Module Name

Principles of Molecular Genetics, Development and Aging

Type of Module	**Module Code**
Advanced Module	AM-B-GDA 1

Identification Number	**Workload**	**Credit Points**	**Term**	**Offered Every**	**Start**	**Duration**
MN-B-GDA 1	180 Hours	6 CP	1. – 3. Semester	WiSe	Winter Term Only	1 Semester

1	**Course Types**	**Contact Time**	**Private Study**	**Planned Group Size**
	Lecture	49 h	131 h	70-100 Students

2 Module Objectives and Skills to be Acquired

Students who successfully completed this module …

- have acquired an understanding of principles and mechanisms of molecular and cellular biology and key concepts in modern genetics and aging research.
- 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.
- • can solve problems and develop strategies to answer questions related to molecular genetics and mechanisms underlying organismal development and aging.

3 Module Content

- Eukaryotic, bacterial and viral genome structure and organization
- DNA stability, damage and repair, incuding cell cycle, DNA replication and recombination
- Regulation of gene expression and epigenetics
- Translation, proteostasis and ER stress, including protein folding and posttranslational modification of proteins
- Signal transduction, inter- and intra-cellular communication
- Mitochondria biology and function
- Cell death and senescence
- Stem cell biology, regeneration
- Infection biology, defense mechanisms and immunity
- Human genetics, polymorphisms and mutations
- Animal models in Biomedical Research
- • Principles of morphogenisis and differentiation

4 Teaching Methods

Lectures

5 Prerequisites (for the Module)

Formally: none

Additional academic requirements:

The knowledge of cell, molecular and developmental biology as well as genetics on the level of general biology text books (e.g. Alberts, Lodish or Watson) is required.

6 Type of Examination

Two hours written examination about topics of the lectures (100 % of the total module mark)

7 Credits Awarded

Written examination at least “sufficient”

8	**Compatibility with other Curricula** None
9	**Proportion of Final Grade** 6/114
10	**Module Coordinator** Prof. Dr. Mirka Uhlirova, phone 478 84334, e-mail: mirka.uhlirova@uni-koeln.de
11	**Further Information** **Participating faculty**: 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 **Literature:** • Information about textbooks and other reading material will be given on the ILIAS representation of the course **General time schedule:** 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