# Modern Techniques of Developmental Biology

<table>
<thead>
<tr>
<th>Identification number</th>
<th>Workload</th>
<th>Credit points</th>
<th>Term of studying</th>
<th>Frequency of occurrence</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN-B-SM (DG 1)</td>
<td>360 h</td>
<td>12 CP</td>
<td>1st or 2nd term of studying</td>
<td>each term, 2nd half</td>
<td>7 weeks</td>
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</tbody>
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## 1 Type of lessons
- a) Lectures
- b) Practical/Lab
- c) Seminar

<table>
<thead>
<tr>
<th>Contact times</th>
<th>Self-study times</th>
<th>Intended group size*</th>
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<tbody>
<tr>
<td>12 h</td>
<td>24 h</td>
<td>max. 13</td>
</tr>
<tr>
<td>162 h</td>
<td>129 h</td>
<td>max. 3</td>
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<tr>
<td>9 h</td>
<td>24 h</td>
<td>max. 6</td>
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## 2 Aims of the module and acquired skills
Students who successfully completed this module …
- have acquired theoretical and experimental skills concerning important techniques in developmental biology (see contents of the module).
- can independently carry out small scientific projects related to the topic of the module.
- have learned how to present research results in oral and written form and to critically discuss scientific publications related to the topic of the module on a professional level.
- are able to transfer skills acquired in this module to other fields of biology.

## 3 Contents of the module
- Genetic analysis of developmental processes
- Clonal analysis
- Advanced techniques of fluorescence microscopy
- Cell transplantations
- Cell ablations
- Transgenic techniques
- RNAi and morpholino knock-down of developmental genes
- Life-imaging of morphogenetic processes
- Cell migration and intracellular transport of mRNAs and proteins
- Basic techniques of molecular cloning (DNA preparation, transformation, ligation, RNA synthesis)
- Basic protein techniques (PAGE, Western blotting)

## 4 Teaching/Learning methods
- Lectures; Practical/Lab (Project work); Seminar; Guidance to independent research; Training on presentation techniques in oral and written form

## 5 Requirements for participation
Enrollment in the Master’s degree course “Biological Sciences” or in the Master’s degree course “Biochemistry”

**Additionally recommended:** Participation in an advanced genetics, cell biology or developmental biology course within a bachelor’s program is highly desirable. The knowledge of basic molecular and cell biology on the level of introductory biology or cell biology textbooks (Campbell, Purves, Alberts) is a prerequisite. Basic lab experience (pipetting, preparation of solutions) is presumed.
6 **Type of module examinations**  
The final examination consists of three parts: Two hours written examination about topics of the lectures and the practical/lab part (50% of the total module mark), oral presentation (25% of the total module mark) and seminar paper (25% of the total module mark).

7 **Requisites for the allocation of credits**  
Regular and active participation;  
Each examination part at least "sufficient" (see appendix of the examination regulations for details).

8 **Compatibility with other Curricula**  
Biological subject module in the Master’s degree course “Biochemistry”

9 **Significance of the module mark for the overall grade**  
In the Master’s degree course “Biological Sciences”: 15% of the overall grade (see also appendix of the examination regulations).

10 **Module coordinator**  
Prof. Dr. Siegfried Roth, phone 470-2491, e-mail: siegfried.roth@uni-koeln.de

11 **Additional information**  
**Subject module** of the Master’s degree course “Biological Sciences”,  
**Focus of research:** (D) Developmental Biology; (G) Genetics and Cell Biology  
**Participating faculty:** PD Dr. B. Altenhein, Prof. Dr. O. Bossinger, Prof. Dr. M. Hammerschmidt, Prof. Dr. M. Hülskamp, PD Dr. M. Kroiher, Dr. H.-M. Pogoda, Prof. Dr. S. Roth, Prof. Dr. B. Schermer, Prof. Dr. M. Uhlirova, Prof. Dr. W. Werr, Prof. Dr. A. Wodarz  
**Literature:**  
- Review articles on particular topics will be provided during the course.  
**General time schedule:** Week 1-5 (Mon.-Fri.): Lectures and practical/lab and preparation for the seminar talk (held in the weeks 4-6); Week 6 (Mon.-Fri): Writing seminar paper; Week 7 (Mon.-Fri): Preparation for the written examination  
**Note:** The module contains hand-on laboratory work conducted individually and is taught in research laboratories. The module does not contain computer-based practicals/research as a main component.  
**Introduction to the module:** May 19, 2020 at 9:00 a.m., Cologne Biocenter, room 3.002 (third floor)  
**Written examination:** July 17, 2020, second/supplementary examination August 28, 2020; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.

*12 students from the Master’s degree course “Biological Sciences” and 1 student from the Master’s degree course “Biochemistry”.*