



Subject card

Subject name and code	Anticancer Drugs, PG_00058241						
Field of study	Biotechnology						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			2.0		
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 inż. Agnieszka Potęga					
	Teachers	dr inż. Agnieszka Potęga					
Lesson types and methods of instruction	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		1.0		19.0	50
Subject objectives	Gaining knowledge on existing antitumor drugs with their clinical applications and toxic side effects; problems with design of new antitumor drugs and therapeutic strategies.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K7_K02] is aware of the limitations and the necessity of continuous development of knowledge and technology; understands the need for education and constant training		The student understands the process of cancer formation and is aware of the need to develop new chemotherapeutics with much greater specificity and including new molecular targets.			[SK5] Assessment of ability to solve problems that arise in practice	
	[K7_W05] knows the basis of civilization diseases, including cancer, and chemical structures and properties of various groups of active substances, including anticancer drugs		The student is able to discuss the factors contributing to the development of cancer, knows the classes of currently used chemotherapeutics and is able to give examples of chemotherapeutics individual classes. The student is able to describe the interactions of individual classes chemotherapeutics with their molecular targets.			[SW1] Assessment of factual knowledge	
	[K7_U04] is able to predict potential properties of biomolecules and biologically active compounds on the basis of knowledge of their chemical structure and apply methods of molecular modelling of biomolecules		The student is able to propose modifications of pharmacological groups of chemotherapeutics in order to improve their physicochemical properties and/or interaction with molecular target.			[SU3] Assessment of ability to use knowledge gained from the subject	

Subject contents	1. History of cancer treatment and chemotherapy 2. The origin of cancer: carcinogenic factors and the process of carcinogenesis 3. Major types of human tumors, diagnostic methods and cancer treatment 4. Antitumor chemotherapy - a historical perspective 5. Antitumor chemotherapeutics according to their mechanism of action: a. DNA targeting drugs: drugs covalently binding to DNA drugs directly damaging DNA structure inhibitors of DNA topoisomerase I and II antimetabolites drugs interacting with telomeric DNA and telomerase inhibitors b. inhibitors of microtubule functions drugs destabilizing microtubules drugs stabilizing microtubules c. Antihormone therapies d. immunotherapies - application of monoclonal antibodies in anticancer therapy e. Kinase inhibitors: stress kinases kinases regulating cell cycle progression (Cdk1, Chk1, Aurora B) atypical kinases - Gleevec f. phosphatase inhibitors g. inhibitors of Ras pathway 6. problems in antitumor treatment: general toxicity, drug resistance (inherent and induced) 7. New directions and strategies in the treatment of human tumors and targeting cancer stem cells.		
Prerequisites and co-requisites	Basic knowledge in organic chemistry, cell biology and biochemistry.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test 2; 45 min; open and test questions	60.0%	50.0%
	test 1; 45 min; open and test questions	60.0%	50.0%
Recommended reading	Basic literature	Lauren Pecorino; Molecular Biology of Cancer; Oxford University Press; Oxford; 2016; ISBN: 9780198717348 Krystyna Orzechowska-Juzwenko; Zarys chemioterapii nowotworów narządowych i układowych; Volumed; Wrocław 2000; ISBN: 83-87804-15-0 Alfred Zejc i Maria Gorczyca; Chemia Leków; PZWL; Warszawa 2009; ISBN: 978-83-200-3652-7	
	Supplementary literature	Recent review articles on new antitumor drugs and therapeutic strategies, materials obtained from pharmaceutical companies on new anticancer drugs (provided by lecturer).	
	eResources addresses	Adresy na platformie eNauczenie: Chemoterapeutyki przeciwnowotworowe - wykład, Biotechnologia leków, 2023/2024 - Moodle ID: 28599 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=28599	
Example issues/ example questions/ tasks being completed	What could be the causes of the decline of cases lung cancer? Why, are lung cancers still the main cause of death caused by cancer? What characteristics must possess a cancer cell in order to be susceptible to treatment with conventional chemotherapeutics such as DNA alkylators?		
Work placement	Not applicable		