University of Gdańsk

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

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 aromatichydrocarbons, 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.

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	Curtis D. Klaasen, Casarett & Doulls Toxicology. The Basic Science of Poisons. 7thed. 2008, McGraw-Hill Medical Publishing Division Frank A. Barile, Clinical Toxicology. Principles and Mechanisms. 2nded. 2010 Informa Healthcare Pavel Anzenbacher, Ulrich M. Zanger, Metabolism of Drugs and Other Xenobiotics, 2012 Wiley-Vch Materials provided by the lecturer during course
Supplementary literature	VV Pilay, Modern Medical Toxicology, 4th ed. 2013, Jaypee Brothers Medical Publishers John A. Timbrell, Principles of Biochemical Toxicology, 4th ed. 2009, Informa Healthcare Ashraf Mozayani, Lionel Raymon, Handbook of Drug Interactions, 2nd ed., 2012, Humana Press

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

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