

Protein Trafficking in the Endomembrane System						
Identification number	Workload	Credit points	Term of studying	Frequency of occurrence	Duration	
MN-B-SM (GP 1)	360 h	12 CP	1 <sup>st</sup> or 2 <sup>nd</sup> term of studying	Winter term, 1 <sup>st</sup> half	7 weeks	
<b>1</b>	<b>Type of lessons</b>		<b>Contact times</b>	<b>Self-study times</b>	<b>Intended group size*</b>	
	a) Lectures		16 h	32 h	max. 6	
	b) Practical/Lab		155 h	129 h	max. 1	
	c) Seminar		4 h	24 h	max. 2	
<b>2</b>	<b>Aims of the module and acquired skills</b> Students who successfully completed this module ... <ul style="list-style-type: none"> <li>• have acquired detailed knowledge about the major protein trafficking pathways in eukaryotic cells, molecular factors of intracellular sorting machineries and their interplay with membrane lipids and the cytoskeleton.</li> <li>• have acquired experimental skills in state-of-the art methods of cell biology, biochemistry and biophysics and can independently carry out small scientific projects related to the topic of the module.</li> <li>• 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.</li> <li>• are able to transfer skills acquired in this module to other fields of biology.</li> </ul>					
<b>3</b>	<b>Contents of the module</b> <ul style="list-style-type: none"> <li>• Intracellular trafficking routes and their regulation in different model organisms (human, mouse, yeast, plants)</li> <li>• Analysis of post-translationally modified proteins, SDS-PAGE electrophoresis and Western blotting</li> <li>• Protein purification using column chromatography</li> <li>• Recombinant protein expression</li> <li>• Synthesis and analysis of membrane-active peptides</li> <li>• Analysis of protein-protein, protein-lipid and peptide/lipid interactions</li> <li>• Surface Plasmon resonance</li> <li>• Gene knockdown</li> <li>• Isolation of primary cells from transgenic animals</li> <li>• Culture and transfection of animal, human and plant cells</li> <li>• Cell-viability assays</li> <li>• Separation and purification of membrane compartments by differential centrifugation</li> <li>• Site-directed mutagenesis</li> <li>• Inducible expression systems</li> <li>• Immunofluorescence</li> <li>• Laser confocal scanning microscopy</li> </ul> <p><i>Explanatory note</i> The above list comprises techniques used in the participating groups in the context of this module. The exact content for each student will depend on the research project.</p>					

4	<p><b>Teaching/Learning methods</b></p> <ul style="list-style-type: none"> <li>Lectures; Practical/Lab (Project work); Seminar; Guidance to independent research; Training on presentation techniques in oral and written form</li> </ul>
5	<p><b>Requirements for participation</b></p> <p>Enrollment in the Master's degree course "Biological Sciences" or in the Master's degree course "Biochemistry"</p>
6	<p><b>Type of module examinations</b></p> <p>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)</p>
7	<p><b>Requisites for the allocation of credits</b></p> <p>Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)</p>
8	<p><b>Compatibility with other Curricula</b></p> <p>Biological subject module in the Master's degree course "Biochemistry"</p>
9	<p><b>Significance of the module mark for the overall grade</b></p> <p>In the Master's degree course "Biological Sciences": 15 % of the overall grade (see also appendix of the examination regulations)</p>
10	<p><b>Module coordinator</b></p> <p>Prof. Dr. Stefan Höning, phone 480-3656, e-mail: shoening@uni-koeln.de</p>
11	<p><b>Additional information</b></p> <p><b>Subject module</b> of the Master's degree course "Biological Sciences", <b>Focus of research:</b> (G) Genetics and Cell Biology; (P) Molecular Plant Sciences</p> <p><b>Participating faculty:</b> Prof. Dr. B. Becker, Prof. Dr. S. Höning, Prof. Dr. I. Neundorf, Dr. M. Plomann, Dr. S. Schellmann</p> <p><b>Literature:</b></p> <ul style="list-style-type: none"> <li>Alberts, B., Bray, D., Lewis, J. (2008) <i>Molecular Biology of the Cell</i>. 5<sup>th</sup> edition, Taylor &amp; Francis</li> <li>Lodish, H., Berk, A., Kaiser, C.A. <i>et al.</i> (2007) <i>Molecular Cell Biology</i>. 6<sup>th</sup> edition, Palgrave Macmillan</li> </ul> <p><b>General time schedule:</b> Week 1-6 (Mon.-Fri.): Lectures, practical/lab, writing seminar paper and preparation for the seminar talk (held at the end of week 6); Week 7 (Mon.-Fri.): Preparation for the written examination</p> <p><b>Note:</b> 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.</p> <p><b>Introduction to the module:</b> October 09, 2017 at 9.15 a.m., Cologne Biocenter, room 0.013 (ground floor)</p> <p><b>Written examination:</b> November 24, 2017; more details will be given at the beginning of the module</p>

\* 5 students from the Master's degree course "Biological Sciences" and 1 student from the Master's degree course "Biochemistry".