

Subject card

Subject name and code	Metabolism and role of chosen xenobiotics, PG_00196955						
Field of study	Biotechnology						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2028/2029		
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	3	Language of instruction			English		
Semester of study	5	ECTS credits			2.0		
Learning profile	academic	Assessment form			credit		
Conducting unit	UG Institute of Biotechnology -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Grzegorz Gołuński				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	0.0	0.0	0.0	20
	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	20		5.0		25.0	50
Subject objectives	The course introduces several groups of the chemical compounds present in various forms in the environment. During the classes chemical structure, origin, metabolism and possible, positive as well as negative effects of xenobiotics are to be discussed. Short panel describing methods for xenobiotics detection and analysis is also included. Preparation and presentation of the short talk on the chosen subject will also promote searching and critical analysis of source materials and practice scientific discussion.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOTECHL3_W05] The graduate understands at an advanced level the mechanisms of vital function disorders and knows the causes, symptoms and methods of assessing selected disorders and pathological changes in the field of pathophysiology, biochemical disorders, and neoplasia; proposes advanced methods of assessing these disorders in the field of medical biotechnology and molecular diagnostics.	The student knows the chemical structure, origin, metabolism and possible positive and negative effects of xenobiotics, as well as methods of detection and analysis of xenobiotics.	[SW2] presentation/project/paper/report
	[BIOTECHL3_U04] The graduate is able to search for, analyse and use scientific information, also in English, in the field of biotechnology in the fields of exact and natural sciences and medical and health sciences; uses electronic sources; has advanced skills in using appropriate databases.	The student is able to prepare a presentation on a selected topic based on an independent and critical analysis of retrieved sources.	[SU2] presentation/project/paper/report
	[BIOTECHL3_W09] The graduate possesses structured and advanced knowledge of the terminology and concepts used in biological and medical sciences and related disciplines.	The student can use terminology related to metabolism and action of xenobiotics.	[SW2] presentation/project/paper/report
Subject contents	<p>1. Mutagens and mutagenesis compounds directly or indirectly interacting with/on DNA (reactive oxygen species generators, alkylating agents, benzene, furanocoumarins, aromatic amines, proflavine). Use of mutagens in biotechnology. 2. Toxins and poisons where and how do we use them? potential threats. Biocides, aflatoxin, botulinum toxin, heavy metals, polycyclic aromatic hydrocarbons, chosen biological and chemical weapons. 3. Antimutagens Potential uses of methylxanthines, flavonoids and other antioxidants in protection from mutagens. 4. Medicines origin, use, metabolism and side effects of chosen medicines (Nonsteroidal anti-inflammatory drugs, classic anticancer drugs, corticosteroids, beta blockers, inhibitors of cellular receptors, benzodiazepines). 5. Psychoactive substances and drugs of abuse mechanism of action, influence on organism, use in medicine (amphetamine, cannabinoids, chosen opiates, LSD, alcohol, nicotine, designer drugs). 6. Performance enhancing drugs (doping) bane of professional sports anabolic steroids, hormones, stimulants. 7. Physicochemical methods for detection of discussed substances. 8. Biological methods for analysis of discussed substances.</p>		
Prerequisites and co-requisites	Basic knowledge in biochemistry and molecular biology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	presentation	51.0%	100.0%
Recommended reading	Basic literature	<p>Curtis D. Klaassen, Casarett & Doulls Toxicology. The Basic Science of Poisons. 7th ed. 2008, McGraw-Hill Medical Publishing Division</p> <p>Frank A. Barile, Clinical Toxicology. Principles and Mechanisms. 2nd ed. 2010 Informa Healthcare</p> <p>Pavel Anzenbacher, Ulrich M. Zanger, Metabolism of Drugs and Other Xenobiotics, 2012 Wiley-Vch</p> <p>Materials provided by the lecturer during course</p>	
	Supplementary literature	<p>VV Pilay, Modern Medical Toxicology, 4th ed. 2013, Jaypee Brothers Medical Publishers</p> <p>John A. Timbrell, Principles of Biochemical Toxicology, 4th ed. 2009, Informa Healthcare</p> <p>Ashraf Mozayani, Lionel Raymon, Handbook of Drug Interactions, 2nd ed., 2012, Humana Press</p>	

	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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