### Title of the module

**Functional genomics of bacteria: RNA and microarray analysis**

### 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>1 (14 h)</td>
<td>1.5</td>
</tr>
<tr>
<td>Seminar</td>
<td>2 (28 h)</td>
<td>2.5</td>
</tr>
<tr>
<td>Practical course</td>
<td>4 (56 h)</td>
<td>2</td>
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</tbody>
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### Self study

- protocols: 20 h
- preparation of the talk: 30 h
- learning for the exam: 32 h

### Module representative

Prof. B. Reinhold-Hurek

### Instructor

Dr. T. Hurek, Prof. B. Reinhold-Hurek

### Examiner

Dr. T. Hurek, Prof. B. Reinhold-Hurek

### Objectives

Increase theoretical knowledge on plant-microbe interactions and their molecular mechanisms. Increase knowledge on methods of functional genomics and gene expression studies. Increase skills in application and optimization of molecular biological methods such as PCR-based techniques, microarrays, and analysis of bacterial mRNA.

### Content of teaching

The course is research-oriented, each student will work on his own experimental set. Molecular principles of plant-microbe interactions, microarray and PCR applications, and RNA analysis will be covered theoretically.

*Experiments include:*

- Gnotobiotic cultivation systems: Inoculation experiments of rice under aseptic conditions (Controlling of bacterial growth, aseptic handling of seedlings).
- Optimization of reaction conditions for PCR (effect of variation of different parameters).
- Real-time PCR experiments for quantification
- Competition experiments for bacterial mutants after site-directed mutagenesis (DNA extraction from roots, PCR)
- Oligonucleotide-based microarray experiments including controls (Generation of fluorescent target, electroelution from agarose gels, strand separation, hybridization, scanning and statistical evaluation)

### Educational objectives

- Ability to deeply understand the topics above
- Ability to design and to carry out above-mentioned experimental strategies with appropriate controls.

### Evaluation of learning progress

Seminars and protocols

### Assessment

- Seminar talk (30%); protocol (20%); oral examination (50%)

### Frequency

Every summer term

### Usage in other degree programmes

The module is suitable for all master students in the BMB-program, eligible for the specialization "Microbial Systems" and also suitable for diploma students.

### Requirements

Successful attendance in modules A and B

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August 2010