

Course title: MODERN RESEARCH METHODS IN CYTOPHYSIOLOGY AND CYTOPATHOLOGY

ECTS credit allocation (and other scores): 2

Semester: autumn

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 30 h.

Course coordinator/ Department and e-mail: Agata Żmijewska and Marta Kieżun; Department of Animal Anatomy and Physiology; agata.zmijewska@uwm.edu.pl, marta.kiezun@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Application of methods for studying apoptosis processes in cells – TUNEL labeling, determination of the activity of caspase or annexin V. Methods for testing cytotoxicity and metabolic activity cells (MTT test, LDH activity determination). Analysis of the reactive oxygen species in cells cultured in vitro. The extracellular vesicles, their importance in intercellular signaling, and methods of their research. Study of the activation of selected signaling pathways.

LECTURES: The fate of cells in the organism - proliferation, apoptosis, necrosis, pyroptosis, ferroptosis, and autophagy. Disorders in the processes of cell apoptosis and proliferation, and their consequences for the organism. Growth and development factors cells and molecules related to cell adhesion.

LEARNING PURPOSE: The subject aims to understand the mechanisms of cytophysiology and cytopathology, including studying the modern analytic methods of the cell death processes determination; the role of extracellular vesicles as signaling molecules, and the importance of adhesive molecules in the processes of cell communication.

On completion of the study programme the graduate will gain:

KNOWLEDGE: Student knows and understands possible fates of cells in the body and the consequences of cytopathological processes for the body; adhesion mechanisms, the role of extracellular vesicles in cellular communication and the use of modern techniques to study these molecules; work in a biological laboratory and methods of handling biological material.

SKILLS: Student can analyze cytophysiological processes/mechanisms and differentiate cytopathological processes from them; performs analyzes in the field of cytophysiology using advanced analytical methods, presents the results obtained and compares them with the results available in the literature

SOCIAL COMPETENCIES: The student is prepared to work with biological material, analyze the results of biological experiments and draw conclusions based on the results obtained, taking into account the principles of occupational health and safety. Works in a team or independently during the analyzes.

Basic literature: Principles and techniques of biochemistry and molecular biology, seventh edition
White, Susan Biochemistry and Molecular Biology Education, 2011, Vol.39 (3), p.244-245,
Cell and molecular biology Autor Chandar, Nalini. copyright © 2024

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 32 h.

Student's independent work: 18 h.