OUTLINE

Organizers

Prof. Uwe T. Bornscheuer, **Dr. Dominique Böttcher**
(Institute of Biochemistry, Greifswald University, Greifswald, Germany)

PD Dr. Susanne Brakmann
(Chemical Biology/BCMT, Technical University Dortmund, Dortmund, Germany)

Prof. Karl Erich Jäger
(Institute of Molecular Enzyme Technology, Düsseldorf University, Düsseldorf, Germany)

Additional Speakers

Prof. Ulrich Schwaneberg
(Dept. of Biotechnology, RWTH Aachen, Aachen, Germany)

Prof. Romas Kazlauskas
(University of Minnesota, Dept. of Biochemistry, Molecular Biology & Biophysics & Biotechnology Institute, Saint Paul, MN, USA)

Dr. Susanne Wilhelm
(Institute of Molecular Enzyme Technology, Düsseldorf University, Düsseldorf, Germany)

Dr. Aurelio Hidalgo
(Centro de Biología Molecular, UAM-CSIC, Madrid, Spain)

Dr. Henk-Jan Joosten
(Bioprodict, Wageningen, The Netherlands)

Prof. Dr. Karl-Heinz Maurer
(Henkel, Düsseldorf, Germany)

FURTHER INFORMATION

Venue

The summer school takes place at the Institute of Biochemistry (Greifswald University, Felix-Hausdorff-Str. 4, D-17487 Greifswald, Germany).

Schedule

Start: 6 September 2010, 8:30 am

End: 10 September 2010, 1:30 pm

Lunch will be available at the student cafeteria (Mensa).

Language

The course will be held in English.

Accommodation

A room contingent has been reserved at the Best Western Hotel Greifswald (Phone: +49 3834 801-0, http://www.europa-greifswald.bestwestern.de). Please mention the code "UG-Direvo" for your reservation.

Registration

Please complete and return the enclosed form or contact:

DECHEMA e.V.
Training Department
P.O. Box 150104
D-60061 Frankfurt/Main, Germany

Phone: +49 69 7564-253
Fax: +49 69 7564-414
E-mail: gruss@dechema.de
Internet: http://kwi.dechema.de/peng.html

Registration fee

390,- €

The course fee includes detailed course material, consumables for laboratory experiments and coffee breaks.
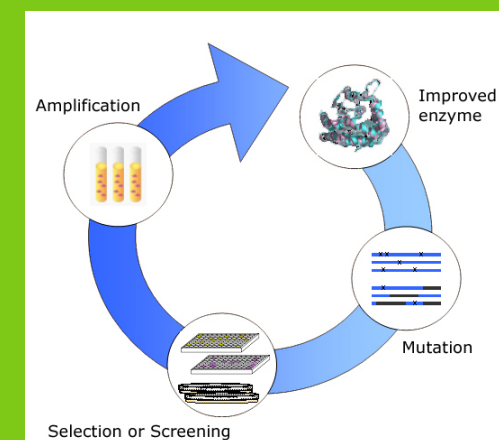
DECHEMA
Karl-Winnacker-Institut

SUMMER SCHOOL

6 – 10 September 2010
Greifswald

Protein Engineering

Rational Design & Directed Evolution

MOTIVATION

Enzymes are ideally suited as biocatalysts for the development of sustainable and environmentally friendly processes. Due to their high chemo-, regio- and stereoselectivity and their activity at low temperatures and ambient pressures, enzymes are currently used in areas such as pharmaceutical synthesis and fine chemistry.

However, not all enzymes are designed by nature for efficient application and hence their properties need to be optimized. Protein engineering is the key method to tailor-design enzymes, but also to investigate their structure-function relationships in basic research.

Due to the rapid development of the tools available for protein engineering in the past decade, researchers have the problem of too many choices when trying to engineer a given enzyme.

This course aims to provide a state-of-the-art overview about the various methods to allow an efficient and fast protein engineering. This should enable the participants to solve their future research problems more easily. The summer school will cover all modern methods ranging from rational protein design via focused directed evolution to pure random mutagenesis in combination with screening or selection. All methodologies will be presented and discussed in detail by international speakers active in the field.

The practicability will be taught in parallel experiments to ensure that tips and tricks from experienced staff can be applied "hands-on" by the participants.

AIMS AND SCOPES

Participants will be introduced into the scientific background and the state-of-the-art methods of protein engineering. The focus will be on evolutive methods (directed molecular evolution) and rational protein design. The topic will be addressed by lectures providing the required molecular biology, computational and chemistry background, detailed introduction into various methodologies and case studies. This should enable participants to solve future problems of their own research projects.

Target Group

Scientists with background in Biology, Biotechnology, Chemistry or related disciplines at the M.Sc., Ph.D. or Postdoc level.

PROGRAMME

The course comprises a range of lectures by highly reputable experts in the field combined with experiments by the participants.

Lectures

1. **Protein Engineering**
   - General concepts
   - Which targets can be addressed?
   - How to choose between rational design and evolutive methods?
   - Examples for successful applications
   - Perspectives
2. **Generation of mutant libraries**
   - Random mutagenesis, DNA shuffling, SeSaM-method etc.
3. **Methods for selection**
   - Bacterial, phage or ribosome display
   - Design of bacterial selection systems
4. **Methods for screening**
   - Classes of enzymes and appropriate assays
   - Automatization (devices, materials)
   - High-throughput-systems
5. **Expression systems**
   - Choice of host organisms, examples
6. **Computational tools**
   - Software for modeling
   - Strategies for rational design
   - Examples
7. **Tips & tricks for mutagenesis**
   - Error-prone PCR
   - Saturation mutagenesis
8. **Industrial applications**
9. **Comparison of different strategies**

Experiments

1. epPCR
2. Ligation, transformation in *E. coli*
3. Cultivation in microtiter plates
4. Cell disruption
5. Screening for altered activity in HTS microtiter plate assay

Reply form
(Fax-No.: +49 69 7564-414)

DECHEMA e.V.
Training dept.
P.O. Box 15 01 04
D-60061 Frankfurt am Main

Registration to the DECHEMA course 3165   **PEng**

"Protein Engineering", Greifswald, 6 - 10 September 2010
Deadline for registration: 9 August 2010

Participant

Mrs ☐ Mr ☐ Title _____

Name _____

Surname _____

Company _____

Department _____

Street/POB _____

Code/Place _____

Phone/Fax _____ E-mail _____

Invoice address

Company _____

Department _____

Street/POB _____

Code/Place _____

The course fee amounts to 390.- € Please do not transfer the fee before having received the final confirmation of participation by DECHEMA. If we receive a notice of withdrawal at least two weeks prior to the beginning of the course, the participation fee less 10% for administration expenses will be reimbursed. Thereafter, a reimbursement will not be possible.

_____   _____
Place, date   signature + company stamp