

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 st or 2 nd term of studying	Winter term, 2 nd half	7 weeks	
1	Type of lessons		Contact times	Self-study times	Intended group size	
	a) Lectures		16 h	32 h	max. 5	
	b) Practical/Lab		155 h	129 h	max. 2	
	c) Seminar		4 h	24 h	max. 2	
2	Aims of the module and acquired skills Students who successfully completed this module ... <ul style="list-style-type: none"> • 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. • 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. • 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. • are able to transfer skills acquired in this module to other fields of biology. 					
3	Contents of the module <ul style="list-style-type: none"> • Intracellular trafficking routes and their regulation in different model organisms (human, mouse, yeast, plants) • Analysis of post-translationally modified proteins, SDS-PAGE electrophoresis and Western blotting • Protein purification using column chromatography • Recombinant protein expression • Synthesis and analysis of membrane-active peptides • Analysis of protein-protein, protein-lipid and peptide/lipid interactions • Surface Plasmon resonance • Gene knockdown • Isolation of primary cells from transgenic animals • Culture and transfection of animal, human and plant cells • Cell-viability assays • Separation and purification of membrane compartments by differential centrifugation • Site-directed mutagenesis • Inducible expression systems • Immunofluorescence • Laser confocal scanning microscopy <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>Teaching/Learning methods</p> <ul style="list-style-type: none"> Lectures; Practical/Lab (Project work); Seminar; Guidance to independent research; Training on presentation techniques in oral and written form
5	<p>Requirements for participation</p> <p>Enrollment in the Master´s degree course "Biological Sciences"</p>
6	<p>Type of module examinations</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>Requisites for the allocation of credits</p> <p>Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)</p>
8	<p>Compatibility with other Curricula</p> <p>None</p>
9	<p>Significance of the module mark for the overall grade</p> <p>15 % of the overall grade (see also appendix of the examination regulations)</p>
10	<p>Module coordinator</p> <p>Prof. Dr. Burkhard Becker, phone 470-7022, e-mail: b.becker@uni-koeln.de</p>
11	<p>Additional information</p> <p>Subject module of the Master´s degree course "Biological Sciences", Focus of research: (G) Genetics and Cell Biology; (P) Molecular Plant Sciences Participating faculty: Prof. Dr. B. Becker, Dr. M. Plomann, Dr. S. Schellmann Literature:</p> <ul style="list-style-type: none"> Alberts, B., Bray, D., Lewis, J. (2008) <i>Molecular Biology of the Cell</i>. 5th edition, Taylor & Francis Lodish, H., Berk, A., Kaiser, C.A. <i>et al.</i> (2007) <i>Molecular Cell Biology</i>. 6th edition, Palgrave Macmillan <p>General time schedule: 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>Note: 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>Introduction to the module: December 02, 2019 at 9.15 a.m., Cologne Biocenter, room 0.013 (ground floor)</p> <p>Written examination: January 31, 2020, second/supplementary examination March 20, 2020; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>