GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	FOUNDATIONS OF PHARMACOLOGY, PG_00038907						
Field of study	Chemistry						
Date of commencement of studies	February 2025		Academic year of realisation of subject	2025/2026			
Education level	second-cycle studies		Subject group	Optional subject group			
Mode of study	Full-time studies		Mode of delivery	at the university			
Year of study	1		Language of instruction	Polish			
Semester of study	2		ECTS credits	3.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Potęga					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	15.0	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	5.0	40.0	75

Subject objectives

The aim of this subject is to provide the basic knowledge on th mode of drug action on healthy and diseased organisms. The course will discuss processes related to pharmacokinetics, describing the routes of administration and absorption of a drug and its distribution in the body. Issues related to metabolism and excretion of the drug from the body will also be presented. Knowledge of pharmacodynamics will allow to understand the effect of the drug at the target site.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_W02	The student, based on the chemical structure of the compound, is able to propose the sites of distribution of the drug in the body and/or cell, and is able to propose the mechanism of detoxification (metabolism) of the molecule.	[SW1] Assessment of factual knowledge
K7_K02	The student knows and understands the stages of implementation of new drugs. He/she is aware of the scale of synthesis of implemented drugs and is able to optimize and/or propose a less cumbersome method of synthesis of implemented/existing drugs.	[SK5] Assessment of ability to solve problems that arise in practice
K7_U01	The student is able to collect information and present the routes of synthesis of known drugs and also their effects on the body (pharmacokinetics and pharmacodynamics). The student understands the problems of drug synthesis and can propose an alternative route for obtaining active substances.	[SU5] Assessment of ability to present the results of task

Subject contents	Basic considerations. Drug action. Pharmaceutical phase. Pharmacokinetic phase. Pharmacodynamic phase (discussion of these concepts). Methods and sites of drug administration. Absorption of the drug barriers to absorption, mechanisms of absorption (diffusion, active transport, phagocytosis). Sites of administration versus absorption. Distribution of the drug in the body and factors affecting distribution (binding to proteins). Biotransformation. Phase I reactions role of cytochrome P450. Phase II reactions conjugation reactions. First-pass effect. Enzymatic induction. Excretion. ABC transport proteins. Pharmacokinetics. Pharmacokinetic parameters. Bioavailability and bioequivalence. Elimination half-life. Therapeutic concentrations. Toxic concentrations. Pharmacokinetic models one-compartment model, two-compartment model and changes in plasma drug concentration after intravenous administration. Concentration changes after oral administration. Pharmacokinetics in special cases pathological states. Pharmacodynamics. Receptor action of drugs. The concept of a receptor. Types and subtypes of receptors (membrane, intracellular). Ion channels. Agonists and antagonists. Mechanisms of action of drugs. Dose-effect relationship. Dependence curves. Allergic reactions. Adverse effects of drugs. Drug dependence. Exploration and testing of new drugs. Phases of clinical trials.
Prerequisites and co-requisites	Knowledge of basic Biochemistry is required.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written colloquium part 1 - 60 minutes .	60.0%	65.0%
Multimedial presentation on a given subject during seminar	60.0%	35.0%

Recommended reading

Basic literature	• E. Mutschler, G. Geisslinger, H.J. Kroemer, P. Ruth, M. Schäfer-Korting. Pharmacology and toxicology. Textbook. Polish edition III revised and supplemented. Scientific editing by W. Buczko. MedPharm Poland 2013. • S. Janicki, A. Fiebiga, M. Sznitowska. Applied pharmacy. Textbook for students of pharmacy. Wydawnictwo Lekarskie PZWL. Warsaw 2012, 4th edition.
Supplementary literature	No requirements.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Example questions:

1. Define the terms: AUC and bioavailability of a drug - present how these kinetic parameters can be determined.
2. List the mechanisms of transport and absorption across biological membranes. Characterize active transport.
3. List the main enzymes of phase I and phase II metabolism. Characterize the physiological function of one family of isoenzymes from each group giving also examples of catalyzed reactions.
4. In what body/cell compartment will drugs with high lipophilicity localize? How to improve the solubility of organic active substances in an aqueous environment?

In what compartment of the body / cells will be located medicines with high lipophilicity? How to improve the solubility of organic active substances in the aqueous solutions?

Work placement	Not applicable

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