University of Gdańsk

Subject card

Subject name and code	Molecular biology of a eukaryotic cell, PG_00147175						
Field of study	Genetics and Experimental Biology						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
Education level	undergraduate studies		Subject group		Obligatory subject group 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				
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	0.0	0.0	20.0	0.0	0.0	20
	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	20		1.0		4.0	25
Subject objectives	Learning and understanding the processes related to the expression of genetic material, its variability and its consequences, becoming familiar with the most important intracellular signaling pathways, acquiring the ability to use laboratory methods and techniques for studying the biology of eukaryotic cells						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GBEL3_W05] the principles of research planning based on achievements in biological sciences and related fields, the potential application of their results in practice, the principles of operation of equipment and apparatus used in molecular genetics research, and the principle of interpreting biological phenomena and processes based on empirical data in research and practical activities, with consideration for sustainable use of biological diversity.	knows the most important techniques used to study the response of a eukaryotic cell to factors damaging the genetic material or cytoskeleton	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[GBEL3_K08] Responsibility for entrusted equipment/materials and respect for the work of others.	is responsible for the entrusted equipment/materials and his/her work and respects the work of others	[SK8] observation of student's independent or team work
[GBEL3_K07] Lifelong learning and updating knowledge in the field of molecular genetics and other disciplines.	understands the need for lifelong learning and updating knowledge regarding the molecular basis of the functioning of eukaryotic cells	[SK8] observation of student's independent or team work
[GBEL3_W03] The molecular mechanisms of genetic information transmission and gene expression, as well as the molecular and genetic basis of human physiology and diseases, including infectious diseases.	describes the molecular mechanisms of expression and variability of genetic information and the reactions of cells to DNA damage and organelles to stressful conditions	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[GBEL3_W01] Understanding the structure and properties of basic types of biological macromolecules, molecular mechanisms of metabolic pathways and genetic information flow, as well as sources of genetic variability in organisms and mechanisms of evolution; explaining the rules of inheritance, elucidating differences in the structure and functioning of prokaryotic and eukaryotic cells, and understanding the structure and functional relationships at the cellular and tissue levels.	describes the molecular mechanisms of expression and variability of genetic information and the reactions of cells to DNA damage and organelles to stressful conditions	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[GBEL3_U03] Proficient in using research equipment and tools, while following the correct sequence of procedures, to conduct basic physical, biological, or chemical observations and measurements in laboratory work within the field of biological sciences.	uses basic research equipment and tools in the manipulation of mammalian cells and, maintaining the correct sequence of activities, performs simple experiments using them	[SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
[GBEL3_K05] Responsibility for the safety of one's own work and others.	is responsible for the safety of his/her own and others' work	[SK8] observation of student's independent or team work
[GBEL3_W06] the development and current state of knowledge, as well as the latest trends in molecular genetics and related fields; indicating their relationship with other disciplines in the natural or medical sciences and the possibilities of their practical application.	is aware of the current state of knowledge and the latest trends in molecular biology, indicates their relationship with other disciplines of natural or medical sciences	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report

Subject contents

methods of culturing Eukaryotic cells, viability tests, determination of metabolic activity, methods for testing the mutagenic potential of chemical agents, methods for testing cell organelles, methods for testing human cell death.

Prerequisites and co-requisites

Basic knowledge of cell biology, molecular biology, biochemistry, genetics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
the final grade is determined on the basis of points obtained from partial tests and reports from laboratory classes	51.0%	100.0%

Recommended reading	Basic literature	1. Molecular Cell Biology, Lodish H., Berk A., Zipursky S.L., Matsudaira P., Baltimore D., Darnell J.E.; W.H. Freeman and Company, 2000 2. Molecular Biology of the Cell, Alberts B., Johnson A., Lewis J., Raff M., Roberts K., Walter P.; 2002 3. Genes VIII, Lewin B., Benjamin Cummings, 2004 4. Biochemia, Berg J.M., Stryer L., Tymoczko J.L., wydanie polskie, PWN, 2007
	Supplementary literature	- 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. 23(3):1429; - 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; - Herman-Antosiewicz A, Lew KL, Xiao H, Singh SV. (2007) Induction of p21 protein protects against sulforaphane-induced mitotic arrest in LNCaP human prostate cancer cell line. Mol Cancer Ther. 6: 1673-81; - 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 6:1249-61; - Nowakowska-Gołacka J, Sominka H, Sowa-Rogozińska N, Słomińska-Wojewódzka M. (2019) Toxins Utilize the Endoplasmic Reticulum-Associated Protein Degradation Pathway in Their Intoxication Process. Int J Mol Sci, 20 (6).
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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