University of Gdańsk

Subject card

Subject name and code	Mechanisms of cell death, PG_00154744						
Field of study	Biology						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2025/2026			
Education level	postgraduate studies		Subject group	Obligatory subject group in the field of study Optional subject group			
Mode of study	full-time studies		Mode of delivery	at the university			
Year of study	2		Language of instruction	Polish			
Semester of study	3		ECTS credits	1.0			
Learning profile	academic		Assessment form				
Conducting unit	Katedra Biologii i Genetyki Medycznej -> Faculty of Biology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Anna Herman-Antosiewicz				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	15		2.0		8.0	25
Subject objectives	Gaining knowledge about the signaling pathways leading to cell death and its course. Understanding the importance of cell death in the development of organisms. Understanding the relationship between anomalies in the course of programmed cell death and developmental disorders and diseases of organisms. Acquiring the ability to select experimental methods to study cell death.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOLMU2_W04] the graduate has an in-depth knowledge of the chosen specialisation in the biological sciences	- describes the types of cell death and characterizes the main signaling pathways leading to aging and cell death - explains the role of organelles involved in the process of cell death or aging	[SW4] test/exam - oral or written
[BIOLMU2_W05] the graduate knows and understands the dynamic development of the biological sciences and new research directions and disciplines	recognizes the dynamic development of sciences examining the molecular basis of aging and cell death and their importance in biology and medicine	[SW4] test/exam - oral or written
[BIOLMU2_W08] the graduate is familiar with the wealth of contemporary experimental approaches and techniques in the biological sciences and their use to solve the tasks at hand	is able to describe and select appropriate experimental techniques to study the mechanisms of cell death	[SW4] test/exam - oral or written
[BIOLMU2_K05] the graduate is prepared to use recognised sources of scientific and popular information in the biological sciences to further his or her knowledge	understands the need to use recognized sources of scientific and popular science information in order to deepen knowledge	[SK4] test/exam - oral or written [SK8] observation of student's independent or team work
[BIOLMU2_U02] the graduate is able to make proficient use of the scientific literature of the biological speciality studied	is able to use scientific literature on cell death research	[SU4] test/exam - oral or written

Subject contents

Programmed and regulated cell death (PCD and RCD) - features, types and role in organisms. Signaling pathways activating apoptosis. The role of mitochondria and lysosomes in cell death. Involvement of death receptors in RCD. Bcl-2 protein family. Caspases and other enzymes of the RCD execution phase. Autophagy-related death. Types of necrotic death. Cell response to damage to genetic material, hypoxia, chemical and oxidative stress. The role of PCD and RCD in the development of the human nervous and immune system. Signaling pathways inhibiting RCD and their role in oncogenesis. Programmed cell death in diseases and aging processes of organisms. Methods of examining cell death.

Prerequisites and co-requisites

Basic knowledge of molecular biology and biochemistry. Ability to read and understand scientific works in English.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written final colloquium	51.0%	100.0%

Recommended reading

Basic literature	The lecture is an original study of issues related to programmed cell death based on many years of study of source literature and my own work. Literature is regularly suggested to students during lectures.
Supplementary literature	Additional literature is suggested to students on an ongoing basis during lectures. These are published reviews and experimental works, including the works of the presenter, such as: - Singh SV, Srivastava SK, Choi S, Lew KL, Antosiewicz J, Xiao D, Zeng Y, Watkins SC, Johnson CS, Trump DL, Lee YJ, Xiao H, Herman-Antosiewicz A. (2005) Sulforaphane-induced cell death in human prostate cancer cells is initiated by reactive oxygen species. J. Biol. Chem. 280: 19911-19924 - Choi S, Lew KL, Xiao H, Herman-Antosiewicz A, Xiao D, Brown CK, Singh SV. (2007) Apoptosis induction by broccoli-derived cancer chemopreventive agent sulforaphane is regulated by IAP family proteins and Apaf-1. Carcinogenesis 28: 151-162. - Herman-Antosiewicz A, Johnson DA, Singh SV. (2006) Sulforaphane causes autophagy to inhibit release of cytochrom c and apoptosis in human prostate cancer cells. Cancer Res. 66: 5828-5835. - Pyrczak-Felczykowska A, Reekie TA, Jąkalski M, Hać A, Malinowska M, Pawlik A, Ryś K, Guzow-Krzemińska B, Herman-Antosiewicz A. (2022) The isoxazole derivative of usnic acid induces an ER stress response in breast cancer cells that leads to paraptosis-like cell death. Int J Mol Sci. 2022 Feb 4;23(3):1802. - Gimła M., PyrczakFelczykowska A., Malinowska M., HaćA., Narajczyk M., Bylińska I., Reekie T., Herman-Antosiewicz A (2023) The pyrazole derivative of usnic acid inhibits the proliferation of pancreatic cancer cells in vitro and in vivo. Cancer Cell International 23(210): 1-13
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Work placement

Not applicable

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