

Title of module

Advanced Practical in the Focal Point Programme:
"Molecular Medicine" VZ: 185881
"Biogenesis of cell organelles"

Credit points

7.5
(of 15)

Available in semester(s)

2

Hours per week

9

Compact course



Lecturer(s)

Prof. R. Erdmann and teaching assistants

Teaching methods

A five-week all-day practical lab course with a compulsory seminar presentation.
Please note: A second Advanced Practical will have to be performed in the same semester to earn the full complement of 15 credits

Evaluation of learning progress

Active participation, feedback during independently performed experiments, project discussions with the supervisor

Mode of examination

Assessment of experimental skills during the practical (50%), a written project report (40%), and a seminar presentation of experimental results (10%).

Learning objectives

After completion of the course, students will have acquired basic practical skills in biochemical, microbiological and molecular biological methods. The students will be able to cultivate pro- and eucaryotic cells, to isolate protein-complexes by affinity chromatography and to characterize these complexes according to their size (size-exclusion chromatography) and constituents (SDS-PAGE, immuno-blotting). Students will learn how state-of-the-art molecular cell biological methods are used to tackle the structure and function of cellular nanomachines.

Soft skills

Communication and collaboration skills will be improved by working hand in hand with the advising members of the research laboratory together with other lab members. Presentation skills will be improved by learning how to present scientific data in talks and scientific discussions as well as in a written thesis.

Contents of module

Topics:

- Characterization of metabolite transport across the peroxisomal membrane
- Dissection of the peroxisomal protein import machinery
- Characterization of the fusion/fission machinery of peroxisomes
- Structure and function of the peroxisomal nano-machine complex Pex1p/Pex6p, two AAA-ATPases.
- The biogenesis of Lipid-droplets in yeast
- Human cell-lines as a tool to study diseases caused by an affected peroxisomal biogenesis

Methods:

- Cultivation of Bakers yeast
- Cell culture of human fibroblasts cells
- Different techniques for cell breakage
- Cell fractionation and isolation of cellular membranes
- Separation of protein mixtures and protein complexes by SDS polyacrylamid gel electrophoresis
- Western blotting and immunodetection
- Size-exclusion chromatography
- (convocal) fluorescence microscopy
- Molecular biology (cloning, site-directed mutagenesis, gene disruption, gene replacement)
- Purification of recombinant proteins
- Protein-protein interaction assays