

Subject card

Subject name and code	Bacterial resistance to antibiotics, PG_00146619						
Field of study	Biology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group		
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		1.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Microbiology -> Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Beata Furmanek-Blaszk				
	Teachers		dr hab. Beata Furmanek-Blaszk				
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		2.0		8.0	25
Subject objectives	1. Understanding the mechanisms of bacterial resistance to antibiotics and the genetic phenomena that detrmine it. 2. Knowledge of antibiotic therapy associated with specific groups of microorganisms. 3. Presentation of threats resulting from the growing resistance to antibiotics and chemotherapeutics.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[BIOLMU2_U03] the graduate can critically analyse and select biological information, especially from electronic sources		Sudent is able to justify the use of specific drugs in the treatment of bacterial infections.		[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written		
	[BIOLMU2_U01] the graduate is able to select and apply research techniques and tools appropriate to the problems of the biological sciences specialisation studied		Student is able to apply various research techniques to determine drug resistance of microorganisms.		[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written		
	[BIOLMU2_W04] the graduate has an in-depth knowledge of the chosen specialisation in the biological sciences		Student has knowledge about groups of antibiotics and their actions as well as the causes of drug resistance.		[SW4] test/exam - oral or written		
	[BIOLMU2_W01] the graduate has an in-depth knowledge and understanding of natural phenomena and processes at different levels of complexity		Student knows and understands the risks associated with the overuse of antibiotics and the complications resulting from their long-term use.		[SW4] test/exam - oral or written		

Subject contents	The major classes of antibiotics. Antibiotics inhibiting the synthesis of the cell wall, cell proteins and nucleic acids. Antibiotics disrupting the osmotic functions of the cytoplasmic membrane. Chemotherapeutics inhibiting the synthesis of essential metabolites. Origin of bacterial resistance to antibiotics. Mechanisms of bacterial resistance to antibiotics. Elimination of antibiotics from the cell on the example of a membrane pumps. Detection of antibiotic resistance genes. Ribosomally synthesized peptide antibiotics. Mechanisms of biofilm formation. Principles of rational antibiotic therapy. Drug resistance of gram-positive cocci and aerobic gram-negative rods.		
Prerequisites and co-requisites	Completed Microbiology course		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	assessment based on a multiple choice test covering lecture material	51.0%	100.0%
Recommended reading	Basic literature	Markiewicz Z., Kwiatkowski Z.A. 2006, Bacteria, antibiotics, drug resistance.	
	Supplementary literature	Review publications selected for students by the lecturer for download from the web. Original articles from scientific journals.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Penicillin G is: A. resistant to low pH B. one of the most potent penicillins against sensitive gram-positive bacteria C. equally active against gram-positive and gram-negative bacteria D. resistant to penicillinases		
Work placement	Not applicable		

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