

Whole Cell Catalysts: Surface displayed Enzymes for Biocatalysts etc.

The innovation

The innovative platform technology presented here allows for the efficient surface display of biocatalysts and proteins in (or rather on) Gram-negatives, e.g. *Escherichia coli*. The proprietary technology permits the generation and design of completely novel whole-cell catalysts, whose main benefits are provided by the ease of product recovery and the catalysts' reusability. The technology neither affects the cell viability or the cell integrity negatively; however it allows the realization of high display densities. Additional advantages are an enhanced enzyme stability as well as minimal restrictions regarding size, structure and origin of the surface-displayed enzymes. Based on the extracellular localization of the biocatalysts this technology enables the transposition of non-membrane-permeable substrates.

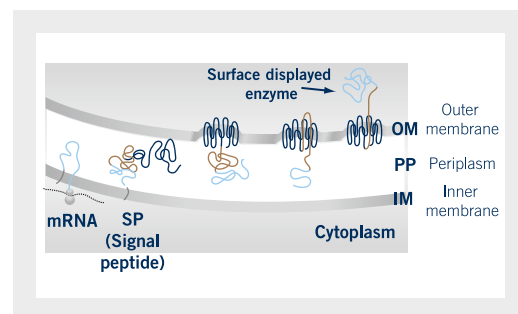
Nowadays, most bioactive substances, i.e. biologics and technical enzymes, are synthesized genetically and hence have to be costly isolated from their recombinant host organisms. The production is usually carried out in bacteria, yeast or cell cultures. In contrast to most of these host organisms, *Escherichia coli* is well-characterized, easy to handle, fast growing and modest with regard to its nutritional needs.

Another difficulty of the conventional production of enzymes is provided by the need to establish an expression system that is practicable also from an economic

point of view. In fact, hyperproduction of recombinant enzymes frequently leads to mis-folding, eventually causing the formation of insoluble and enzymatically inactive protein aggregates, so-called inclusion bodies. Retrieval of soluble and active enzyme requires costly refolding and additional purification, both significantly increasing the price of product allocation. Since production costs are the main cost-driver, the presented autodisplay technology possesses great potential for increasing the efficiency and profitability of the manufacturing of biologics and enzymes.

Efficient exploitation of the autodisplay technology is facilitated by a toolbox, consisting of different tailor-made expression plasmids and host strains. The technology has already been successfully used for the surface-display of the most diverse enzymes and proteins, all examples verifying its robustness and universal adaptability.

Apart from already established whole-cell catalysts that are available for exclusive licensing, the autodisplay technology can be used for the generation of tailor-made whole-cell catalysts according to customer's needs and for most diverse applications. Preferred areas of application are biotransformation, drug discovery and production, bioremediation, bioanalytics as well as screening.



Advantages at a glance

- Highly efficient surface display due to exploitation of a homologous, host-specific autotransport system
- Enhanced enzyme stability due to immobilization on the cell's surface.
- Minimal restrictions regarding size, structure and origin of the surface-displayed enzyme.
- Optimal access of – even impermeable – substrates
- Easy recovery of “Whole-Cell Catalysts” and products
- Reusability of whole-cell catalysts
- No impairment of cell viability and integrity

To acquire a licence for this new technology, please don't hesitate to contact us!

Keywords

- „White“ und „red“ biotechnology
- Autotransport system
- Surface display technology
- Enzyme immobilization

Areas of application

- Biotransformation
- Drug discovery and production
- Bioremediation
- Bioanalytics & biosensor technology
- Screening
- Nanobiotechnology

Patent status

The invention is covered by patent families that were internationally filed and both have been already granted in EP. They are owned or have been exclusively licensed by ZYRUS Beteiligungsgesellschaft mbH & CO. Patente I KG. The basic application was filed in May 1996.



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