

| Principles of Molecular Genetics, Development and Aging |   |               |  |                                  |   |
|---|---|---------------|--|----------------------------------|---|
| Identification number                                   | Workload  | Credit points | Term of studying                           | Frequency of occurrence          | Duration                                      |
| MN-B-GDA 1  | 180 h   | 6 CP          | 1 <sup>st</sup> or higher term of studying | Winter term                      | 15 weeks                                      |
| 1   | <b>Type of lessons</b><br>Lectures  |               | <b>Contact times</b><br>49 h               | <b>Self-study times</b><br>131 h | <b>Intended group size*</b><br>approx. 70-100 |
| 2   | <b>Aims of the module and acquired skills</b><br>Students who successfully completed this module ... <ul style="list-style-type: none"> <li>• have acquired an understanding of principles and mechanisms of molecular and cellular biology and key concepts in modern genetics and aging research.</li> <li>• have acquired in-depth knowledge of molecular, cellular and systemic mechanisms that orchestrate development and organismal homeostasis and how their malfunctions contribute to aging and aging-associated diseases.</li> <li>• can solve problems and develop strategies to answer questions related to molecular genetics and mechanisms underlying organismal development and aging.</li> </ul>  |               |  |                                  |   |
| 3   | <b>Contents of the module</b> <ul style="list-style-type: none"> <li>• Eukaryotic, bacterial and viral genome structure and organization</li> <li>• DNA stability, damage and repair, including cell cycle, DNA replication and recombination</li> <li>• Regulation of gene expression and epigenetics</li> <li>• Translation, proteostasis and ER stress, including protein folding and posttranslational modification of proteins</li> <li>• Signal transduction, inter- and intra-cellular communication</li> <li>• Mitochondria biology and function</li> <li>• Cell death and senescence</li> <li>• Stem cell biology, regeneration</li> <li>• Infection biology, defense mechanisms and immunity</li> <li>• Human genetics, polymorphisms and mutations</li> <li>• Animal models in Biomedical Research</li> <li>• Principles of morphogenesis and differentiation</li> </ul> |               |  |                                  |   |
| 4   | <b>Teaching/Learning methods</b> <ul style="list-style-type: none"> <li>• Lectures</li> </ul>   |               |  |                                  |   |
| 5   | <b>Requirements for participation</b><br>Enrollment in the Master's degree course "Biological Sciences"<br><b>Additional academic requirements</b><br>The knowledge of cell, molecular and developmental biology as well as genetics on the level of general biology text books ( <i>e.g.</i> Alberts, Lodish or Watson) is required.   |               |  |                                  |   |

*Principles of Molecular Genetics, Development and Aging (MN-B-GDA 1) continued*

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| 6  | <p><b>Type of module examinations</b></p> <p>Two hours written examination about topics of the lectures (100 % of the total module mark)</p>  |
| 7  | <p><b>Requisites for the allocation of credits</b></p> <p>Written examination at least "sufficient"</p>   |
| 8  | <p><b>Compatibility with other Curricula*</b></p> <p>None</p>   |
| 9  | <p><b>Significance of the module mark for the overall grade</b></p> <p>7.5 % of the overall grade</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>Additional information</b></p> <p><b>Participating faculty:</b> Prof. Dr. J. Dohmen, Prof. Dr. S. Eming, Prof. Dr. A. Garcia-Sáez, Prof. Dr. N. Gehring, Prof. Dr. M. Hammerschmidt, Prof. Dr. K. Hofmann, Prof. Dr. T. Hoppe, Prof. Dr. M. Krüger, Prof. Dr. C. Niessen, Prof. Dr. M. Pasparakris, Dr. S. Pöpsel, Prof. Dr. S. Roth, Prof. Dr. E. Rugarli, Prof. Dr. M. Uhlirova</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_crs_3516843.html">https://www.ilias.uni-koeln.de/ilias/goto_uk_crs_3516843.html</a>)</li> </ul> <p><b>General time schedule:</b> Weeks 1-14: Mon. from 11:00 to 12:30 a.m. and Thr. from 9:00 to 10:30 a.m.; Week 15 (Mon.-Fri.): Preparation for the written examination</p> <p><b>Introduction to the module:</b> November 02, 2020 at 11:00 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><b>Written examination:</b> Febuary 26, 2021, second/supplementary examination March 26, 2021; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p> |

\* Depending on how many students from other subject areas (and if indicated also from other master's degree courses, see 5) choose this module.