

Name of the subject: Molecular mechanisms of cellular communication		
Teacher(s): Silvana Andric, PhD, professor; Tatjana Kostic, PhD, professor		
Status of the subject: Elective		
Number of ECTS points: 15		
Condition: -		
Goal of the subject Objective of this course is to enable students to understand and learn integrated knowledge of the communications between the cells and their environment, as well as signaling pathways involved in the transfers of the information in the cells till ultimate effectors systems. In addition, students should gain the ability of scientific-based interpretations of the experimental data from the field of molecular mechanisms of cell communications.		
Outcome of the subject At the end of this course students will be able to understand and 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. In addition, students will have ability to critically analyze scientific papers, scientific hypothesis and the experimental data in the field of molecular mechanisms of cell communication and signaling, and to perform experiment form the field of molecular mechanisms of cell communication and signaling.		
Content of the subject <i>Theoretical lectures</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 lectures</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). <i>Seminars.</i> Short presentation of the specified topics connected with the subject of student's PhD thesis. <i>Journal Club.</i> Presentation of the original peer-review scientific paper from the field of molecular mechanisms of cell communication and signaling.		
Recommended literature Bolander FF (2004): <i>Molecular Endocrinology</i> . Elsevier Academic Press Bradshaw RA & Dennis EA (2004): <i>Handbook of Cell Signaling, Three Volumes set 1-3</i> . Academic Press. Conn MP & Means AR (2000): <i>Principles of Molecular Regulation</i> . Humana Press. Gomperts BD, Kramer IM & Tatham PER (2003): <i>Signal Transduction</i> . Elsevier Academic Press Hancock JT (2005): <i>Cell Signaling</i> . Oxford University Press. Krauss G (2005): <i>Biochemistry of Signal Transduction and Regulation</i> . WILEY-VCH. Wilson J & Hunt T (2002): <i>Molecular Biology of the Cell Problems Approach Book 4thed</i> . Garland Science. Review peer-review scientific paper from the field of molecular mechanisms of cell communication and signaling.		
Number of active classes	Theory: 5	Practice: 5
Methods of delivering lectures <i>Theoretical lectures</i> – interactive lectures, consultation, and group discussion. <i>Student research work</i> – active participation in the planing and conducting the experiments, as well as analysis, interpretation and discussion of the results. <i>Seminar</i> – short presentation (10 – 15 minutes) connected with the subject of student's PhD thesis. <i>Journal Club</i> – Presentation of the original peer-review scientific paper from the field.		
Evaluation of knowledge (maximum number of points 100) Student research work –up to 30 points; Seminar – up to 10 points; Presentation of the original scientific paper – up to 10 points; Oral exam – up to 50 points.		