## Module variant to: Advanced Neurobiology and Behavior

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| **Module:** Neuroimmunology and Physiology of Microglia | |
| **University/Department/Teaching Unit:** Freie Universität Berlin/Department of Biology, Chemistry, Pharmacy/Biology | |
| **Module coordinator:** Dr. Marcus Semtner | |
| **Prerequisites:** none | |
| **Learning objectives:**<br>After completing this module, students have basic knowledge of the physiological investigation of microglial cells. Graduates of the module acquire methodological skills in calcium imaging, with a particular focus on epifluorescence and transmitted light microscopy as a basis. Students learn methods for quantifying cell migration and phagocytosis activity. Histological staining and sectioning techniques as well as immunohistochemical methods and their quantification are also used. The students gain experience with computer-aided analysis methods using the IGOR and ImageJ software. | |
| **Content:**<br>During the three-week practical course, physiological studies on microglia are carried out *in vitro* and *in situ*. The following techniques are applied: live cell calcium imaging, qPCR, fixation, staining and confocal microscopy of cells and tissues (including the context of changes in phagocytosis activity and microglial morphology) as well as cell culture with BV2 cells and the isolation of primary microglial cells from the mouse brain.<br>The course also includes working with computer-aided analysis programs and the evaluation of confocal image stacks with the help of appropriate programs (ImageJ) as well as the evaluation and statistical analysis of calcium imaging data.<br>Part of the internship is an integrated lecture section in which selected new research results and new methods are presented and discussed in detail. In addition, each student must give a short presentation in English on a relevant research publication. | |

| **Modes of instruction** | **Contact hours** (hours per week during the semester) | **Types of active participation** | **Workload** (in hours) | |
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| Lecture (V) | 2 | – | Class attendance (lecture)<br>Preparation, before and after (lecture) | 30<br>30 |
| Seminar (S) | 1 | Presentation and discussion | Class attendance (seminar)<br>Preparation, before and after (seminar) | 15<br>30 |
| Safety Lab (sP) | 5 | Carrying out and documenting lab experiments | Class attendance (safety lab)<br>Preparation, before and after (safety lab)<br>Exam preparation and exam | 75<br>40<br>80 |

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| **Module assessment** | Written exam (60 minutes), wholly or partially in multiple-choice format; can also be carried out electronically or written report on research results (approx. 10 pages) or examination colloquium (approx. 20 minutes) | |
| **Language** | English | |
| **Regular attendance required** | Seminar and safety lab: yes, lecture: attendance recommended | |
| **Total workload** | 300 hours | 10 credit points |
| **Duration** | one semester | |
| **Frequency** | irregular | |
| **Applicability** | Master's degree program M.Sc. Biology | |

Utilization in the following specializations (decision by the examining board):

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| Biodiversity, Evolution and Ecology | |
| Genetics and Genomics | |
| Microbiology | |
| Molecular- and Cellular Biology | x |
| Molecular Plant Sciences | |
| Neurobiology | x |
| Biology | x |

U. Lauer