Title of module	Advanced Practical in the Focal Point Programme: "Molecular Medicine" VZ: 185881 "Molecular mechanisms of Redox Signaling"		
Credit points	7.5 (of 15)	***Available in semester(s)***	2
Hours per week	9	***Compact course***	☒
Lecturer(s)	L. Leichert 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	Experimental design, independent lab research, critical evaluation of experimental data, choice and establishment of productive methods and techniques.		
Soft skills	Team work and collaboration, presentation skills, comprehension of original research papers, writing skills.		

Contents of module

During this 5-week course the student will be supervised by a graduate student or postdoc and will work on a small independent research project that is closely connected to ongoing research in our lab.

When bacterial cells encounter cells of the immune system, they are exposed to a toxic mixture of reactive species such as superoxide, hydrogen peroxide and hypochlorous acid. These reactive species can cause damage to the biomolecules that make up the bacterial cell. We are particularly interested in the effect these species have on proteins and we study how the post-translational modifications caused influence cellular signaling in bacteria, but also the host cell.

These research project will include some or all of the following techniques:

- Physiological stress experiments with *E. coli*.
- Phenotypical analysis of *E. coli* knock-out mutants.
- Culture of immune cell lines
- Co-cultivation of immune cells with bacteria
- Fluorescence redox probes
- Genetic modification of bacteria and cell lines.
- Chaperone assays
- Characterization of redox-active proteins with Fluorescence spectroscopy, UV-VIS, CD, mass spectrometry, SDS PAGE, Western blot, HPLC.
- Molecular biology, rational mutagenesis of proteins.
- Protein purification.