

<b>Module Name</b> Proteostasis in health and disease						
<b>Type of Module</b> ○ Advanced Module				<b>Module Code</b> Proteostasis		
<b>Identification Number</b> MN-B-SM (A 6)	<b>Workload</b> 360 h	<b>Credit Points</b> 12 CP	<b>Term</b> 2 <sup>nd</sup> term of studying	<b>Offered Every</b> Summer term, 2 <sup>nd</sup> half	<b>Start</b> Summer term only	<b>Duration</b> 7 weeks
<b>1</b>	<b>Course Types</b> a) Lectures b) Practical/Lab c) Seminar		<b>Contact Time</b> 10 h 150 h 10 h		<b>Private Study</b> 20 h 60 h 6 h	
<b>2</b>	<b>Module Objectives and Skills to be Acquired</b> Students who successfully completed this module <ul style="list-style-type: none"> <li>• have learned mechanisms of protein homeostasis (proteostasis) in physiology and disease in different tissues and different model organisms.</li> <li>• have acquired experimental skills in state-of-the art methods in cell biology, molecular biology and biochemistry and can independently carry out small scientific projects related to the topic of the module.</li> <li>• have learned how to present research results in oral and written form and to critically discuss scientific publications related to the topic of the module on a professional level</li> <li>• have learned how to present research results in oral and written form and to critically discuss scientific publications related to the topic of the module on a professional level.</li> <li>• Are able to transfer skills acquired in this module to other fields of biology.</li> </ul>					
<b>3</b>	<b>Module Content</b> Joining ongoing research projects of the participating groups on how proteostasis is controlled on the level of entire organisms, cells or cellular organelles (e.g. mitochondria, ER) the students get introduced to the following methodologies: <ul style="list-style-type: none"> <li>• Mammalian cell culture (immortalized cell lines, murine primary neurons), transfection</li> <li>• Work with model organisms such as <i>C. elegans</i> and <i>S. cerevisiae</i></li> <li>• Western blot analysis, immunoprecipitation, crosslinking-techniques, subcellular fractionation, membrane biology</li> <li>• Immunostaining</li> <li>• Methods to study protein turnover such as cycloheximide chase experiments</li> <li>• Genome editing and genetic engineering in different model systems, CRISPR-Cas9</li> <li>• RNAi</li> <li>• Molecular cloning</li> <li>• Proteomics methods</li> <li>• • Light microscopy</li> </ul>					

*Proteostasis in health and disease (MN-B-SM [A 6]) continued*

4	<p><b>Teaching Methods</b></p> <ul style="list-style-type: none"> <li>Lectures; Practical/Lab (project work); Seminar (Journal Club); Guidance to independent research; Training on presentation techniques in oral and written form</li> </ul>
5	<p><b>Prerequisites (for the Module)</b></p> <p>Enrollment in the Master's of Science degree course "Genetics and Biology of Aging and Regeneration" or in the Master's degree course "Biochemistry"</p>
6	<p><b>Type of Examination</b></p> <p>The final examination consists of two parts: 1 page summary of the practical lab work in the style of a poster abstract and the Powerpoint slides for the oral presentation (50 % of the total module mark), oral presentation (20-30 min including discussion; 50 % of the total module mark)</p>
7	<p><b>Credits Awarded</b></p> <p>Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)</p>
8	<p><b>Compatibility with other Curricula*</b></p> <p>Optional compulsory module in the Master's degree course "Biochemistry"</p>
9	<p><b>Proportion of Final Grade</b></p> <p>12.0 %</p>
10	<p><b>Module Coordinator</b></p> <p>Dr. Julian Nüchel, phone: +49 (0)221 478-84620, e-mail: nuechel.julian@uni-koeln.de          Prof. Dr. Marius Lemberg: phone: +49 (0)221 478-77288 e-mail: m.lemberg@uni-koeln.de</p>
11	<p><b>Further Information</b></p> <p><b>Participating faculty:</b> Dr. J. Nüchel, Prof. Dr. M. Lemberg, Prof. Dr. I. Dudanova, Dr. M. Escobar-Henriques, Dr. E. Fenech, Prof. Dr. T. Hoppe, Prof. Dr. Roland Knorr, Prof. Dr. N. Kononenko, Prof. Dr. D. Vilchez, Dr. G. Zaffagnini</p> <p><b>Literature:</b> Information about textbooks and other reading material will be given on the ILIAS representation of the course.</p> <p><b>General time schedule:</b> Week 1 (Mon.-Fri.): Introduction to Proteostasis (lectures), safety lecture and lab projects; Week 2-6 (Mon.-Fri.): Lectures, Journal Club and lab projects; Week 7 (Mon.-Fri): Preparation for the oral examination and of the written report (1 page)</p> <p><b>Note:</b> The module contains hands-on laboratory work conducted individually and is taught in research laboratories. The module does not contain computer-based practicals/research as a main component.</p> <p><b>Introduction to the module:</b> June 8, 2026 at 09:00; for further details and preparation for the module before this introduction see ILIAS link under literature.</p> <p><b>Oral examination:</b> July 23, 2026, second/supplementary examination August 28, 2026; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>