

Study program: REPRODUCTIVE BIOLOGY			
Course title: Stem cell biology			
Teacher: Andjelka Čelić, Miodrag Stojković, Biljana Ljujic			
Course status: elective			
ECTS: 4			
Requirements: none			
Course objectives The course will provide students with knowledge of wide-ranging topics related to stem cell and regenerative biology.			
Learning outcomes Students will learn how and from what sources researchers obtain stem cells, what are the properties that define stem cells and their potential therapeutic uses. Students will also be able to apply knowledge acquired over the duration of the course to their own scientific research as well as to form their own opinions about the political and ethical issues surrounding the stem cell debate.			
Syllabus <i>Lectures</i> History of stem cell biology and nuclear transfer: definitions, classifications, introduction of terms toti-, pluri-, multi- i unipotent. Embryonic and fetal stem cells. Adult stem cells: purpose, properties, localization. What makes a stem cell a stem cell I and II: transcription factors, chromatin structure, DNA methylation and epigenetics. Induced pluripotent stem cells: fibroblast reprogramming, disease modeling. Stem cells and cancer. Therapeutic uses of stem cells in: current and potential treatments of diabetes (β -cells from embryonic and iPS cells), cardiovascular disease (cardiomyocyte transplantation), brain and spinal cord trauma, neurodegenerative diseases (Alzheimer's, Parkinson's, Lou Gehrig's and Huntington's diseases, multiple sclerosis). Stem cells in fertility treatments: culture, selection and transfer of human embryos, reprogramming adult cells to gametes. Genome editing and disease modeling: ZFN, TALEN, CRISPR/Cas9 strategies. Ethical issues concerning stem cells. <i>Other forms of teaching</i> Preparation and presentation of term papers representing themes presented during lectures. Students will select from a list of available topics (or one of their choosing if relevant), conduct critical analysis of one or more primary scientific publications, prepare a presentation of their conclusions to be given in front of their fellow classmates and participate in class discussions on each topic.			
Literature 1. Presentations and other material used during the lectures will be posted on https://moodle.pmf.uns.ac.rs 2. Essentials of Stem Cell Biology, 3 rd edition by Robert Lanza and Anthony Atala, Elsevier 2014 3. Stem Cells: A Short Course, Rob Burgess, Wiley-Blackwell 2016 4. https://www.stembook.org/			
Weekly teaching load			
Lectures: 2		Practical lectures: 0+0+1	
Teaching methods Lectures, discussion of primary literature, student seminars and consultations.			
Evaluation of knowledge (maximum score 100)			
Pre-exam obligation	Points	Final exam	Points
Tests	2x20=40	Test/Written exam	30
Seminar	10	Oral exam	20