

Module Name Seminar Modern Techniques and Approaches in Aging Research						
Type of Module ○ Basic Module				Module Code Aging Seminar		
Identification Number MN-B-A 2	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 Seminar (incl. Tutorial)		Contact Time 45 h	Private Study 135 h		Planned Group Size 20 students
2	Module Objectives and Skills to be Acquired Students who successfully completed this module <ul style="list-style-type: none"> • 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. • have learned how to present research results in oral and written form on a professional level. • have learned how to analyze scientific problems and critically discuss scientific publications related to the topics of the module on a professional level. • are able to develop strategies on how to solve scientific questions, including choice of suitable model system, methods and data analysis. • are able to transfer and apply knowledge and skills acquired in this module to wet-lab settings and related scientific fields. 					
3	Module Content <ul style="list-style-type: none"> • Cloning strategies and generation of stable cell lines • Principles of genome engineering (CRISPR-Cas, CRE-Lox, TALENs) • Regulation of nuclear and chromatin architecture (3C, HiC) • Epigenetic regulation of gene expression (repurposed Cas9 and Cas13) • Principles of translational control (Polysome profiling and riboseq) • Fate decisions and functional identity (hESC/iPSC, clonal analysis lineage tracing techniques) • Principles of transcriptional regulation (ChIP-seq, ATAC-seq, DamID...) • Functional genetics in model organisms (genetic screens, genetic epistasis) • Methods for genomic and proteomic analyses (RNA-seq, scRNA-seq, snRNA-seq, Mass-spec...) • Optogenetics and chemogenetics in model organisms • Microscopy techniques (Light and Superresolution microscopy), immunological staining methods • Quantitative Imaging • Scientific writing and oral presentation 					

4	<p>Teaching Methods</p> <ul style="list-style-type: none"> Interactive tutorials; Seminar; Group discussions; Guidance to critical interpretation of literature; Training on presentation techniques in oral and written form
5	<p>Prerequisites (for the Module)</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>Type of Examination</p> <p>Oral presentation with written elaboration (100 % of the total module mark)</p>
7	<p>Credits Awarded</p> <p>Regular and active participation; Oral presentation with written elaboration at least “sufficient”</p>
8	<p>Compatibility with other Curricula</p> <p>None</p>
9	<p>Proportion of Final Grade</p> <p>7.5 %</p>
10	<p>Module Coordinator</p> <p>Prof. Dr. Ana J. Garcia-Saez, phone 478 84263, e-mail: ana.garcia@uni-koeln.de</p>
11	<p>Further Information</p> <p>Participating faculty: Professors and Group Leaders of the Cologne Excellence Cluster on Cellular Stress Responses in Aging-Associated Diseases (CECAD) and invited guest speakers</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 (see https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html) <p>General time schedule: Weeks 1-14: Seminars/tutorials and oral presentations (starting at 2:00 p.m. usually on Tuesdays and Thursdays, more details will be given in the introduction to the module).</p> <p>Introduction to the module: October 11, 2022 at 2:00 p.m., in presence if permitted otherwise 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>