

## SCIENTIFIC AND METHOD MODULES

<b>Module name</b>	<b>Basic Concepts in Biochemistry</b>
<b>Number</b>	2015-B2
<b>Aims</b>	Doctoral researchers without a background in biochemistry or biology will be brought up to a level necessary to understand the thematic and advanced modules (T1–T6, A2, A1). The module introduces basics in bioactive molecules and biomacromolecules, including their structure and (bio)chemical properties, as well as cell biology. The doctoral researchers will learn how proteins are produced, how mutations are introduced and which types of chemical and physical data can be obtained from these types of experiments.
<b>Basics</b>	
<b>Contents</b>	Basic bioactive molecules and macromolecules (DNA, RNA, peptides, proteins, carbohydrates, lipids), Cell structure and metabolism, Methods in molecular biology (recombinant DNA, PCR, tools to produce DNA or proteins), Proteins (biochemical and biophysical characteristics, folding and stability), Cell membranes, Protein chemistry, Tissue culturing and biological assays, fluorescence microscopy.
<b>Methods</b>	
<b>Type</b>	Two-day block course/ yearly recurrence with modification
<b>Date (month/year)</b>	9/10 March 2015
<b>Time</b>	See page 2
<b>Work load</b>	15 hours presence/ 45 hours self-study
<b>Examination</b>	Written
<b>Credit points</b>	2
<b>Responsible scientists</b>	Harms, Huster
<b>International guest lecturers</b>	-
<b>Industrial partners</b>	-
<b>Recommendations for literature, e-learning</b>	<ul style="list-style-type: none"> <li>• L. Stryer: Biochemistry</li> <li>• G. Löffler: Basiswissen Biochemie</li> </ul>

## SCHEDULE for Module 2015-B2

Time	Lecturer	Programme	Location
<b>9 March 2015</b>			
09:00 – 09:30	Hauke Harms	Motivation: Why should physicists/chemists know about biochemistry?	UFZ Geb. 4.0, Room 101
09:45 – 11:30	Hauke Harms	Biomolecules. An overview Biopolymers and their building blocks Polysaccharides (cellulose, chitin, murein) Proteins Nucleic acids Lipids Inorganic structures Functional vs. structural proteins Enzyme classes, transporters Self assembly structures Molecular assembly lines Proteins involved in movement Vesicles	UFZ Geb. 4.0, Room 101
	<i>Lunchbreak</i>		
12:30 – 14:00	Antonis Chatzinotas	Basic principles in molecular biology Cellular information flow Gene regulation Genetic engineering and diagnosis Cloning, sequencing fingerprinting Systems biology	UFZ Geb. 4.0, Room 101
14:15 – 15:45	Lukas Wick	Interactions of cells with interfaces and particles	UFZ Geb. 4.0, Room 101
16:00 – 17:30	Falk Harnisch	Bioelectrochemical systems - processes involving the exchange of electrons between bacteria and electrodes	UFZ Geb. 4.0, Room 101
	Hauke Harms	Short summary and questions	
<b>10 March 2015</b>			
09:00 – 10:30	Peter Schmidt	Recombinant expression of proteins by microorganisms <ul style="list-style-type: none"> <li>• Comparison of expression hosts</li> <li>• E. coli expression and fermentation</li> </ul>	Härtelstr. 16-18, Room 017
10:45 – 12:15	Ulrike Krug	Purification of Proteins by Chromatography <ul style="list-style-type: none"> <li>• FPLC, Äkta System</li> <li>• Tags</li> </ul>	Härtelstr. 16-18, Room 017
	<i>Lunch break</i>		
13:00 – 14:30	Georg Künze	In vitro refolding of recombinant proteins and assessment of their biological activity <ul style="list-style-type: none"> <li>• Theory of protein folding</li> <li>• Re-Folding of recombinant proteins</li> <li>• Methods to study protein folding</li> <li>• Biological activity assays</li> </ul>	Härtelstr. 16-18, Room 017
15:00 – 16:00	Members AG Huster	Short demonstration: Cloning, Expression, Purification, Activity Assays Proteins	Laboratories IMPB

	Ulrike Krug	Short summary and questions	
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**Didactic elements:**

Lecture, discussions, practical training – lab demonstration, etc.

**Expected performance:**

Active participation in discussions during lab demonstration etc.

Doctoral candidates from the biochemistry field are allowed to take part in the module but will not receive any credit point or mark for attendance.

Doctoral candidates who have already received two credit points and a mark for the attendance of this module can participate, but cannot receive two graded credit points again or improve their mark.