University of Gdańsk

Subject card

Subject name and code	Protein phosphorylation in bacteria, PG_00197620		
Field of study	Biotechnology		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Intercollegiate Faculty of Biotechnology Office -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Michał Obuchowski	
	Teachers	prof. dr hab. Michał Obuchowski	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	14.0	0.0	0.0	0.0	0.0	14

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	14	5.0	31.0	50

Subject objectives

The aim of the course is to provide knowledge about the chemistry of protein phosphorylation and its significance for all living organisms. The student becomes familiar with selected protein phosphorylation systems functioning in various bacterial species at the molecular level, learns to identify the relationships between these systems and the behavior of microorganisms in the environment, and to predict the consequences of their malfunction for bacterial cell physiology and interactions with other living organisms.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHL3_W01] The graduate possesses structured and advanced knowledge of biological phenomena at the molecular level and understands their importance for biotechnology.	The student knows and is able to describe selected protein phosphorylation systems occurring in various bacterial species at the molecular level.	[SW4] test/exam - oral or written
[BIOTECHL3_W03] The graduate possesses structured and advanced knowledge of organism-environment relationships and their importance for understanding biological processes and biotechnological applications.	The student is able to identify relationships between protein phosphorylation systems and microbial behavior in the environment, and to predict the effects of their disruption on bacterial cell physiology and interactions with other organisms.	[SW4] test/exam - oral or written

Subject contents

General concept of regulation of protein activity by phosphorylation. Structure and function of protein kinases and phosphatases. Selected examples of systems using protein phosphorylation such as: regulation of the chemotactic response in bacteria (*E. coli*), operation of the general stress response mechanism (*B. subtilis*), control of the absorption of bioavailable nitrogen (*E. coli*), regulation of virulence (*V. cholerae* and *P. aeruginosa*), formation of bacterial spores (*B. subtilis*), regulation of bacterial bioluminescence (*V. fisheri*, *V. harveyi*), mechanism of acquiring natural genetic competence (*B. subtilis*), regulation of phosphorylation-coupled sugar transport into the cell (*B. subtilis*) .

<table>
<tr><td>Prerequisites and co-requisites</td><td></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>Final colloquium</td><td>51.0%</td><td>100.0%</td></tr>
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<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>"Protein phosphorylation in bacteria" script, literature indicated by the lecturer.</td></tr>
<tr><td>Supplementary literature</td><td>None</td></tr>
<tr><td>eResources addresses</td><td></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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