

<b>Georg-August-Universität Göttingen</b> <b>Modul M.Neuro.11: Neuroanatomy and Development of the Nervous System</b>	4 C
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<b>Lernziele/Kompetenzen:</b> The students get an overview of the human central nervous system. The different brain parts are introduced with respect to their developmental origin. The histology and cellular composition of different brain parts is presented in conjunction with different staining techniques. Relevant experimental animal models including invertebrates are introduced and discussed comparatively. The module is accompanied by practical courses on "functional neuroanatomy" (i.e. physiology and morphology of cortical neurons).	<b>Arbeitsaufwand:</b> Präsenzzeit: 42 Stunden Selbststudium: 78 Stunden
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<b>Lehrveranstaltungen:</b> <b>1. Lecture (24 h)</b> <b>2. Tutorial (18 h)</b>	
<b>Prüfung:</b> Part of comprehensive examination (§ 7 PStO) <b>Prüfungsanforderungen:</b> General gross and microscopic anatomy, development and cellular architecture of the human central nervous system and relevant non-human experimental animals.	

<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. med. Jochen Staiger
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 4 weeks
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>
<b>Maximale Studierendenzahl:</b> 20	

<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Bio: 4h lecture, 2h tutorial; Med-VK: 14h lecture, 12h tutorial; MPI/DPZ: 6h lecture, 4h tutorial
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<b>Georg-August-Universität Göttingen</b> <b>Modul M.Neuro.12: Physiology and Basic Statistics</b>	8 C
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<b>Lernziele/Kompetenzen:</b> The students get an overview on the biophysical and cell biological principles of nervous system and nerve cell physiology, which are discussed in conjunction with methodological approaches to measure relevant physiological parameters. Basic statistical approaches and computer programming tools to evaluate and quantify physiological parameters are introduced. Relevant techniques to assess and statistically analyze physiological parameters in the nervous system are introduced in accompanying practical courses.	<b>Arbeitsaufwand:</b> Präsenzzeit: 82 Stunden Selbststudium: 158 Stunden
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<b>Lehrveranstaltungen:</b> <b>1. Lecture (40 h)</b> <b>2. Tutorial (42 h)</b>	
<b>Prüfung:</b> Part of comprehensive examination (§ 7 PStO) <b>Prüfungsanforderungen:</b> Physiological principles of the nervous system and nerve cells including the physiological techniques to assess functional parameters. Understanding of statistical analysis approaches and computer programming tools to evaluate physiological data.	

<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Luis Pardo
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 6 weeks
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>
<b>Maximale Studierendenzahl:</b> 20	

<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Bio: 4h Tutorial; Med-VK: 8h Lecture, 6h Tutorial; Med-KT: 18h Lecture, 18h Tutorial; MPI/DPZ: 14h Lecture, 14h Tutorial
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<b>Georg-August-Universität Göttingen</b>		4 C
<b>Modul M.Neuro.13: Molecular Biology, Neurogenetics and Neuroimmunology</b>		
<b>Lernziele/Kompetenzen:</b> The students get an overview of cell biological processes at the molecular level, principles of neurogenetics and neuroimmunology, and diseases of the nervous system with underlying mechanisms. The module is accompanied by practical courses on basic molecular and cell biological techniques.		<b>Arbeitsaufwand:</b> Präsenzzeit: 44 Stunden Selbststudium: 76 Stunden
<b>Lehrveranstaltungen:</b> <b>1. Lecture (24 h)</b> <b>2. Tutorial (20 h)</b>		
<b>Prüfung:</b> Part of comprehensive examination (§ 7 PStO) <b>Prüfungsanforderungen:</b> Cell biological principles, neurogenetics and neuroimmunology, including molecular mechanisms of diseases of the nervous system.		
<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -	
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Nils Brose	
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 5 weeks	
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>	
<b>Maximale Studierendenzahl:</b> 20		
<b>Bemerkungen:</b> Teaching capacity provided by: Med-KT: 4 h lecture, 4 h tutorial; Med-KL: 4 h lecture, 4 h tutorial; MPI/DPZ: 16 h lecture, 12 h tutorial		

<b>Georg-August-Universität Göttingen</b> <b>Modul M.Neuro.14: Computational Neuroscience, Autonomous Nervous System, Neuroendocrinology, Neuropharmacology</b>	4 C
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<b>Lernziele/Kompetenzen:</b> The students get introduced to the form and function of the autonomous nervous system, the neuroendocrine system and to theoretical approaches to model nervous system functions. Furthermore, neuropharmacological methodologies are presented with respect to quantitative behavioral analyses. The theoretical content of this module is accompanied by practical courses on modeling techniques and assessment of animal behavior.	<b>Arbeitsaufwand:</b> Präsenzzeit: 50 Stunden Selbststudium: 70 Stunden
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<b>Lehrveranstaltungen:</b> <b>1. Lecture (30 h)</b> <b>2. Tutorial (20 h)</b>	
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<b>Prüfung:</b> Part of comprehensive examination (§ 7 PStO) <b>Prüfungsanforderungen:</b> Modelling approaches, functional principles of the autonomous nervous system and the neuroendocrine system, basic neuropharmacology and behavioral testing.	
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<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Andrea Antal
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 5 weeks
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>
<b>Maximale Studierendenzahl:</b> 20	

<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Bio: 2h lecture, 2h tutorial; Med-KL: 16h lecture, 10h tutorial; Med-VK: 10h lecture, 6h tutorial; MPI/DPZ: 2h lecture, 2h tutorial
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<b>Georg-August-Universität Göttingen</b> <b>Modul M.Neuro.15: Sensory and Motor Systems</b>	4 C
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<b>Lernziele/Kompetenzen:</b> The students gain knowledge on the structure and function of major sensory systems in humans and relevant non-human experimental animals with a focus on cell physiological aspects. In addition, the central motor systems and the anatomy, physiology and neuronal control of skeletal muscles are introduced.	<b>Arbeitsaufwand:</b> Präsenzzeit: 42 Stunden Selbststudium: 78 Stunden
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<b>Lehrveranstaltungen:</b> <b>1. Lecture (20 h)</b> <b>2. Tutorial (22 h)</b>	
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<b>Prüfung:</b> Part of comprehensive examination (§ 7 PStO) <b>Prüfungsanforderungen:</b> Sensory systems in humans and relevant non-human experimental animals, anatomy and physiology of central motor systems, skeletal muscle and muscle control.	
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<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Tim Gollisch
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 5 weeks
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>
<b>Maximale Studierendenzahl:</b> 20	

<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Bio: 2h lecture, 2h tutorial; Med-KL: 14h lecture, 16h tutorial; MPI/DPZ: 4h lecture, 4h tutorial
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<b>Georg-August-Universität Göttingen</b> <b>Modul M.Neuro.16: Clinical Neurosciences and Higher Brain Functions</b>	6 C
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<b>Lernziele/Kompetenzen:</b> Based on the knowledge of the previous modules, the students gain insight into higher brain functions and human brain diseases. The focus is on the introduction of brain disease principles, description of clinical syndromes and treatment strategies including the discussion of molecular mechanisms of disease development and principles of therapeutic intervention approaches.	<b>Arbeitsaufwand:</b> Präsenzzeit: 72 Stunden Selbststudium: 108 Stunden
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<b>Lehrveranstaltungen:</b> <b>1. Lecture (38 h)</b> <b>2. Tutorial (34 h)</b>	
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<b>Prüfung:</b> Part of comprehensive examination (§ 7 PStO) <b>Prüfungsanforderungen:</b> Higher brain functions and human brain diseases including the molecular characterization of clinical syndromes and clinical therapy options.	
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<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr André Fischer
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 9 weeks
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>
<b>Maximale Studierendenzahl:</b> 20	

<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Bio: 4h lecture, 4h tutorial; Med-KT: 8h lecture, 8h tutorial; Med-KL: 16h lecture, 14h tutorial; MPI/DPZ: 10h lecture, 8h tutorial
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<b>Georg-August-Universität Göttingen</b> <b>Modul M.Neuro.21: Methods Courses: Histology, Cytochemistry &amp; Molecular Biology</b>	2 C
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<b>Lernziele/Kompetenzen:</b> The students get a practical introduction into histological techniques, including classical staining procedures, tissue dissection and preparation, immunocytochemistry, single cell staining, and related anatomical methods for conventional microscopy as well as high-resolution and electron microscopy. They learn when and how to apply the various imaging techniques in conjunction with appropriate quantitative analysis tools. Furthermore, the students are introduced to cell biological techniques frequently used to investigate cell function on a molecular level.	<b>Arbeitsaufwand:</b> Präsenzzeit: 48 Stunden Selbststudium: 12 Stunden
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<b>Lehrveranstaltung:</b> Introductory methods courses (48 h)	
<b>Prüfung:</b> Oral group examinations, unbenotet <b>Prüfungsanforderungen:</b> Scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.	

<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. med. Jochen Staiger
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 7 weeks
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>
<b>Maximale Studierendenzahl:</b> 20	

<b>Bemerkungen:</b> Teaching capacity provided by: Med-VK: 24h; MPis/DPZ: 24h
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<b>Georg-August-Universität Göttingen</b> <b>Modul M.Neuro.22: Methods Courses: Electrophysiology &amp; Basic Programming</b>	2 C
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<b>Lernziele/Kompetenzen:</b> The students get introduced to the basic practical methods of electrophysiology including current- and voltage-clamp recording configurations, data acquisition and analysis procedures, and the preparation of neuronal tissue for in-vivo and in-vitro recordings in conjunction with high-resolution imaging techniques. The students learn when and how to apply the various techniques appropriately. Additionally, the students receive an introduction to programming in the programming language Python.	<b>Arbeitsaufwand:</b> Präsenzzeit: 48 Stunden Selbststudium: 12 Stunden
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<b>Lehrveranstaltung:</b> Introductory methods courses (48 h)	
<b>Prüfung:</b> Oral group examinations, unbenotet <b>Prüfungsanforderungen:</b> Scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.	

<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Ralf Heinrich
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 6 weeks
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>
<b>Maximale Studierendenzahl:</b> 20	

<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Phy: 6h; Med-VK: 4h; Med-KT: 8h; Med-ENI: 20h; MPI/DPZ: 10h
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<b>Georg-August-Universität Göttingen</b>		2 C
<b>Modul M.Neuro.23: Methods Courses: Microscopy &amp; Imaging</b>		
<b>Lernziele/Kompetenzen:</b> The students get introduced to high resolution imaging techniques including confocal and non-confocal fluorescence microscopy, STED, FLIM, (cryo-) electron microscopy, MRI and related techniques, relevant data acquisition and analysis procedures, and the preparation of neuronal tissue for in-vivo and in-vitro measurements. The students learn when and how to apply the various techniques appropriately.		<b>Arbeitsaufwand:</b> Präsenzzeit: 44 Stunden Selbststudium: 16 Stunden
<b>Lehrveranstaltung:</b> Introductory methods courses (44 h)		
<b>Prüfung:</b> Oral group examinations, unbenotet <b>Prüfungsanforderungen:</b> Scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.		
<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -	
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Silvio Rizzoli	
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 5 weeks	
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>	
<b>Maximale Studierendenzahl:</b> 20		
<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Bio: 10h; Med-VK: 6h; Med-KT: 6h; Med-KL: 14h; MPI/DPZ: 8h		

<b>Georg-August-Universität Göttingen</b>		2 C
<b>Modul M.Neuro.24: Methods Courses: Zoo-Physiology</b>		
<b>Lernziele/Kompetenzen:</b> The students get introduced to a series of different physiological experiments and approaches in different animal preparations in a comparative way. Topics include the preparation of invertebrate sensory and motor systems and measurement of physiological parameters or the quantitative analysis of animal behavior. The students learn when and how to apply the various techniques appropriately.		<b>Arbeitsaufwand:</b> Präsenzzeit: 49 Stunden Selbststudium: 11 Stunden
<b>Lehrveranstaltung:</b> Introductory methods courses (49 h)		
<b>Prüfung:</b> Oral group examinations, unbenotet		
<b>Prüfungsanforderungen:</b> Scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.		
<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -	
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Ralf Heinrich	
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 2 weeks	
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>	
<b>Maximale Studierendenzahl:</b> 20		
<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Bio: 40h; Med-KT: 6h; MPI/DPZ: 3h		

<b>Georg-August-Universität Göttingen</b> <b>Modul M.Neuro.25: Lab Rotations</b>	45 C
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<b>Lernziele/Kompetenzen:</b> In these individually supervised research projects, the students acquire the skills to organize a scientific project, from defining the scientific question, identifying the appropriate methods, performing the experiments, and evaluating the experiments, to presenting and discussing the results in written and oral reports. The students are encouraged to select their research projects from different research areas and methodological approaches.	<b>Arbeitsaufwand:</b> Präsenzzeit: 720 Stunden Selbststudium: 630 Stunden
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<b>Lehrveranstaltung:</b> Three Lab Rotations in the participating institutions, selected from different subject areas (8 weeks, 40 h teaching, 200 h laboratory work each)	
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<b>Prüfung:</b> 3 lab reports, unbenotet <b>Prüfungsanforderungen:</b> Scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and scientific presentation of research results.	
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<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Martin Göpfert
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 24 weeks
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>
<b>Maximale Studierendenzahl:</b> 1	

<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Bio: 93h; Med-VK: 53h; Med-KT: 93h; Med-KL: 173h; Med-ENI: 27h; MPis/DPZ: 280h
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<b>Georg-August-Universität Göttingen</b> <b>Modul M.Neuro.31: Professional Skills in Science</b>	2 C
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<b>Lernziele/Kompetenzen:</b> The students are trained in scientific writing, oral and poster presentation skills which enable them to adequately structure and compose scientific texts, particularly for written and oral reports on experimental findings in the field of their studies. They get introduced to the principles of good scientific practice and comprehension of adequate measures to secure ethical standards in science. In addition, the students gain an understanding of laboratory safety principles and knowledge of adequate measures and procedures to secure laboratory safety standards in a research environment. The students are also trained in project- and self-management techniques and get introduced to ethical and practical aspects of experimental work with animals in the laboratory.	<b>Arbeitsaufwand:</b> Präsenzzeit: 38 Stunden Selbststudium: 22 Stunden
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<b>Lehrveranstaltungen:</b> 1. <b>Workshop: Scientific Writing and Graphics (6 h)</b> 2. <b>Workshop: Oral Presentation of Scientific Results (8 h)</b> 3. <b>Workshop: Poster Presentation of Scientific Results (4h)</b> 4. <b>Seminar: Laboratory Safety (4 h)</b> 5. <b>Seminar: Good Scientific Practice (4 h)</b> 6. <b>Seminar: Project- and Self-Management (6h)</b> 7. <b>Seminar: Ethical &amp; practical aspects of handling experimental animals (6 h)</b>	
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<b>Prüfung:</b> Oral presentation, written scientific text, oral group examination, unbenotet <b>Prüfungsanforderungen:</b> Demonstration of writing competence, oral presentation skills, understanding of ethical codes of conduct and knowledge of experimental work with animals, lab safety rules and regulations in a scientific context in the English language at an advanced level.	
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<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Martin Göpfert
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 5 weeks
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>
<b>Maximale Studierendenzahl:</b> 20	

<b>Bemerkungen:</b> Teaching capacity provided by: Med-KT: 4h; MPI/DPZ: 10h; extern: 24h
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<b>Georg-August-Universität Göttingen</b>		5 C
<b>Modul M.Neuro.32: Results of the research projects</b>		
<b>Lernziele/Kompetenzen:</b> The specific skills practiced in the seminar include efficient and concise presentation of own scientific results in English, supported by power point and poster presentations, development of a differentiated scientific vocabulary, and the critical discussion of the scientific data in the broader context of their relevance for current research in the neurosciences.		<b>Arbeitsaufwand:</b> Präsenzzeit: 20 Stunden Selbststudium: 130 Stunden
<b>Lehrveranstaltung: Seminar (20 h)</b> (Seminar)		
<b>Prüfung:</b> One oral and one poster presentation per student, group discussion, unbenotet <b>Prüfungsanforderungen:</b> Demonstration of adequate oral and poster presentation skills including the critical discussion and evaluation of the data presented.		
<b>Zugangsvoraussetzungen:</b> none	<b>Empfohlene Vorkenntnisse:</b> -	
<b>Sprache:</b> Englisch	<b>Modulverantwortliche[r]:</b> Prof. Dr. Martin Göpfert	
<b>Angebotshäufigkeit:</b> jährlich	<b>Dauer:</b> 5 weeks	
<b>Wiederholbarkeit:</b> einmalig	<b>Empfohlenes Fachsemester:</b>	
<b>Maximale Studierendenzahl:</b> 20		
<b>Bemerkungen:</b> Teaching capacity provided by: Uni-Bio: 6h; Med-KL: 4h; MPI/DPZ: 10h		