University of Gdańsk

Subject card

Subject name and code	Medical aspects of cell signalling, PG_00153609		
Field of study	Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	postgraduate 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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
Learning profile	academic	Assessment form	
Conducting unit	Intercollegiate Faculty of Biotechnology UG-MUG		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Rafał Sądej	
	Teachers	prof. dr hab. Rafał Sądej	

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	5.0	30.0	50

Subject objectives

To pass a knowledge about eukaryotic cell signaling, regulation, and disruptions of cellular processes. Emphasis will be placed on signaling pathways that are elements of targered therapies. - the student understands biological phenomena at the molecular level, knows their significance for biotechnology, - the student has advanced knowledge in related scientific fields and disciplines, enabling them to recognize connections and dependencies in nature, - the student has knowledge of issues currently discussed in the relevant literature that are significant in biotechnology

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHMU2_W03] The graduate knows and understands general concepts of therapy and diagnostic methods of human diseases, including the mechanisms of action of selected drugs, immunotherapy and gene therapy	The student knows the basic signaling pathways, their disorders, and the associated diseases. They understand the concept of targeted therapies, their mechanisms, and applications	[SW4] test/exam - oral or written
[BIOTECHMU2_W01] The graduate knows and understands complex biological phenomena at the molecular level, their importance for biotechnology	The student knows and understands the complex molecular mechanisms of human cells, and can relate their importance to biotechnology and other disciplines.	[SW4] test/exam - oral or written
[BIOTECHMU2_W04] The graduate knows and understands selected problems of biotechnology currently discussed in the literature	The student knows and understands contemporary issues and problems in biotechnology, including the development and application of targeted therapies	[SW4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>1. Protein kinases chemical activity, regulation, structure, families of protein kinases, dysregulation of kinase activity, kinase inhibitors in therapy. Protein phosphatases mechanism of action, types of phosphatases. Interdependence of kinase/phosphatase in major signaling cascades.
2. Adhesion receptors importance of cell adhesion, major adhesion receptors integrins and their ligands extracellular matrix proteins, cadherins, selectins, glycosylation of adhesion receptors. Adhesion disorders, cell migration - consequences.
3. G protein-coupled receptors cAMP and phosphatidylinositol signaling pathways. Interleukin-dependent signaling, JAK-STAT factors.
4. Growth factor receptors RTK - family of tyrosine kinase receptors main representatives, classical activation pathway, alternative pathways, RTK signaling disorders, growth factor receptor inhibitors in therapy.
5. Steroid hormone receptors mechanism of action, significance in the physiology of the mammary and prostate glands, disorders in oncology, hormone therapies.
6. Transcription factors link with cellular signaling. Mechanisms of transcription factor activation. Transcription factors in pathology.
• Control of the cell cycle, cell death, autophagy, protein sorting in the cell integrations.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Bachelors degree</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam</td><td>51.0%</td><td>100.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Cell Signalling 4th Edition. JT Hancock</td></tr>
<tr><td>Supplementary literature</td><td>Cellular Signal Transduction in Toxicology and Pharmacology: Data Collection, Analysis, and Interpretation. Boyd Jonathan W. Neubig Richard R.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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