# M4415 Molecular Biomedicine

**Coordinator (responsible lecturer)**
Prof. Dr. Eckhard Lammert (lammert@uni-duesseldorf.de)

**Lecturers**
Prof. Dr. Eckhard Lammert and coworkers

**Contact and organization**
Dr. Daniel Eberhard (daniel.eberhard@uni-duesseldorf.de)

| Workload | Credit points | Contact time | Self-study | Duration |
|---|---|---|---|---|
| 420 h | 14 CP | 300 h | 120 h | 1 semester |

| Course components | Frequency | Group size |
|---|---|---|
| Practicals: 18 PPW<br>Lectures: 2 PPW | Every summer semester | 20 students |

**Learning outcomes/skills**
Students will learn how to describe, analyse and manipulate organ development, physiology, cell biology and biomedicine of selected organs and their human diseases. The students will organize and perform their own experiments on tissues and medically relevant organs, such as the cardiovascular system. The students will perform experiments on their own, using fluorescence and laser scanning microscopes (LSM), microsurgery, ELISA, real-time PCR, gel documentation system, and other state-of-the-art lab equipment.

**Forms of teaching**
Lectures and practical courses

**Contents**
*Lectures:*
The lectures are about the basics of biomedicine, development, physiologic function and human disease of selected organs and tissues. In addition, the lectures cover some in vitro and in vivo models for human diseases as well as tissue and cell culture techniques.

*Practical course:*
Students will perform state-of-the-art methods on cell biology, developmental biology, physiology and biomedicine of selected organs and tissues. The students will isolate embryos, and - among other organs - isolate the aorta as the largest arterial blood vessel, islets of Langerhans as the key tissues involved in diabetes mellitus, lymph nodes involved in immunity, infection and autoimmunity under the stereomicroscope. They will generate cryosections of these important tissues, perform immunohisto- and cytochemistry, laser scanning microscopy (LSM), time-lapse video microscopy, insulin secretion assays (ELISA) required for diabetes research, angiogenesis assays required for tumour and cancer research, western blots, tissue- and cell culture techniques as well as software-based image analysis.

**Requirements for admission**
**Formal:** none
**With regards to content:** Read the script

**Type of examination**
(1) Competence sector “Knowledge” (70% of the score): Written examination in most cases about the lecture and the experiments
(2) Competence sector “Documentation” (30% of the score): Preparation of a protocol (introduction to the topic, performance of experiments, results, conclusions and

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| discussions) |
| **Requisites for the allocation of credit**<br>(1) Success in passing the competence sector “knowledge”<br>(2) Continuous and active participation of the practical courses<br>(3) Submission of protocols that fulfil the criteria of good scientific documentation |
| **Relevant for following study programmes/major (only MSc programme)**<br>M.Sc. Biology<br>M.Sc. Biology International; |
| **Compatibility with other curricula**<br>M.Sc. biochemistry. M.Sc. biochemistry. |
| **Significance of the mark for the overall grade**<br>The mark given will contribute to the final grade in proper relation to its credits.<br>M.Sc. Biology International: 14/44 CP |
| **Course language**<br>English |
| **Additional information**<br>Students have to apply to Dr. Daniel Eberhard (Daniel.eberhard@hhu.de)<br>The students are recommended to also participate in the seminar “Molecular Biomedicine” |