

Subject card

Subject name and code	Mechanisms of cell death, PG_00154203						
Field of study	Mechanizmy śmierci komórek (Wykład)						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2024/2025		
Education level	Master's studies		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		credit		
Conducting unit	Department of Medical Biology and Genetics -> Faculty of Biology -> Rector						
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
	[BIOLMEDMU2_K02] is willing to recognise the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem on his/her own	understands the need to use recognized sources of scientific information and popular science to deepen knowledge	[SK4] test/egzamin - ustny lub pisemny [SK8] obserwacja samodzielnej lub zespołowej pracy studenta
	[BIOLMEDMU2_U01] can proficiently, but critically, use scientific literature and databases necessary in the field of medical biology and related disciplines	uses scientific literature on cell death research	[SU4] test/egzamin - ustny lub pisemny
	[BIOLMEDMU2_W04] knows the principles of research planning based on the achievements of biological and medical sciences, the principles of the operation of equipment and apparatus used in medical biology research, and the principle of interpreting biological phenomena and processes based on empirical data in research and practical activities	can describe and select appropriate experimental techniques used in research on cell death mechanisms	[SW4] test/egzamin - ustny lub pisemny
	[BIOLMEDMU2_W02] is familiar with currently discussed problems in medical biology and related disciplines	is familiar with currently discussed problems regarding aging and cell death and their importance in biology and medicine	[SW4] test/egzamin - ustny lub pisemny
	[BIOLMEDMU2_W01] has in-depth knowledge of scientific fields and disciplines relevant to medical biology and the specialty being studied, and knows their main development trends	- describes the types of cell death and characterizes the main signaling pathways leading to cell senescence and death - explains the role of organelles involved in the process of cell death	[SW4] test/egzamin - ustny lub pisemny
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 papers 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, Jąkański 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., Hać A., 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	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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