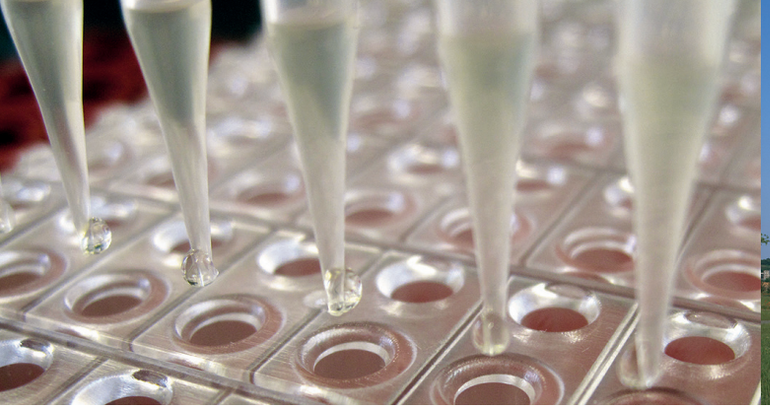

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ANTIBODY TECHNOLOGIES

APPLICATIONS

- Fast and parallel cell-free synthesis of recombinant antibody formats, e.g. IgG, scFv, scFv-Fc, and process optimization
- DNA template design
- Functional characterization of antibodies
- Site-specific modifications of antibodies by introduction of non-canonical amino acids via amber suppression
- Cell-free synthesis of fluorescently labeled antibodies
- Development of antibody-drug conjugates (ADCs)
- Cell-free synthesis and characterization of toxins, targeted toxins and immunotoxins

REFERENCES (SELECTION)

- Stech et al.: Cell-free synthesis of functional antibodies using a coupled in vitro transcription translation system based on CHO cell lysates. Sci Rep. (2017) 7:12030.
- Thoring et al.: A high-yield production technology for synthesis of »difficult-to-express« proteins based on a novel continuous exchange CHO cell-free system. Sci Rep. (2017) 7:11710.
- Stech, M. and Kubick, S.: Cell-free synthesis meets antibody production: A review. Antibodies (2015) 4:12-33.

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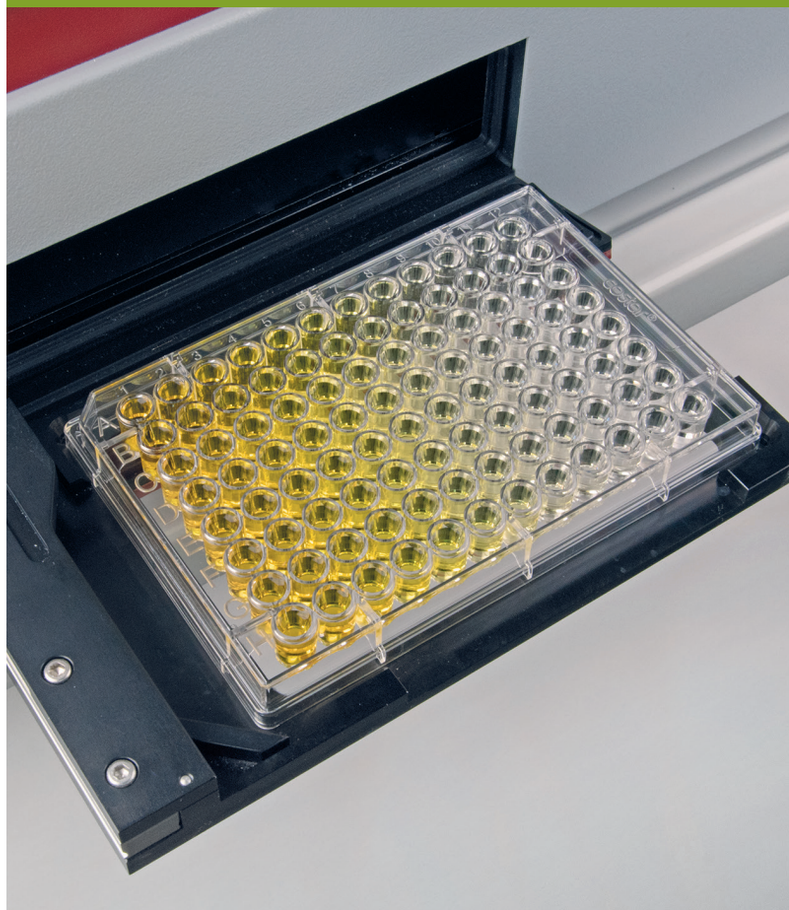


CELL-FREE ANTIBODY TECHNOLOGIES

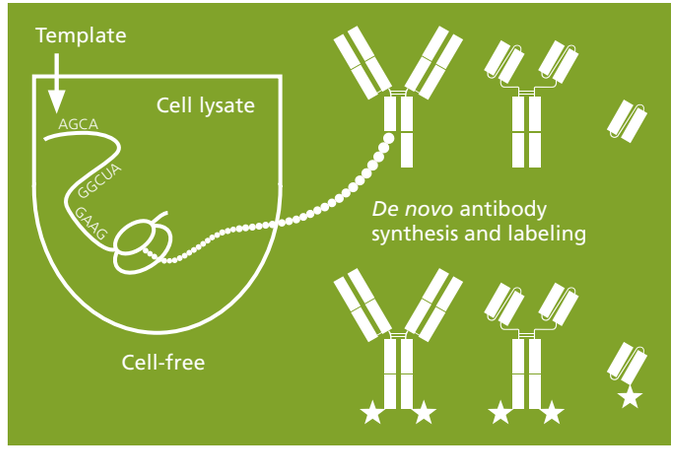
Motivation

Antibodies recognize their corresponding antigen with high affinity and specificity. This quality makes engineered antibodies to key players in research, diagnostics and therapy. Unfortunately, handling of cell culture processes for antibody development is laborious and time-consuming and can hardly be accelerated. Due to these drawbacks on the one side and the extraordinarily high medical need for novel antibody candidates on the other side, we have developed novel cell-free systems which allow for a more time-saving, flexible and economical synthesis of recombinant antibodies.

Expertise

Cell-free antibody synthesis is performed completely *in vitro* independently of living cells as production host. We apply translationally active cell lysates which are prepared from cultured CHO cells. In addition, we have developed lysates from *Spodoptera frugiperda* 21 cells and the human cell line K562.

These lysates contain the molecular components necessary for translation, such as ribosomes, translation factors and enzymes. Our cell-free systems comprise endogenous microsomal vesicles which originate from the endoplasmic reticulum (ER) of the cells used for lysate preparation. Thus, *de novo* synthesized antibodies find optimal conditions for folding, assembly and post translational modifications after signal peptide-induced translocation into the lumen of ER-derived microsomes. Lysates and buffers used for cell-free protein synthesis can be stored frozen at – 80 °C showing reproducible and reliable performance over years.



Cell-free antibody synthesis and labeling

Advantages

- Fast antibody synthesis (3 h – 24 h)
- Reproducible and reliable performance
- Easy-to-handle reactions
- HTS-compatible and scalable
- Open reaction design allowing for individual adaptations and optimization
- Antibody synthesis based on PCR fragments circumventing time-consuming and labor-intensive cloning steps
- Rapid introduction of site-specific modifications via introduction of non-canonical amino acids by using amber suppression
- Rapid generation of antibody-drug conjugates (ADCs)

Key Intrumentation

- Amersham Typhoon RGB Biomolecular Imager for autoradiography, In-gel-fluorescence, chemiluminescence
- LB 943 Mithras Monochromator Multimode Microplate Reader for luminescence, fluorescence, absorption, FRET and BRET analyses
- Confocal laser scanning microscope (Zeiss CLSM 510) for the analysis of fluorescence labeled proteins