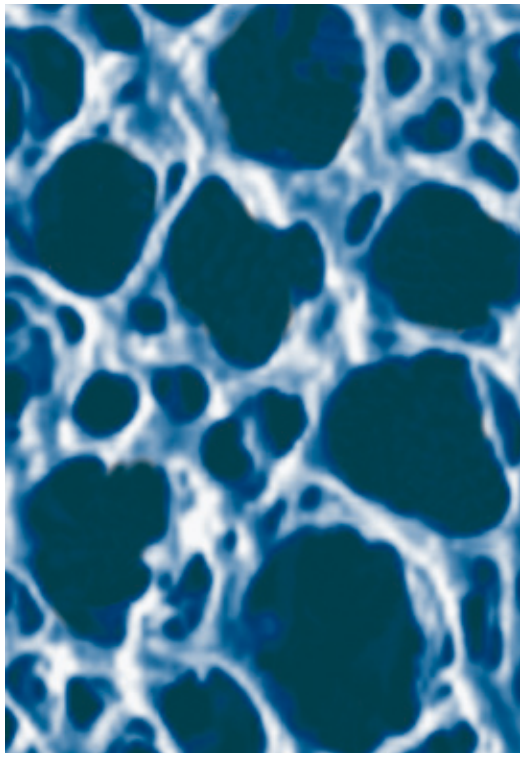
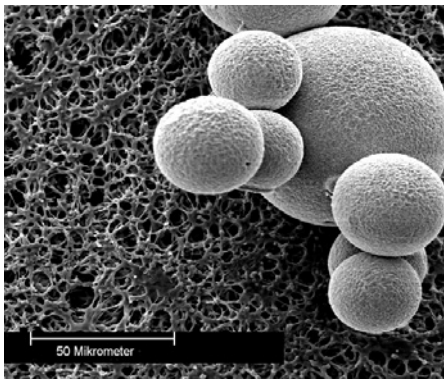
sartorius stedim biotech

Vivapure®
Ion Exchange Chromatography Products



turning science into solutions

Vivapure®
Ion Exchange Protein Purification Products



Chromatography gel beads (right) are shown on top of a membrane adsorber in this SEM picture. The membrane adsorber pores are over 50 × larger than bead pores.

The unique Sartobind membrane adsorber matrix
Sartobind IEX membrane adsorbers are based on stabilized regenerated cellulose and display a microporous structure with a pore size of > 3 µm, which is orders of magnitude larger than conventional chromatographic gel materials. This allows molecules to be transported to the ligands immobilized on the membrane adsorber by convective flow, leading to very high flow rates.

In contrast to that, gel chromatography is slowed down due to diffusion limitations, as the molecules need to enter the small bead pores in order to be bound by the ligands. The porous membrane adsorber enables fast, reproducible and scalable protein purification.

Fast and easy-to-use chromatography devices
Vivapure® Ion Exchange (IEX) products, incorporate Sartobind Membrane Adsorber technology as their chromatography matrix. They make protein purification as easy as filtration. The devices are ready-to-use and do not bear the risk of running dry. For many protein purification applications, they can replace time-consuming and tedious column chromatography.

The rapid 1-2-3 bind-wash-elute protocol especially lends itself to screening applications, where many different samples are processed in parallel.

... Scalable to Industrial Applications

Scalable SingleSep disposable capsules for process scale applications, e.g. virus removal, DNA removal and endotoxin removal. The devices are available in formats ranging from 1 ml to 1620 ml membrane volume, for capacities from 0.029 g to 48 g. For technical data and description, refer for SingleSep brochures and data sheets.

Scalable to industrial scale applications
Sartobind membrane adsorber (MA) technology is available from 96-well plate format to industrial process scale modules. Sartobind IEX MA units are useful tools when flow control is needed, as the down scale step to a process scale application.

Vivapure® IEX products

Vivapure® Mini – 400|500 µl
Binding capacities: 1–4 mg

Vivapure® Maxi – 19|20 ml
Binding capacities: 15–80 mg

Membrane availability

Functional groups	Ion exchanger type	
Sulphonic acid (S)	Strong acidic cation exchanger:	$R\text{-}CH_2\text{-}SO_3^-Na^+$
Quaternary ammonium (Q)	Strong basic anion exchanger:	$R\text{-}CH_2\text{-}N^+\text{-}(CH_3)_3Cl^-$
Diethylamine (D)	Weak basic anion exchanger:	$R\text{-}CH_2\text{-}NH^+\text{-}(CH_2H_5)_2$

Available formats

Vivapure®	Application
Vivapure Mini Spin Columns	– Sample fractionation – Purification condition scouting – Small scale purification
Vivapure Maxi Spin Columns	– Large scale sample fractionation – One step protein purification| concentration – Polishing of his-tagged protein

Vivapure® advantages

Fast and simple to use
- Devices are ready to use – no column packing
- Make protein purification as simple as filtration

Reproducible results
- Membrane adsorber columns cannot crack or run dry
- Membrane adsorber columns are highly reproducible to manufacture

Centrifugal devices
- Offer the possibility of working in parallel

Low bed volume
- Small membrane adsorber bed volumes allow working with lower buffer amounts, leading to concentrated elution fractions

Up-scalable product range
- Process scale modules are available with the same Sartobind IEX membrane adsorber matrix

Applications

- Fractionation of protein mixtures prior to 2D-PAGE
- Purification scouting of an unknown protein
- Sample preparation prior to 1-D or 2-D PAGE
- Removal of endotoxins from monoclonal antibodies
- Preparation of heme moiety from heme containing protein for functional analysis
- Polishing of His-tagged proteins
- General protein purification
- Detergent removal from protein solutions
- Purification of antibodies from serum, ascites or tissue culture supernatant
- Establishing a purification | prepurification protocol for a given protein
- HPLC|FPLC sample preparation
- Purification of membrane-bound proteins

Technical Specifications

Performance characteristics

Device	Protein binding capacity* (mg)	Max. volume per centrifuge run using a swing-out rotor (ml)	Max. volume per centrifuge using a fixed angle rotor run (ml)
Vivapure Mini H	4	0.4	
Vivapure Maxi H	60–80	19	10.5

* Actual yields depend on specific protein sample and selected pH and salt conditions. Yields established using 1 mg/ml BSA in 25 mM Tris/HCL pH 8.0 with Vivapure Q & D spin columns and 1 mg/ml cytochrome c in 25 mM sodium acetate buffer pH 5.5 with Vivapure® S & C spin columns.

Capacities and dimensions

Device	Bed Volume (µl)	Membrane Area (cm^2)
Vivapure Mini H	240	7.48
Vivapure Maxi H	2700	84.40

Membrane Adsorber	
Nominal pore size	3–5 µm (Large pore size prevents gel filtration effects and minimizes non-specific adsorption)
Thickness	230–320 µm
Amount of ionic groups (µEquivalents/ml)	145–218 µEquivalents/ml for monovalent ions (D,Q & S) 72 µEquivalents/ml for monovalent ions (C)
Working pH (D & C)	4–10
Working pH (Q & S)	2–12
Approximate pka of ionic groups	D–9.5 | Q–11 | S–1 | C–4.5

Materials of construction	
Device	Polypropylene
Supporting matrix	Stabilized regenerated cellulose

Ordering Information

Cat Number	Vivapure Mini Spin Columns	Spin Centrifuge	Columns Tubes
VS-IX01SQ16	Vivapure Mini S & Q H Starter Kit (8 of each ion exchange class)	16	32
VS-IX01DH24	Vivapure D Mini H	24	48
VS-IX01QH24	Vivapure Q Mini H	24	48
VS-IX01SH24	Vivapure S Mini H	24	48

Cat Number	Vivapure Maxi Spin Columns	Spin Centrifuge	Columns Tubes
VS-IX20QH08	Vivapure Q Maxi H	8	16
VS-IX20SH08	Vivapure S Maxi H	8	16

Vivapure IEX Spin Columns – Applications

1. Fractionation of complex protein lysates with IEX-membrane spin columns improves resolution of 2-D PAGE.

   Perkin Elmer, Boston (USA) Mary Lopez et al., American Biotechnology|Laboratory

2. A fast and simple protocol for finding out the optimal purification conditions (purification scouting) of an unknown protein, using different buffers and IEX spin column chemistries in parallel.

   Vivascience, Hanover, Germany C. Neumann et. Al.

3. A simple, fast and reliable method using Vivapure Q Mini for removing highly charged contaminant from samples prior to 2D-PAGE e.g. proteoglycanes from cartilage explant.

   Roche, Palo Alto, USA

4. Vivapure centrifugal anion exchangers were used to remove endotoxin from research grade monoclonal antibody solutions easily with high protein recovery.

   Cambridge Antibody Technology, Cambridge UK B. Fish et al., Drug Discovery 3 (2003) 26-27

5. A simple and reliable protocol for the separation of Tween 20 treated soluble Guanylate cyclase from detergent and free porphyrin is described using Vivapure Mini Q for routine use.

   Bayer Ag Wuppertal, Germany P. Schmidt et al., Protein Expression and Purification 31 (2003) 42-46

6. Application of Vivapure S centrifugal ion-exchange membrane devices for the purification|polishing of Histagged proteins for crystallization.

   Birkbeck College, University of London, UK.

7. Purification of caspase-14 using Vivapure Mini H D anion exchange spin columns for functional analysis.

   Department of Medicine, University of Washington, Seattle, USA Andy J. Chien et al., Biochem. And Biophys. Research Communications 296 (2002) 911-9177.

8. Rapid removal of the detergent, n-octyl beta-D-glucopyranoside from a membrane protein mimic using an innovative centrifugal anion exchange membrane technology.

   University of Cambridge, UK.

9. Purification of monoclonal antibodies from high cell density (MiniPERM) tissue culture supernatant using Vivapure centrifugal ion exchange membrane devices.

   University of Bochum, Germany.

Available in detail on our website:
www.sartorius-stedim.com

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