

## SCIENTIFIC AND METHOD MODULES

in collaboration with the **Tutorials of the 16<sup>th</sup> Leipziger Workshop Zytomik**

<b>Module name</b>	<b>From biomolecules to cells</b>
<b>Number</b>	2011-M04
<b>Aims</b>	We will present the basics of proliferation, differentiation, migration, and apoptosis of neuronal cell biology and cell-matrix interactions. You will get insight in processes of directed axonal out growth dependent on guidance molecules correlated with the receptor expression profile. Also, novel methods and techniques for optical and bio-electronic monitoring will be demonstrated. Another focus are principles of bio-hybrid systems such as micro-electronic microarrays and viable cell and tissue models. A series of tutorials on flow cytometry, slide-based cytometry, multiparametric analyses etc. are also made available.
<b>Basics</b>	(The topics are covered by lectures in biochemistry/biotechnology courses from existing bachelor and master courses): Principles in cell biology and biosensors as well as in optical analysis (high resolution microscopy)
<b>Contents</b>	1. neuronal cellbiology, guidance molecules and axonal out growth 2. stem cell biology and differentiation 3. cell and tissue models on multielectrode-microarrays, e.g. Morbus Alzheimer on a chip 4. impedance based spectroscopy and measurement methods (tutorials) 5. super-microscope and high resolution microscopy (demonstration)
<b>Methods</b>	Impedance spectroscopy, cytometry, high resolution microscopy of cells and tissues.
<b>Type</b>	Two-day block course / yearly recurrence with modification
<b>Date (month/year)</b>	April 13 <sup>th</sup> and 14 <sup>th</sup> , 2011
<b>Time</b>	9.00 – 18.00
<b>Work load</b>	15 hours presence/ 45 hours self-study
<b>Examination</b>	Oral – April 19 <sup>th</sup> and 20 <sup>th</sup> 2011
<b>Credit points</b>	2
<b>Responsible scientists</b>	Andrea Robitzki
<b>International guest lecturers</b>	F. Preijers (Radboud University Nijmegen), R. F. Murphy (Carnegie Mellon University, Pittsburgh, USA), G. Nolan (University of Stanford, CA, USA)
<b>Industrial partners</b>	Niklas Senghaas (Nikon GmbH), C. Vallan (Celeza GmbH),
<b>Recommendations for literature, e-learning</b>	s. <a href="http://www.uni-leipzig.de/~dmpt/lectures">http://www.uni-leipzig.de/~dmpt/lectures</a> (pdf files of selected reviews and power point presentations)

**SCHEDULE: Wednesday 13<sup>th</sup>, April – Thursday, 14<sup>th</sup> April, 2011**

Time	Lecturer	Program	Location
April 13 <sup>th</sup> , 2011			
09:00–09:15	Andrea Robitzki, BBZ	Overview and Introduction – Road Map	BBZ lecture hall
09:15-10:45	Andrea Robitzki, BBZ	Neuronal cell biology and stem cells	BBZ lecture hall
11:00-12:30	Heinz-Georg Jahnke, BBZ	Novel aspects of neuropathology processes: an impedance spectroscopy study	BBZ lecture hall
12:30-14:00	Lunch break		
14:00-15:30	Niklas Senghaas, Nikon	Speed, Sensitivity and Resolution: Advances in Confocal and Superresolution microscopy	BBZ lecture hall
April 14 <sup>th</sup> , 2011 in collaboration with 16 <sup>th</sup> Leipziger Workshop Cytometry			
09:00 – 11:00	Heinz-Georg Jahnke and colleagues	Demonstration of impedance work-station, field potential recording work-station	BBZ laboratories 4 <sup>th</sup> floor
		Presentation of different microarray configurations	BBZ laboratories 4 <sup>th</sup> floor
Tutorials			
11:00	F. Preijers	Prerequisites for the development of multi-colour MoAb panels	BBZ lecture hall
11:40	A. Robitzki	Progress in cell and tissue based bioimpedance spectroscopy on microarrays	BBZ lecture hall
12:20	A. Pierzchalski	Impedance Flow Cytometry – Principles, instruments and Applications	BBZ lecture hall
12:50	Practical Demos / Visit the booths – Lunch break		
13:20	A. Mittag	Image Cytometry	BBZ lecture hall
13:50	C. Vallan	Intelligent Gates - The New FlowJo Tools	BBZ lecture hall
14:20	R. Edwards	DRAQ5 and DRAQ7	BBZ lecture hall
14:50	H. Holland	Authentication of cells in therapy research applying cytogenetics and genome wide high-resolution single-nucleotide polymorphism array	BBZ lecture hall
15:20	Practical Demos / Visit the booths – Coffee break		
15:50	A. Baumgartner	Spectral Imaging and single-cell interphase FISH - towards the enumeration of all 24 different human chromosomes	BBZ lecture hall
16:20	R. F. Murphy	Creation of an international cytometry certification:update & Q&A	BBZ lecture hall
17:00	G. Nolan	Polychromatic Phospho-Flow technique, mechanistic, and clinical applications	BBZ lecture hall

**Didactic elements:**

Lectures, discussions, practical training – lab demonstration

**Expected performance:**

Active participation in discussions during lab demonstration (selected work stations)