

Study program: Doctoral academic studies in biomedical sciences		
Course title: BIODOSIMETRY IN MEDICAL RESEARCH		
Teacher: Jasna M. Mihailović, Radmila R. Žeravica, Branislava P. Ilinčić, Velibor S. Čabarkapa, Ivana M. Urošević, Nataša M. Prvulović Bunović, Jasminka Ž. Mrđanović		
Course status: elective		
ECTS Credits: 20		
Condition: -		
Course aim: Acquiring knowledge about basics of biological effects and mechanisms of action of ionizing radiation on a living organism-cellular and molecular changes as well as the importance of biodosimetry in clinical and research work.		
Expected outcome of the course:		
Knowledge: Candidates should acquire knowledge that will enable him to understand how disorders of homeostatic mechanisms at the cellular and molecular level caused by ionizing radiation can be detected and quantified.		
Skills: The student should be acquainted with the methods used today in the detection of cytogenetic and metabolic changes and their importance in assessing the effects of ionizing radiation.		
Course description		
<i>Theoretical education</i>		
<ul style="list-style-type: none"> • Radioactivity and radiation. Types and sources of radiation • Radiation detection and dosimetry • Mechanisms of radiation action at the cellular and molecular level. Dose-effect relationship. • Cytogenetic changes and genetic basis of the disease. • Sensitivity of individual cellular systems. Individual sensitivity • Basic principles of biodosimetry. • Markers in biodosimetry: chromosomal aberrations, DNA damage, free radicals, dysregulation of gene expression, production of antioxidants and metabolites. • Ionizing radiation biomarkers in epidemiological studies • Useful value of biodosimetric methods in clinical and scientific research. 		
<i>Practical education</i>		
Consultations with the mentor, case reports and detailed consideration of biodosimetric methods used to assess the effect of radiation at the cellular and molecular level.		
Literature		
<i>Compulsory</i>		
<ol style="list-style-type: none"> 1. Cytogenetic Dosimetry: Applications in preparedness for and response to radiation emergencies IAEA, Printed by the IAEA in Austria September 2011 2. Mettler FA Jr, Upton AC: Medical Effects of Ionizing Radiation, 3rd ed. Philadelphia, Pa: Saunders Elsevier, 2008. 3. Mary T. Sproull, corresponding author Kevin A. Camphausen, and Gregory D. Koblentz. Biodosimetry: A Future Tool for Medical Management of Radiological Emergencies. Health Secur. 2017; 15(6): 599–610. 4. Harold M. Swartz, corresponding author Benjamin B. Williams, and Ann Barry Flood. Overview of the principles and practice of biodosimetry. Radiat Environ Biophys. 2014 May; 53(2): 221–232. 5. Paul S, Amundson SA. Development of gene expression signatures for practical radiation biodosimetry. Int J Radiat Oncol Biol Phys. 2008;71(4):1236–44. 		
<i>Additional</i>		
<ol style="list-style-type: none"> 1. Ainsbury EA, Bakhanova E, Barquinero JF, Brai M, Chumak V, Correcher V, et al. Review of retrospective dosimetry techniques for external ionising radiation exposures. Radiat Prot Dosimetry. 2011;147(4):573–92 		
Number of active classes	Theory: 60	Practice: 45
Teaching methods: Interactive lectures and practices; Consultations; Essays		
Student activity assessment (maximally 100 points)		
lectures: 10		
practices: 20		
colloquium: 5		
essay: 10		

