

<b>Module Name</b> Seminar Modern Techniques and Approaches in Aging Research						
<b>Type of Module</b> ○ Basic Module				<b>Module Code</b> Aging Seminar		
<b>Identification Number</b> MN-B-A 2	<b>Workload</b> 180 h	<b>Credit Points</b> 6 CP	<b>Term</b> 1 <sup>st</sup> term of studying	<b>Offered Every</b> Winter term	<b>Start</b> Winter term only	<b>Duration</b> 1 term
<b>1</b>	<b>Course Types</b> Seminar (incl. Tutorial)		<b>Contact Time</b> 52 h	<b>Private Study</b> 128 h		<b>Planned Group Size</b> 20 students
<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 acquired detailed knowledge about the concepts of state-of-the-art methods of functional genomics, genetics, cell and molecular biology and imaging, and their applications to study and understand cell and tissue functions in physiology and disease.</li> <li>• have learned how to present research results in oral and written form on a professional level.</li> <li>• have learned how to analyze scientific problems and critically discuss scientific publications related to the topics of the module on a professional level.</li> <li>• are able to develop strategies on how to solve scientific questions in the field of Aging research.</li> <li>• are able to transfer and apply knowledge and skills acquired in this module to wet-lab settings and related scientific fields.</li> </ul>					
<b>3</b>	<b>Module Content</b> <ul style="list-style-type: none"> <li>• Cloning strategies and generation of stable cell lines</li> <li>• Principles of genome engineering (CRISPR-Cas, CRE-Lox, TALENs)</li> <li>• Regulation of nuclear and chromatin architecture (3C, HiC)</li> <li>• Epigenetic regulation of gene expression (repurposed Cas9 and Cas13)</li> <li>• Principles of translational control (Polysome profiling and riboseq)</li> <li>• Fate decisions and functional identity (hESC/iPSC, clonal analysis lineage tracing techniques)</li> <li>• Principles of transcriptional regulation (ChIP-seq, ATAC-seq, DamID...)</li> <li>• Functional genetics in model organisms (haploid screens, genetic epistasis)</li> <li>• Methods for genomic and proteomic analyses (RNA-seq, scRNA-seq, snRNA-seq, Mass-spec.)</li> <li>• Optogenetics and chemogenetics in model organisms</li> <li>• Microscopy techniques (Light and Superresolution microscopy), immunological staining methods</li> <li>• Quantitative Imaging</li> </ul>					
<b>4</b>	<b>Teaching Methods</b> <ul style="list-style-type: none"> <li>• Tutorials; Seminar; Group discussions; Guidance to critical interpretation of literature; 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 degree course “Biological Sciences”; Simultaneous participation in the lecture module “Principles of Molecular Genetics, Development and Aging”</p>
6	<p><b>Type of Examination</b></p> <p>Oral presentation (100 % of the total module mark)</p>
7	<p><b>Credits Awarded</b></p> <p>Regular and active participation; Oral presentation at least “sufficient”</p>
8	<p><b>Compatibility with other Curricula</b></p> <p>None</p>
9	<p><b>Proportion of Final Grade</b></p> <p>7.5 %</p>
10	<p><b>Module Coordinator</b></p> <p>Prof. Dr. Mirka Uhlirova, phone 478 84334, e-mail: mirka.uhlirova@uni-koeln.de</p>
11	<p><b>Further Information</b></p> <p><b>Participating faculty:</b> Professors and Group Leaders of the Cologne Excellence Cluster on Cellular Stress Responses in Aging-Associated Diseases (CECAD) and invited guest speakers</p> <p><b>Literature:</b></p> <ul style="list-style-type: none"> <li>• Information about textbooks and other reading material will be given on the ILIAS representation of the course (<a href="https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html">https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html</a>)</li> </ul> <p><b>General time schedule:</b> Weeks 1-14: Seminars/tutorials and oral presentations (starting at 2:30 p.m. usually on Tuesdays and Thursdays, more details will be given in the introduction to the module).</p> <p><b>Introduction to the module:</b> October 12, 2021 at 2:30 p.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>