Title of the module: **Intracellular targeting of proteins**

Term/semester: **Summer term / 2**

VAK-Number: **Will be assigned centrally**

Credit points: **6 ECTS**

**Compulsory / elective course:** Elective course

**Teaching methods**

<table>
<thead>
<tr>
<th>Method</th>
<th>SWS</th>
<th>CP</th>
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</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>0.5 (7 h)</td>
<td>0.5</td>
</tr>
<tr>
<td>Seminar</td>
<td>1.5 (21 h)</td>
<td>1.9</td>
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<tr>
<td>Lab course</td>
<td>4 (56 h)</td>
<td>3.6</td>
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**Self studies**

- Protocols: 20 h
- Preparation of the talk: 30 h
- Learning for the exam: 46 h

**Module representative:** Prof. Dr. R. Stick

**Instructor:** Prof. Dr. R. Stick / Dr. Annette Peter

**Examiner:** Prof. Dr. R. Stick

**Objectives**

- Deepened knowledge about cell biological aspects of amphibian oogenesis and early development
- Basic knowledge about intermediate filament proteins
- Knowledge about protein lipidation
- Development of experimental strategies
- Performance of microinjection techniques
- Acquiring experimental skills in basal lab techniques: protein separation and detection
- Basic skills in immuno-histochemistry and fluorescence microscopy
- Basic skills in data interpretation and evaluation

**Content of teaching**

**Theoretical part:**

- Introduction in the oogenesis and early development of amphibians with special emphasis on the biological adaptations of amphibian oocytes.
- Amphibian oocytes as protein expression system.
- Cell fractionation techniques including differential centrifugation, floating gradient centrifugation. Oocyte handling, nuclear isolation, sub-fractionation of oocyte nuclei, in vitro egg maturation.
- Introduction into intermediate filament biology with special emphasis on nuclear lamins, posttranslational modification and processing, principles of subcellular targeting.

**Practical part:**

- Oocyte isolation and handling, oocyte microinjection, cellfractionation and nuclear fractionation, protein sample preparation for SDS-PAGE, SDS-PAGE, western-blotting.
- Cryofixation, cryosectioning and immunostaining, fluorescence microscopy, image processing.

**Educational objectives**

- Ability to understand the advantages and shortcomings of the 'biological system oocyte'
- Ability to plan and perform scientific experiments
- Ability to interpretate and evaluate scientific data produced in the practical
- Ability to present and discuss scientific data obtained in the practical

**Evaluation of the learning progress**

Protocol, oral presentation of the results, discussion round during the practical

**Assessment**

Seminar talk (30%); protocol (30%); final exam (40%)

**Frequency**

Each summer semester

**Usage in other degree programmes**

The module is also provided to diploma students (Biology)

**Requirements**

Successful participation in module A