GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	ANTICANCER CHEMOTHERAPEUTICS, PG_00063489		
Field of study	Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Optional subject group Specialty 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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Potęga	
	Teachers	dr hab. 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 for treating human cancers.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W06] recognizes the technological and scientific, as well as organizational and economic opportunities and limitations in biotechnology and related fields	The student recognizes and analyzes the technological, scientific, organizational, and economic opportunities and limitations associated with the design, production, and implementation of anticancer chemotherapeutics, including targeted therapies, classical cytostatics, and new molecular strategies used in oncology.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
[K7_U06] plans research and designs biotechnological products and processes taking into account legal regulations and bioethical principles	The student is able to plan research and design biotechnology products and processes, such as new anticancer drugs, taking into account relevant regulations and bioethical principles, such as clinical trial requirements, patient rights, and environmental considerations.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K7_W05] identifies crucial developments in research, apparatus and technology in biotechnology and related fields	The student is able to discuss factors that promote the development of cancer, knows the classes of chemotherapeutics currently in use, and can give examples of chemotherapeutics from each class. The student describes the interactions of each class of chemotherapeutic agent with their molecular targets.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation

<table>
<tr><td>Subject contents</td><td>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 accordign 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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge in organic chemistry, cell biology, biochemistry, and molecular biology.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>final test; 60 min; open questions</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>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</td></tr><tr><td>Supplementary literature</td><td>Recent review articles on new antitumor drugs and therapeutic strategies, materials obtained from pharmaceutical companies on new anticancer drugs (provided by lecturer).</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>- What are the main mechanisms of action of classical anticancer drugs (e.g., antimetabolites, DNA alkylators)?
- What is the difference between cytostatics and targeted therapies in cancer treatment?
- What characteristics must a cancer cell have in order to be susceptible to treatment with conventional chemotherapeutics such as DNA alkylators?
- Which anticancer therapies are currently most commonly used to treat breast, lung and colorectal cancer?
- Discuss the role of immunotherapy in cancer treatment.
- Which mechanisms allow the immune system to be used in cancer therapy?
- What are the steps involved in conducting clinical trials of new anticancer drugs? What regulations define them?</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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