



Subject card

Subject name and code	Basic Pharmacology, PG_00037514						
Field of study	Biotechnology						
Date of commencement of studies	October 2024		Academic year of realisation of subject			2026/2027	
Education level	first-cycle studies		Subject group			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	3		Language of instruction			Polish	
Semester of study	6		ECTS credits			2.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Agnieszka Potęga				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	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		2.0		18.0	50
Subject objectives	The aim of the course is to deepen students' knowledge of the fundamentals of pharmacology, particularly the molecular mechanisms of action of medicinal substances, pharmacokinetics, pharmacodynamics, and the safety of their use, as well as to develop engineering competencies in applying knowledge of chemistry and biochemistry to analyse and predict the properties of medicinal substances, their interactions with biomolecules, and the processes associated with their action, metabolism, and elimination in biological systems, and to solve basic problems in biotechnology and pharmaceutical technology.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	K6_U02		is able to apply knowledge of chemistry and biochemistry to analyse the properties of medicinal substances and predict their transport across biological membranes, distribution, biotransformation, elimination, and interactions with biomolecules.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject	
	K6_W05		knows and can explain the basic concepts of pharmacology, the molecular and biochemical mechanisms of action of medicinal substances, their fate in the body, and the fundamental principles of safe drug use.			[SW1] Assessment of factual knowledge	

Subject contents	Course content – lecture - Introductory information - definitions (active substance, drug, poison, potency, efficacy, pharmacology), drug action (pharmaceutical phase, pharmacokinetic phase, pharmacodynamic phase), methods and places of drug administration. - Drug absorption and transport across membranes. - Distribution of the drug in the body - compartments, protein binding, distribution factors. - Biotransformation - phase I reactions (oxidation, reduction, hydrolysis, decarboxylation), phase II reactions (conjugation with endogenous substrates), induction of drug transporting and metabolizing proteins, first pass effect, inhibition of enzymatic activity, bioinactivation and bioactivation, factors influencing biotransformation. - Excretion. - Pharmacokinetics - pharmacokinetic parameters (bioavailability, bioequivalence, elimination half-life, minimal therapeutic concentration and minimal toxic concentration) and pharmacokinetic models, pharmacokinetics in special situations - pathological conditions, the elderly). - Pharmacodynamics - mechanisms of drug action, pharmacological action through receptors (the concept of a receptor, types and subtypes of receptors, receptor reserve, agonists and antagonists, ion channels). - Dosage and drug action dependence on dose or concentration - dependence curves, indices and pharmacological values. - Adverse drug reactions - drug allergic reactions, side effects, drug dependence, drug interactions. - Searching for and testing new drugs - preclinical and clinical trials, placebo action, types of drug testing. - Applied pharmacy - drug forms and methods of preparation (powders, granules, tablets, capsules, liposomes, microspheres, medicinal aerosols, syrups, ointments, creams, parenteral drugs), drug administration routes, injection drug form technology (ampoules, vials).		
Prerequisites and co-requisites	Basic knowledge of biochemistry and enzymology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test, part 2 - lecture material 6 - 9.	60.0%	50.0%
	Written test, part 1 - lecture material 1 - 5.	60.0%	50.0%
Recommended reading	Basic literature	1. E. Mutschler, G. Geisslinger, H. J. Kroemer, P. Ruth, M. Schäfer-Korting. <i>Pharmacology and Toxicology. Textbook</i>. Third revised and expanded Polish edition. Scientific editor: W. Buczek. MedPharm Polska, 2013. 2. S. Janicki, A. Fiebica, M. Sznitowska. <i>Applied Pharmacy. Textbook for Pharmacy Students</i>. 4th edition. PZWL Medical Publishing, Warsaw, 2012.	
	Supplementary literature	Review papers in scientific journals provided by the lecturer.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Sample questions: 1. Define the terms: AUC and drug bioavailability - show how these kinetic parameters can be determined. 2. List the mechanisms of transport and absorption through biological membranes. Characterize active transport. 3. List the main enzymes of phase I and II metabolism. Characterize the physiological function of one family of isoenzymes from each group, also giving examples of catalyzed reactions. 4. In which compartment of the body/cell will highly lipophilic drugs be located? How can the solubility of organic active substances in an aqueous environment be improved.		
Practical activities within the subject	Not applicable		

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