

Advertisement feature

Pure and simple

Technology to simplify protein purification



Image supplied by GE Healthcare

The development of techniques and methods for protein purification has been an essential pre-requisite for many of the advances made in biotechnology, as it is vital for characterisation of the function, structure and interactions of proteins. Because protein purification is a fundamental element of many workflows, the field is continually evolving with the development of new and improved technologies that enable scientists to maximise yield and minimise the number of steps required to achieve optimal purity.

Protein tagging

To address bottlenecks in the tag-removal process involved with the purification of affinity-tagged proteins, **Bio-Rad Laboratories** has introduced the **Profinity eXact™** fusion-tag system. The result is true, single-step purification without the difficulty and expense of cleavage enzymes, incubation times, or removal of reagents. Benefits include purification and processing of fusion-tagged proteins in a single step, on-column cleavage in as little as 30 minutes and elimination of a protease addition step. This is a significant improvement over the traditional tag cleavage workflow in which protease incubations can take as long as 48 hours.

Efficient detection and one-step purification of recombinant proteins is possible on **IBA's** immobilised **Strep-Tactin™**, enabling greater than 99% purity to be achieved from crude lysates under physiological conditions. Products are available for *Strep*-tag purification from small- to large-scale and also in a high throughput format. In addition, IBA has developed the antibody *Strep*MAB-Imm which exhibits – in contrast to the reversibly binding *Strep*-Tactin – nearly irreversible binding characteristics for *Strep*-tagII and One-STREP-tag, thereby allowing the further analysis of *Strep*-tagged proteins, for example by immobilisation on microplates or on **Biacore™** chips.

USB, now part of **Affymetrix**, offers kits and resin for both high specificity and high yield purification of histidine-tagged proteins. **USB® PrepEase™** histidine-tagged protein purification products use

a dry silica-based resin for purifying histidine-tagged proteins with high yield and specificity. All **PrepEase** products come with straightforward and optimised purification protocols, can be stored at room temperature and are highly stable against chelating and reducing agents.

Chromatography and separation

BAC's CaptureSelect® affinity products possess a combination of unique properties such as stability, affinity and selectivity that provide competitive benefits including reduced cost of purification, higher quality product, and increased flexibility in the purification process. These features make **CaptureSelect** products ideal tools for bioseparation and life science research applications. **BAC** has developed a **Fab Kappa** ligand, providing a unique affinity product for an antibody sub-set that has previously been extremely difficult to purify. The new media product is marketed by **GE Healthcare** as **KappaSelect**, as part of its custom media range. "Single domain affinity ligands offer real advantages for all types of protein purification," commented **Laurens Sierkstra**, CEO of **BAC**. "The flexibility and adaptability inherent in the design and development of these products enables ligands for almost any purification challenge to be produced."

Upfront Chromatography has introduced the **Rhobust™ Whey Refinery**, a new, cost-effective, large-scale chromatography platform for optimal purification of high-value protein products from whey. The separation system combines **Upfront's** proprietary **EBA (Expanded Bed**

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The Thermo Scientific KingFisher Flex magnetic particle processor

Adsorption) chromatography platform with advanced membrane filtration techniques. With only minimal water consumption, the sustainable and cost-efficient process extracts highly functional, quality protein products. The Rhobust Whey Refinery is capable of purifying multiple protein products from crude whey in a single, flexible process, thereby meeting the demands of a diverse range of customers. The Rhobust Whey Refinery platform can be linked to existing membrane-based WPC (Whey Protein Concentrates) plants.

Bangs Laboratories BioMag[®] particles have very large surface areas and high magnetic responsiveness, making them ideally suited for protein purification applications. BioMag particles coated with Fc-binding proteins, such as Protein A and Protein G, are used for antibody isolation from cell culture, and for recovery of antibody complexes from immunoprecipitations. BioMag WGA and Con A particles enable the isolation of glycosylated proteins from samples such as serum or cell lysate, or other lectin- or glycan-mediated processes.

The compact **Mini-V8.10 PAGE** System from **Whatman Biometra** (formerly Gibco BRL) is an integrated, vertical electrophoresis system designed specifically for rapid, high-quality separations. The system is able to run 2 gels simultaneously, separating up to 20 samples at one time, with 6-10 samples per gel. A patented drop-in wedge automatically positions gels without the use of gaskets or clamps. Complementing this electrophoresis system are the blot module, for the transfer of proteins and nucleic acids onto membranes, and the gel casting system designed for the safe and easy set-up and casting of polyacrylamide gels.

Sample prep

Thermo Fisher Scientific has introduced the **Thermo Scientific KingFisher Flex** magnetic particle processor. Based on the KingFisher 96, the KingFisher Flex offers increased flexibility and throughput with the incorporation of magnetic heads for both 96- and 24-well plates. The 24-magnet



The compact Mini-V8.10 PAGE System from Whatman Biometra

head enables the high-speed processing of samples from 200-5000 μ L in 24-well deep well plates, providing five times the yield with excellent reproducibility and quality.

GE Healthcare has launched **HiTrap[™] Albumin & IgG Depletion and Albumin & IgG Depletion SpinTrap[™]** pre-packed columns, for the depletion of albumin and IgG from human serum and plasma. Depleting samples of albumin and IgG allows proteins normally obscured by albumin and IgG to be visualised, greatly enhancing the quality and depth of analysis. Both columns have high depletion capacity, removing >95% albumin and >90% IgG. Very high reproducibility is achieved, which is an important consideration in parallel sample preparation. Separations are simple and fast, taking approximately 35 minutes to complete with the HiTrap column, for larger sample volumes (~150 μ L), and approximately 10 minutes with the SpinTrap column, for smaller sample volumes (~50 μ L). In addition, the HiTrap column may be used for a limited number of repeat runs, with consistent depletion rates.

Protein expression systems

The **BacuVance** protein expression system from **GenScript** uses insect cells infected by a high-titre recombinant baculovirus and can fill orders of up to gram quantities of highly purified protein. BacuVance is available for a selection of different insect cell types, for fine-tuned insect expression. **YeastHIGH** is a yeast protein expression system producing proteins via high expression levels of genes of interest by selecting desired yeast transformants. The system uses durable, stable yeast strains with protein processing resembling that of mammalian cells. This system has a very high yield and a capacity of up to 500 L.

The **GIBCO[®] OptiCHO[™] Protein Express Kit** from **Invitrogen** provides a complete solution for serum-free development of a desired stable cell line for expression of biotherapeutics, including DG44 cells banked under cGMP conditions, with solid documentation to simplify regulatory filings. All products within the workflow for the complete

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Laurens Sierkstra, CEO, BAC.

OptiCHO Protein Express Kit are serum free, animal origin free, and optimised to allow the development and selection of transformed DG44 cell clones without ever introducing serum.

Companies mentioned in this Product Focus:

Affymetrix – www.affymetrix.com
BAC – www.bac.nl
Bangs Laboratories – www.bangslabs.com
Bio-Rad – www.bio-rad.com
GE Healthcare – www.gelifesciences.com
GenScript – www.genscript.com
IBA – www.iba-go.com
Invitrogen – www.invitrogen.com
Thermo Fisher Scientific – www.thermo.com
Upfront Chromatography – www.upfront-dk.com
USB – www.usbweb.com
Whatman Biometra – www.biometra.de

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