

Study programme: BSc in Biology			
Level: bachelor degree			
Course title: MECHANISMS OF CELL COMMUNICATION			
Lecturers: Prof. Dr Silvana Andric, Prof. Dr Tatjana Kostic			
Status: Obligatory			
ECTS: 6			
Requirements: -			
Learning objectives Objective of this course is to enable students to understand and learn basic terms and principles of the communications between the cells and their environment, as well as the molecules and signaling transduction pathways involved in the transfers of the information in the cells till ultimate effectors systems.			
Learning outcomes At the end of this course students will be able to understand and describe the basic principles in the cellular communication realized via chemical signaling. In addition, students will be able to describe characteristics of intracellular signaling pathways and ways of formation of networks for detection, transduction, transmission, propagation and amplification of the information in order to realized adequate biological response of the cell.			
Syllabus <i>Theoretical instruction</i> Overview of different ways of cellular communications and basic signaling transduction pathways. Receptors and signaling pathways connected with trimeric G-proteins (<u>G</u> - <u>P</u> roteins <u>C</u> oupled <u>R</u> eceptors – GPCRs). Receptors enzymes and receptors connected with enzymes. Receptors and signaling pathways involving proteolysis. Intracellular receptors. Functional organization of the proteins in membranes and their translocation. Basic signaling pathways in apoptosis. <i>Practical instruction</i> Analysis of NO-cGMP signaling pathway will be used to present and learn basic methodological approach(s) required for studying communications between the cells. This will include: RT-PCR; Western blot; stimulation/inhibition of the signaling pathways elements; up (over-expression) and/or down regulation (siRNA, dsRNA, anti-sense) of the signaling pathway element(s); analysis of phosphorylation of the signaling pathway element(s).			
Recommended Literature: Andric S & Kostic T (2007): <i>Mechanisms of cellular communication (script)</i> . WUS Austria. Hancock JT (2005): <i>Cell Signaling</i> . Oxford University Press. Gomperts BD, Kramer IM & Tatham PER (2005): <i>Signal Transduction</i> . Elsevier Academic Press Krauss G (2005): <i>Biochemistry of Signal Transduction and Regulation</i> . Wiley-VCH. Bolander FF (2004): <i>Molecular Endocrinology</i> . Elsevier Academic Press Bradshaw RA & Dennis EA (2004): <i>Handbook of Cell Signaling, three volume set 1-3</i> . Academic Press. Wilson J & Hunt T (2002): <i>Molecular Biology of the Cell Problems Approach Book</i> , 4 th Ed. Garland Science.			
Weekly teaching load			Other:
Lectures: 2	Exercises:	Other forms of teaching: 4	Student research:
Teaching methodology Theoretical part - Lectures Practical part – Combination of laboratory work and computer simulations Seminars - Short presentation of the specified topics			
Grading method (total number of points 100)			
Pre-exam obligations	points	Final exam	points
Practical problems	up to 40	Oral exam	up to 20
Tests	up to 40		