



Study program: Doctoral Academic Studies in Biomedical Sciences		
Name of the subject: BRAIN AGING, REGENERATION AND PLASTICITY		
Teacher(s): Željko D. Živanović, Duško B. Kozić, Jelena V. Ostojić, Marija D. Semnic, Oto F. Barak, Ivan Đ. Čapo, Aleksandar Lj. Knežević, Vojislava V. Bugarski Ignjatović		
Status of the subject: elective		
Number of ECTS points: 20		
Condition: -		
Goal of the subject: The aim of this subject is to present current concepts of physiological brain aging, brain aging in different neurologic and systemic disorders, neuronal injury (via direct and indirect mechanisms) and brain response to this injury. Modern concepts of different patterns of brain aging, non-invasive methods of brain stimulation in neurorehabilitation, as well as advanced imaging methods in dementia, brain aging and regeneration will be demonstrated. Students will be presented with current issues in the fields of advanced neuroimaging, neurorehabilitation, regenerative neurology, clinical psychology, neurophysiology and neuropathology.		
Outcome of the subject: Students will acquire basic knowledge in modern aspects of neuronal injury understanding, brain response to this injury, significance and role of adequate and advanced neuroimaging, neurorehabilitation, different patterns of brain aging and monitoring of the therapeutic interventions. Students will also become familiar with current scientific theoretical and practical knowledge necessary for definition and comprehension of adult neurogenesis regulators, regenerative neurology, and molecular and genetic basis of brain plasticity and neurodegeneration. After acquiring these concepts, student will be able to independently create scientific problems, set aims and convey studies in the field of brain aging, regeneration and plasticity in neuronal injury of different etiology.		
Content of the subject <i>Theoretical lectures</i> <ol style="list-style-type: none"> 1. Neuronal injury and brain response 2. Regulators of adult neurogenesis 3. Molecular and genetic mechanisms of brain plasticity 4. Basics of neurodegenerative processes 5. Physiological brain aging 6. Accelerated brain aging: different patterns 7. Regenerative neurology 8. Non-invasive brain stimulation in neurorehabilitation 9. Advanced structural imaging of brain aging, dementia and brain recovery 10. Molecular basics of physiological and pathophysiological brain aging <i>Practical lectures</i> <ol style="list-style-type: none"> 1. Physiological brain aging: advanced neuroimaging, neurophysiology, neurologic diagnostics 2. Pathophysiological brain aging: advanced neuroimaging, neuropathology, methods of laboratory and other diagnostics 3. Neurorehabilitation: non-invasive methods 4. Brain plasticity: neuroimaging, neurocognitive testing, interventions 5. Regenerative neurology 6. Approach to the patients with accelerated brain aging 		
Recommended literature <i>Obligatory</i> <ol style="list-style-type: none"> 1. Riddle RD (2007). Brain aging: Models, methods and mechanisms, 1st edition. CRC Press. 2. Johns P. Clinical Neuroscience. ScienceDirect 2014. <i>Additonal</i> Will be advised during every lecture of theoretical part		
Number of active classes	Theory: 60	Practice: 45
Methods of delivering lectures: Lectures, workshops, presentations, seminars		
Evaluation of knowledge (maximum number of points 100) activity during lectures: 15 practical course: 20		

seminar: 15

written exam: 50