Lehrstuhl für Biotechnologie

Prof. Dr. Ulrich Schwaneberg
RWTH Aachen
Lehrstuhl für Biotechnologie
Biologiesammelbau 2
Worringerweg 3
52074 Aachen

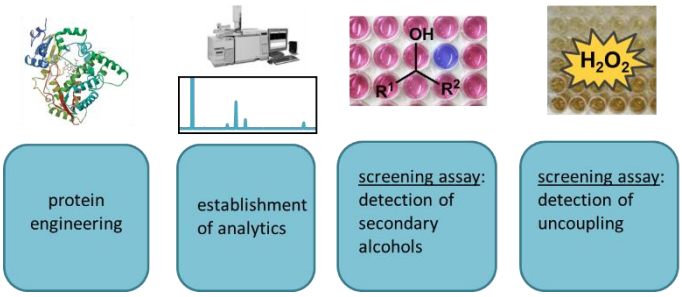
Thesis/ Internship

Engineering of the Monooxygenase P450 BM3 for improved activity towards olefins

P450 monooxygenases play an important role in the functionalization of unactivated C-H atoms, which presents a challenge in organic chemistry, e.g. for the production of phenols as starting materials for the synthesis of pharmaceuticals, plastics or vitamins. The monooxygenase P450 BM3 from *Bacillus megaterium* is an enzyme with promising properties and should be optimized for the catalytic conversion of olefins.

Aim of work

In the course of this work, the substrate spectrum of P450 BM3 will be extended by protein using site-saturation mutagenesis. Capillary electrophoresis will be used as a screening system for the identification of improved variants. In addition, the newly generated variants will be purified and characterized analytically in terms of their product formation.



Methods

Molecular Biology / Microbiological Methods: Expression in flasks and microtiter plates, protein purification, DNA and protein analysis;
Biochemical / Analytical Methods: Screening in the 96-well format by capillary electrophoresis, gas chromatography, mass spectrometry;
Protein engineering: PCR, plasmid purification, transformation

Qualifications:

- Motivated student studying Master of Biotechnology or Biology
- Basic experience in the field of Molecular biology and Microbiology (PCR, bacterial expression systems, sterile work)
- Independent laboratory work (under supervision)
- Basic knowledge of Microsoft Word, Excel and Power Point
- Basic English skills as presentations will be hold in English; the report/thesis can be written in German or English

Period: from mid-September or October 2018

Contact: Anna Gärtner, MSc; a.gaertner@biotec.rwth-aachen.de, Tel: 0241-80-206732, Raum 4.132
Please send an e-mail with CV and an overview of grades

References:

Dennig, A., Marienhagen, J., Ruff, A. J., Guddat, L. & Schwaneberg, U. Directed Evolution of P 450 BM 3 into a p-Xylene Hydroxylase. *ChemCatChem* **4**, 771–773 (2012).
Cheng, F., Zhu, L. & Schwaneberg, U. Directed evolution 2.0: improving and deciphering enzyme properties. *Chem. Commun*. **51**, 9760–9772 (2015).