Accelerate antibody drug development

Pim Hermans, Frank Deters and Jessica de Rooij
Thermo Fisher Scientific, J.H. Oortweg 21, 2333 CH, Leiden, the Netherlands

ABSTRACT
The development of novel antibody therapeutics brings new challenges in the purification of these molecules. Standard chromatography resins, such as Protein A, may not result in the most efficient process. Thermo Scientific CaptureSelect™ ligands, focusing on alternative antibody domains, enhance the success of your antibody purification process. The affinity resins provide high target purity in a single step, independent of feedstock. In combination with mild elution to protect the target molecule, these resins provide a platform solution to the industry.

INTRODUCTION
Protein A affinity chromatography has become a powerful tool in the downstream process of therapeutic monoclonal antibody (Mab) production. With the development of novel formats, such as trizonal and bispecific Mabs or antibody fragments, new purification challenges arise. Small changes in Fc regions can already influence Protein A binding, thereby eliminating the option of affinity purification in the downstream process.

Thermo Scientific CaptureSelect affinity purification products and analytical tools are developed for the discovery and manufacturing of therapeutic proteins, including antibodies and antibody fragments. These products help enable a reduced time-to-market, increased purity and yield, and an overall lower cost of goods for biopharmaceutical development.

CAPTURESELECT TECHNOLOGY
CaptureSelect ligands offer a unique affinity purification solution based on Camelid-derived single domain [VHH] antibody fragments (fig.1). These small, 14 kDa affinity ligands, are the platform solution for many biopharmaceutical purification challenges.

Benefits
- The three CDR regions of the VHH ligand provide unique, tunable specificity
- Ligand candidates are screened for optimal elution & stability to help ensure process robustness
- Produced in an animal origin free yeast expression process
- Technology used in clinical and commercial processes

Fig.1 Regular antibody compared to a Camelid single domain antibody. The VHH antibody fragments offer high specificity, affinity and stability.

ANTIBODY SUBDOMAIN TARGETS

Visit us at www.thermofisher.com/captureselect

For Research Use or further manufacturing, not for diagnostic use or direct administration in humans or animals.
with subdomain-specific affinity ligands

PURIFICATION

CaptureSelect CH1-XL affinity matrix

Binding to the constant domain of the heavy chain, CaptureSelect CH1-XL provides a platform solution for the purification of Fab fragments, irrespective of the type of light chain.

- No co-purification of over-expressed free light chains due to heavy chain binding
- Efficient elution at 50 mM acetic acid, pH 4.0
- High DBC: 21 g Fab/ 31 g IgG per liter of matrix

![Intact Fab](image)

Fig. 3 Purification of Fab fragments from CHO cells, containing over-expressed light chains; high purity of the Fabs, no light chains present in the eluate.

CaptureSelect FcXL affinity matrix

Combining high specificity and mild elution for the purification of monoclonal antibodies and Fc-fusion proteins.

Ideal for the purification of low pH sensitive Mabs and Fc-fusion constructs

- High selectivity for human IgG-Fc (C4 domain, all 4 subclasses)
- High DBC: ~25-30 mg/ml IgG per liter of matrix
- Efficient elution at pH 5 and higher

![FcXL](image)

Fig. 4 Purification of human IgG1 monoclonal antibody; efficient clearance of product-related impurities.

ANALYTICAL TOOLS

POROS CaptureSelect HPLC columns

POROS CaptureSelect affinity columns allow you to combine speed, selectivity, method automation and high precision when monitoring antibody titers and yield during manufacturing.

![Fig. 5 Rapid quantitation of protein samples in HPLC format using a LC-Kappa column.](image)

CaptureSelect ligand conjugates

CaptureSelect biotinylated ligands can be used to develop a range of analytical assays, including ELISA, Western Blot and assays for label-free detection platforms.

CONCLUSIONS

CaptureSelect antibody subdomain-specific affinity resins address the purification challenges in therapeutic antibody development by providing high purity and yields in a one-step purification process.

CAPTURESELECT AFFINITY PRODUCTS

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<th>CaptureSelect Ligand</th>
<th>Species</th>
<th>Blotin</th>
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