

Course title: **Enzymology and Bioorganic Catalysis**

Credits /Duration (days)

9 or 15 cr, week 43-51

Description

The course includes lectures (9 and 15 cr), group discussions (9 and 15 cr), tutorials (9 and 15 cr) and laboratory practicals (15 cr). Participation in discussions (9 and 15 cr), tutorials (9 and 15 cr) and laboratory practicals (15 cr) is mandatory. In addition, a mandatory literature project should be carried out, which is presented orally and in writing (9 and 15 cr).

Learning Outcomes

- to analyse structure/function relationships in biocatalysed reactions
- to predict possible catalytic mechanisms of given reaction types
- to present strategies for the analysis of kinetic mechanisms of catalysed reactions
- to account for industrial applications of biocatalysis

Contents

Reaction kinetics of simple and complex reactions (rate equations, reaction order, molecularity, rate limiting step). Thermodynamic aspects of reactions (reaction coordinates, activated complexes and transition states). Enzyme kinetics (steady-state kinetics, pre-steady-state kinetics). Reaction mechanisms (ligand binding; catalytic groups: acid/base, nucleophiles, electrophiles, co-factors, metals and entropic effects). Experimental analysis of catalytic and kinetic mechanisms (spectrometry, X-ray crystallography, stopped flow, isotope effects, structure/reactivity relationships). Mathematical data analysis (regression analysis, model discrimination). Modelling of enzymatic reactions. Stereo chemistry (mechanisms). Structure/function relationships (protein folding, mutagenesis, enzyme inhibition, evolution of catalytic mechanism, catalytic antibodies). Catalytic nucleic acids (ribozymes, catalytic DNA).

Examination

A written exam is held at the end of the course and corresponds to 9 credits. Mandatory course components, tutorials, laboratory practicals and literature project, corresponds to 6 points. For a final passing grade, reports from the mandatory components must be passed. The final grade is weighted from the results on the written exam and the practical part

Literature

Frey, P.A. Hegeman,, A.D. Enzymatic Reaction Mechanisms, Oxford University Press, 2007

Contact

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