

**Subject card**

<b>Subject name and code</b>	Functioning of organisms at the molecular level, PG_00072770						
<b>Field of study</b>	Molekularne podstawy funkcjonowania organizmów (Wykład)						
<b>Date of commencement of studies</b>	October 2022	<b>Academic year of realisation of subject</b>			2024/2025		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>					
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	3	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	5	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			credit		
<b>Conducting unit</b>							
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		prof. dr hab. Anna Herman-Antosiewicz				
	<b>Teachers</b>		prof. dr hab. Anna Herman-Antosiewicz				
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	15		0.0		0.0	15
<b>Subject objectives</b>	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.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOLL3_W16] the graduate knows and understands the relationship between the achievements of the selected 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
	[BIOLL3_W14] the graduate knows the theoretical basis of experimental methods and the most important techniques of biological sciences	explains the theoretical basis of experimental methods; lists the most important techniques for examining the genetic material and the response of cells to its changes	[SW4] test/egzamin - ustny lub pisemny
	[BIOLL3_W02] the graduate knows the structure and properties of biological macromolecules, the molecular mechanisms of basal metabolic pathways and genetic information flow and the sources of variation in organisms; the rules of inheritance	knows the molecular mechanisms of the variability of genetic information and its impact on the functioning of cells and entire organisms	[SW4] test/egzamin - ustny lub pisemny
	[BIOLL3_U10] the graduate is able to prepare oral speeches in Polish and foreign language concerning specific issues in biology	has the ability to 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/ dyskusja [SU2] prezentacja/projekt/referat/ raport
	[BIOLL3_U06] the graduate can read with understanding simple scientific biological texts in Polish and simple texts in English	reads and understands scientific texts in Polish and simple texts in English	[SU1] wypowiedź ustna/rozmowa/ dyskusja [SU2] prezentacja/projekt/referat/ raport [SU4] test/egzamin - ustny lub pisemny
	[BIOLL3_U05] the graduate is able to synthesise data from a variety of 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	[SU1] wypowiedź ustna/rozmowa/ dyskusja [SU2] prezentacja/projekt/referat/ raport
[BIOLL3_K03] the graduate is ready to organize the work of a small team and to work effectively in a team environment	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	
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, Hahn 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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