

Subject card

Subject name and code	Mechanisms of cell death, PG_00211654						
Field of study	Medical Biology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Master's 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		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	0.0	15.0	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_W02] is oriented to the currently debated problems in medical biology and related disciplines	is familiar with the currently discussed problems regarding aging and cell death and their importance in biology and medicine	[SW4] test/exam - oral or written
	[BIOLMEDMU2_K02] is ready to recognize the importance of knowledge in solving cognitive and practical problems and to seek expert advice when having difficulty solving a problem on his own	understands the need to use recognized sources of scientific information and popular science to deepen knowledge	[SK8] observation of student's independent or team work
	[BIOLMEDMU2_W01] has an in-depth knowledge of scientific fields and disciplines relevant to medical biology and the studied specialty and knows their main development trends	- describes the types of cell death and characterizes the main signaling pathways leading to cell aging and death - explains the role of organelles involved in the process of cell death or aging	[SW4] test/exam - oral or written
	[BIOLMEDMU2_W04] knows the principles of planning research based on the achievements of biological and medical sciences, the principles of 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 work and practical activities	can describe and select appropriate experimental techniques used in research on cell death mechanisms	[SW4] test/exam - oral or written
	[BIOLMEDMU2_U01] can proficiently, but critically, use the scientific literature and databases necessary in the activities of medical biology and related disciplines	uses scientific literature on cell death research	[SU1] oral statement/conversation/discussion [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
	Final test	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, Jąkowski 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	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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