

Subject card

Subject name and code	Bacterial resistance to antibiotics, PG_00150873						
Field of study	Medical 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						
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 determine 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
	[BIOLMEDMU2_W01] has an in-depth knowledge of scientific fields and disciplines relevant to medical biology and the studied specialty and knows their main development trends	Student has knowledge about groups of antibiotics and their actions as well as the causes of drug resistance	[SW4] test/exam - oral or written
	[BIOLMEDMU2_K02] is ready to recognize the importance of knowledge in solving cognitive and practical problems and to seek expert advice when having difficulty solving a problem on his own	Student understands the need for continuous education in the field of new generation drugs and is aware of their positive and negative effects.	[SK8] observation of student's independent or team work
	[BIOLMEDMU2_W04] knows the principles of planning research based on the achievements of biological and medical sciences, the principles of operation of equipment and apparatus used in medical biology research, and the principle of interpreting biological phenomena and processes based on empirical data in research work and practical activities	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
	[BIOLMEDMU2_U03] is able to formulate and solve problems on the basis of the known laws and methods, including - using computer tools and statistical methods	Student 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
	[BIOLMEDMU2_U02] is able to plan and conduct experiments and measurements based on advanced research techniques and tools, is able to interpret the obtained results and draw conclusions	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
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 to download from the web. Original source works 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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