

Module Name Lecture Advanced Biochemistry and Molecular Medicine						
Type of Module ○ Basic Module				Module Code Biochemistry Lecture		
Identification Number MN-B-B 1	Workload 180 h	Credit Points 6 CP	Term 1 st term of studying	Offered Every Winter term	Start Winter term only	Duration 1 term
1	Course Types Lecture		Contact Time 49 h	Private Study 131 h		Planned Group Size* Approx. 50-70 students
2	Module Objectives and Skills to be Acquired Students who successfully completed this module <ul style="list-style-type: none"> • have acquired an understanding of advanced concepts and technologies related to the molecular basis of biochemical principles. • possess the ability to develop hypotheses through problem analysis and will be able to develop experiments to test these hypotheses. • have acquired a knowledge of important concepts in biochemistry such as reaction mechanisms, molecular basis of diseases, development and use of model systems and key technologies. 					
3	Module Content <ul style="list-style-type: none"> • Regulation of protein translation, maturation, and degradation in health and disease • Structural dynamics of soluble and membrane-bound proteins • Structure and function of proteins of the immune system and receptor-like kinases • Synthesis, modifications and therapeutic applications of synthetic peptides • Mitochondrial biogenesis, proteostasis and cellular redox signaling • Structure and function of metalloenzymes-enzymes in inborn errors of metabolism • Structural basis of eukaryotic protein kinase regulation and function • Cellular mechanobiology, novel tools in optogenetics and high density cell tracking • Tumor necrosis factor-based signaling in health and disease • Molecular mechanisms of membrane protein trafficking in eukaryotic cells • Autophagy and proteostasis in neurodegenerative disorders • Complex I and mitochondrial disorders • Proteases controlling mitochondrial fission and fusion in aging and disease • Mapping phosphorylation-based signaling in eukaryotic cells • Molecular architecture of histone-based control of gene expression • Extracellular matrix-based signaling in proliferation, differentiation, and apoptosis • MicroRNAs, extracellular matrix and mitochondria in pediatric disorders 					

3	<p>Module Content (continued)</p> <ul style="list-style-type: none"> • Chemical biology of nucleotide-based diagnosis and treatment of disease • Peptido-mimetics control and dissect cellular signaling mechanisms in cancer • Mechanism and treatment of spinal muscular atrophy and related disorders
4	<p>Teaching Methods</p> <ul style="list-style-type: none"> • Research-oriented, interactive lectures (incl. <i>e.g.</i> audience response systems and concept mapping)
5	<p>Prerequisites (for the Module)</p> <p>Enrollment in the Master´s degree course "Biological Sciences" or in the Master´s degree course "Biochemistry"</p> <p>Additional academic requirements</p> <p>Knowledge of basic and specific biochemistry, cell biology and genetics at the level of general biochemistry/biology text books (<i>e.g.</i> Voet, Stryer, Lehninger, Alberts and Lewin) is required.</p>
6	<p>Type of Examination</p> <p>Two hours written examination about topics of the lectures (100 % of the total module mark)</p>
7	<p>Credits Awarded</p> <p>Written examination at least "sufficient"</p>
8	<p>Compatibility with other Curricula</p> <p>Master´s degree course "Biochemistry"</p>
9	<p>Proportion of Final Grade</p> <p>7.5 %</p>
10	<p>Module Coordinator</p> <p>Prof. Dr. Günter Schwarz, phone 470 6440, e-mail: gschwarz@uni-koeln.de</p> <p>Dr. Jakob Suckale, phone 470 3536, jsuckale@uni-koeln.de</p>
11	<p>Further Information</p> <p>Participating faculty: Prof. Dr. U. Baumann, Prof. Dr. E. Behrmann, Prof. Dr. T. Benzing, Prof. Dr. B. Brachvogel, Prof. Dr. U. Brandt, Prof. Dr. J. Chai, Dr. M. Escobar-Henriques, Prof. Dr. M. Gather, Prof. Dr. S. Höning, Prof. Dr. P. Huesgen, apl. Prof. Dr. K. Niefind, Prof. Dr. S. Kath-Schorr, Prof. Dr. N. Kononenko, Prof. Dr. M. Krüger, Prof. Dr. T. Langer, Prof. Dr. M. Lemberg, Prof. Dr. I. Neundorf, Prof. Dr. M. Pasparakis, Prof. Dr. J. Riemer, Prof. Dr. H.-G. Schmalz, Prof. Dr. G. Schwarz, Prof. Dr. G. Sengle, Prof. Dr. H. Walczak, Prof. Dr. B. Wirth</p> <p>Literature:</p> <ul style="list-style-type: none"> • Information about textbooks and other reading material will be given on the ILIAS representation of the course (https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html) <p>General time schedule: Weeks 1-14: Tue. and Fri. from 8:15 to 9:45 a.m.; Week 15 (Mon.-Fri.): Preparation for the written examination</p>

11	<p>Further Information (continued)</p> <p>Introduction to the module: October 12, 2021 at 8:15 a.m., online (further information/link will be sent to your Smail-Account); for preparation to the module before this introduction see ILIAS link under literature.</p> <p>Written examination: February 15, 2022, second/supplementary examination March 15, 2022; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>
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* Depending on how many students from other subject areas (and if indicated also from other master's degree courses, see 5) choose this module.