

Subject card

Subject name and code	Functioning of organisms at the molecular level, PG_00207432						
Field of study	Biology						
Date of commencement of studies	October 2026		Academic year of realisation of subject			2028/2029	
Education level	Bachelor's studies		Subject group			Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study	
Mode of study	full-time studies		Mode of delivery			at the university	
Year of study	3		Language of instruction			Polish	
Semester of study	5		ECTS credits			1.0	
Learning profile	academic		Assessment form			credit	
Conducting unit							
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		1.0		9.0	25
Subject objectives	Knowledge and understanding of processes related to the variability of genetic material and its consequences. Ability to select methods and techniques for examining the impact of genetic and epigenetic changes on cell biology and interpreting the results. Ability to give oral presentations and independently search for information.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOLL3_W07] knows the development of biology as a science, its connections with other disciplines and the principles of using biological knowledge in the economy and social life, including ways that are entrepreneurial		
	[BIOLL3_W05] has advanced knowledge of experimental methods, laboratory and field techniques, and the principles of planning and conducting biological research		
	[BIOLL3_W02] knows and understands at an advanced level the structure and properties of biological macromolecules, mechanisms of metabolism, flow of genetic information, sources of variation in organisms; rules of inheritance	knows the molecular mechanisms of variability of genetic information and its impact on the functioning of cells and entire organisms	[SW2] presentation/project/paper/report [SW3] text preparation/written work
	[BIOLL3_U05] is able to prepare written papers and oral presentations on biological issues, using specialized terminology		
	[BIOLL3_U03] is able to search for, select and critically analyze information from various sources, including scientific literature and electronic databases, as well as read and understand scientific texts in Polish and English		
	[BIOLL3_U02] is able to use statistical methods, IT tools and data analysis techniques to describe biological phenomena, as well as synthesize information from various sources and formulate correct conclusions based on them		
	[BIOLL3_K05] is ready to perform professional roles responsibly, both individually and in teams, including organizing the work of small teams and taking joint responsibility for the implementation of assigned tasks and the results achieved.		
Subject contents	Control of the frequency of initiation of replication and transfer of DNA to daughter cells in connection with the cell cycle in eukaryotic cells. Transmission of DNA damage signals in eukaryotic cells. Chromatin structure and gene expression. Variability of genetic material: mutagenesis and DNA repair processes, mobile genetic elements, genome rearrangements. Molecular basis of cancer		
Prerequisites and co-requisites	Basic knowledge of the biology of nucleic acids and eukaryotic cells, understanding the relationship between genotype and phenotype		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test covering material from lectures	51.0%	100.0%
Recommended reading	Basic literature	Lewin B. Genes VIII. Oxford University Press, USA, 2004 Lodish H. i wsp. Molecular Cell Biology. W.H.Freeman &Co., 2016, New York Węgleński P. Genetyka molekularna, PWN, Warszawa, 2008 Alberts i wsp. Podstawy biologii komórki, PWN, Warszawa, 2009-2016	

	Supplementary literature	Materials indicated by the lecturer, including: Herman-Antosiewicz A, Stan SD, Hahm ER, Xiao D, Singh SV. (2007) Activation of a novel ataxia-telangiectasia mutated and Rad3 related/ checkpoint kinase 1-dependent prometaphase checkpoint in cancer cells by diallyl trisulfide, a promising cancer chemopreventive constituent of processed garlic. Mol Cancer Ther. 6:1249-61. Herman-Antosiewicz A, Kim Y-A, Kim S-H, Xiao D, Singh SV. (2010) Diallyl trisulfide-induced G2/M phase cell cycle arrest in DU145 cells is associated with delayed nuclear translocation of cyclin-dependent kinase 1. Pharm. Res. 27: 1072-1079. Hać A., Brokowska J., Rintz E., Bartkowski M., Węgrzyn G., Herman-Antosiewicz A. (2019) Mechanism of selective anticancer activity of isothiocyanates relies on differences in DNA damage repair between cancer and healthy cells. Eur J Nutr. 59(4):1421-1432 Zdrowowicz M, Spisz P, Hać A, Herman-Antosiewicz A, Rak J. (2022) Influence of Hypoxia on Radiosensitization of Cancer Cells by 5-Bromo-2'- deoxyuridine. Int J Mol Sci. 2022 Jan 27;23(3):1429
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Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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