration uses the same principle as dialysis, but drives by an outer-force

page B131 (UF Stirred Cells).

Gel filtration

Gel filtration is an alternative method to dialysis for desalting rapidly samples

page B132 (Desalting columns).