

Module	Vitamin B6 biosynthesis in <i>Plasmodium falciparum</i>: Functional analysis of the dynamic assembly of the enzyme complex
Organizer	Carsten Wrenger und Gerhard Wunderlich
Goals	Understanding of protein-protein interactions.
Contents	The course is accompanied by a lecture on the molecular biology of protozoan parasites.
Methods	<ul style="list-style-type: none"> • RT-PCR, FPLC • Western-Dot-Blot, SDS-PAGE • Cell differentiation • DNA-construct: design and cloning • Affinity- and chelate-chromatography • Enzyme kinetics • Crystallization
Exams	Protocol, seminar presentation, multiple choice test (English/Portuguese/German)
Language	English/Portuguese/German

Module	Molecular analysis on gene and protein level of the arginase of the human malaria parasite
Organizer	Carsten Wrenger und Gerhard Wunderlich
Goals	Understanding of genetic modifications and their effect on enzymatic functions in malaria.
Contents	The course is accompanied by a lecture on the molecular biology of protozoan parasites.
Methods	<ul style="list-style-type: none"> • Dot-blotting • Site-directed mutagenesis, general cloning techniques • Filter-lift hybridisation • Real-time PCR analysis
Exams	Protocol, seminar presentation, multiple choice test
Language	English/Portuguese/German

Module	Molecular Biology of <i>Plasmodium falciparum</i> – a practical course
Organizer	Gerhard Wunderlich und Carsten Wrenger
Goals	Introduction into the molecular biology of malaria.
Contents	<p>Introduction to cloning and expression of relevant merozoite surface proteins and their subsequent recognition by antibodies</p> <p>The course provides a high level of individual hands-on teaching but also tricks and hints of each technique and fundamental information about the techniques learned.</p>
Methods	<ul style="list-style-type: none"> • Reverse transcription • Real time PCR • Non-radioactive Northern blots • Recombinant protein expression of vaccine-relevant antigens • ELISA
Exams	Final written exam, oral presentations and protocol
Language	English/Portuguese/German

Module	Principles and applications of flow cytometry
Organizer	Sílvia Beatriz Boscardin
Goals	Introduction of basic concepts in flow cytometry and its applications.
Contents	We will use lectures, practical classes, project presentation and group discussions to address the following topics (see Methods).
Methods	<ul style="list-style-type: none"> • Basics of flow cytometry • Lasers, optics and fluid dynamics • Fluorochromes and compensation • Immunophenotyping and functional evaluation of dendritic cells, NK cells, NKT cells, monocytes, regulatory T cells, B cells and B1 • Evaluation of cell proliferation • Evaluation of cytotoxicity • Multimers and their application • Detection of intracellular cytokine cytometry and multiparameter CBA • Phosflow • Apoptosis • Cell viability • Sorting (separation of different cell populations) • Data Analysis • ELISA
Exams	Students will be assessed by class participation in discussions of the work and the presentation of a research project that must be prepared using the techniques developed in the course.
Language	English/Portuguese