University of Gdańsk

Subject card

Subject name and code	Experimental medicine, PG_00192261		
Field of study	Biotechnology		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	English
Semester of study	3	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Aleksandra Markiewicz	
	Teachers	dr hab. Aleksandra Markiewicz	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	0.0	0.0	30.0	30

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	30	5.0	15.0	50

Subject objectives

The aim of the course is to familiarize students with the research approach in the analysis and validation of molecular markers potentially useful in clinical practice.

During classes, the student will:

- demonstrate knowledge of research models used to characterize biological and clinical significance of a molecular marker, terminology and conceptual apparatus for molecular diagnostics, precision medicine

- acquire competences enabling planning of a research path aimed at demonstrating the biological significance and clinical utility of a molecular marker in precision medicine.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHMU2_W03] The graduate knows and understands concepts of therapy and diagnostic methods of human diseases, including the mechanisms of action of selected drugs, immunotherapy and gene therapy.	The student understands the relationship between the disorder of a given type of molecular marker and the possibilities of using it e.g. in targeted therapy or as a prognostic and predictive marker. Is able to design an experiment aimed at validating the usefulness of a molecular marker	[SW2] presentation/project/paper/ report
[BIOTECHMU2_W01] The graduate has in-depth knowledge of complex biological phenomena at the molecular level and knows their importance for biotechnology.	The student understands the relationship between the disturbance of the level of a molecular marker and the possibility of using this fact, e.g. to detect diseases and monitoring their course.	[SW4] test/exam - oral or written

Subject contents	1. Types of molecular markers.2. Research tools for the analysis of cells, RNA, DNA and protein.3. Preparation of clinical samples for analysis.4. Methodology of working with clinical material.5. Research using in vitro tests.6. Research using animal models.7. Clinical trials.8. Assessment of the usefulness of molecular markers in medicine.9. Analysis of molecular test results.10. Statistical analysis.11. Molecular marker in medicine - the path from the laboratory to the patient.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Final exam - test and open questions	51.0%	80.0%
Presentation of a research task by the student	51.0%	20.0%

Recommended reading

Basic literature	Principles of Translational Science in Medicine. From Bench to Bedside. Martin Wehling. Third edition (2021). ISBN 978-0-12-820493-1
Supplementary literature	1. Lost in translation: the valley of death across preclinical and clinical divide – identification of problems and overcoming obstacles.Attila A. Seyhan. Translational Medicine Communications 4(18), 2019. doi.org/10.1186/s41231-019-0050-7 2. Preclinical mouse solid tumour models: status quo, challenges and perspectives Gengenbacher N et al. Nature Reviews Cancer 17; 2017. doi:10.1038/nrc.2017.92 3. Breast cancer. Harbeck et a. Nature Reviews 5(66); 2019.doi.org/ 10.1038/s41572-019-0111-2
eResources addresses	

Example issues/ example questions/ tasks being completed	• What are the steps of molecular marker validation? • How receiver operating characteristic curve (ROC) allows to select a better diagnostic molecular marker? • Design an in vitro experiment allowing to assess if a given molecular marker is important for increased invasion of a breast cancer cell line. • What are the benefits and limitations of in vitro studies in translational research?
Work placement	Not applicable

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