Course Unit Descriptor

Study Programme: Doctoral Academic Studies in Biochemistry

Course Unit Title: Biochemistry of Aging

Course Unit Code: DSB-628

Name of Lecturer(s): Research Associate Sanja Krstić

Type and Level of Studies: PhD degree

Course Status (compulsory/elective): elective

Semester (winter/summer): winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 15

Prerequisites: None

Course Aims:

The objective of the course is understanding and acquiring knowledge about molecular basis and mechanisms and aging; to acquire the necessary knowledge of the causes of aging (at the molecular level), as well as the relationship between aging and the development of different types of diseases.

Learning Outcomes:

The student should, through the course, gain insight into the correlation of the aging process with various pathophysiological changes and to help him acquire the knowledge in the future scientific-research career. The student is expected to be able to select and use scientific literature independently and carefully and to present the results obtained in experimental work or research, in oral and written form, and thus developing a critical opinion on the subject matter of this course.

Syllabus:

Theory

Cellular bioavailability and bioavailability of nutrients and bioactive food molecules; Biochemical theories of aging (*Programmed Longevity, Endocrine Theory, Cross-linking theory, Free radicals theory, Somatic DNA damage theory, Hayflick limit theory of aging, etc*.). Defining concepts of *structural biochemistry* and *cellular aging*. Biochemical basis of nature and causes of aging. The influence of endogenous agents in the biochemical progression of aging. Biochemical markers of aging. The consequence of aging from the molecular aspect; occurrence of various diseases: cancer, cardiovascular, neurodegenerative. Prolonging the aging process. Methods for assessment of the molecular aging process.

Practice

Getting acquainted with the methods and protocols used to observe and study molecular aging mechanisms. Planning, setting up experiments and applying methods based on free radical biochemical theory of aging. Processing of obtained data.

Required Reading:

1. Knight, J. A. (2001) The Biochemistry of Aging. Academic Press Inc.
2. Malavolte, M., Mocchegiani, E. (2016) Molecular Basis of Nutrition and Aging
3. Kunlin, J. (2010) Modern Biological Theory of Aging. *Aging Disease*, 1: 72-74
4. Rodwell,V.W. et al. (2015) Harper`s Illustrated Biochemistry, Mc Graw Hill Education
5. Rothstein, M. (1975) Aging and the alteration of enzymes: a review. *Mechanisms of Ageing and Development*, 4:325-338
6. Berlet, B., Stadtman, E (1997) Protein Oxidation in Aging, Disease, and Oxidative Stress: Mini review. The

Journal of Biological Chemistry, 15: 20313-20316		
Weekly Contact Hours: 10	**Lectures:** 5	**Practical work:** 5
Teaching Methods: Lectures, laboratory work, study projects		
Knowledge Assessment (maximum of 100 points): 100		

Pre-exam obligations	points	**Final exam**	points
Active class participation		written exam	45
Project presentation	30	oral exam	25
Preliminary exam(s)		…….	
Seminar(s)			

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.