

Subject card

Subject name and code	Functioning of organisms at the molecular level, PG_00072770						
Field of study	Molekularne podstawy funkcjonowania organizmów (Wykład)						
Date of commencement of studies	October 2023		Academic year of realisation of subject			2025/2026	
Education level	Bachelor's studies		Subject group				
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	0.0	0.0	15		
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 - applies to tutorial						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOLL3_W02] the graduate has an advanced understanding of the structure and properties of biological macromolecules, the molecular mechanisms of the basal metabolic pathways and genetic information flow and the sources of variation in organisms; the rules of inheritance	knows the molecular mechanisms of variability of genetic information and its impact on the functioning of cells and entire organisms	[SW4] test/egzamin - ustny lub pisemny
	[BIOLL3_W14] the graduate knows the theoretical basis of experimental methods and the most important techniques of the biological sciences	explains the connections between the achievements of molecular biology and the possibilities of its use in socio-economic life	[SW4] test/egzamin - ustny lub pisemny [SW2] prezentacja/projekt/referat/raport
	[BIOLL3_W16] the graduate knows and understands the relationship between the achievements of the chosen field of science and discipline of natural sciences and the possibilities of their use in socio-economic life, taking into account the sustainable use of biodiversity	explains the connections between the achievements of molecular biology and the possibilities of its use in socio-economic life	[SW4] test/egzamin - ustny lub pisemny [SW2] prezentacja/projekt/referat/raport
	[BIOLL3_U05] the graduate is able to synthesise data from various sources and draw appropriate conclusions on this basis	synthesizes data from various sources and draws appropriate conclusions on this basis, which is used in the preparation of presentations - applies to tutorial	[SU2] prezentacja/projekt/referat/raport
	[BIOLL3_U10] the graduate is able to prepare oral presentations in Polish and in a foreign language on specific topics in the field of biology	can give oral presentations in Polish on specific issues related to the molecular basis of the functioning of organisms - applies to tutorial	[SU1] wypowiedź ustna/rozmowa/diskusja [SU2] prezentacja/projekt/referat/raport
	[BIOLL3_K03] the graduate is ready to organise the work of a small team and to work effectively as part of a team	can organize the work of a small team and demonstrates the ability to work effectively in a team - applies to tutorial	[SK2] prezentacja/projekt/referat/raport
[BIOLL3_U06] the graduate can read with comprehension simple scientific biological texts in Polish and simple texts in English	reads and understands scientific texts in Polish and simple texts in English	[SU2] prezentacja/projekt/referat/raport [SU4] test/egzamin - ustny lub pisemny	
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; wydanie VII jest dostępne online; Lodish H. i wsp. Molecular Cell Biology. W.H.Freeman &Co., 2016, New York, (wydanie IV z 2002 r. jest dostępne online). 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 chase 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	
	eResources addresses		
Example issues/ example questions/ tasks being completed			

Work placement	Not applicable
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