University of Gdańsk

Subject card

Subject name and code	Monographic lecture - Biologically active peptides, PG_00082496		
Field of study	Chemistry		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish Polish
Semester of study	4	ECTS credits	3.0
Learning profile	academic	Assessment form	credit
Conducting unit	Laboratory of Bioorganic Chemistry -> Department of Molecular Biochemistry -> Faculty of Chemistry -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Krzysztof Rolka	
	Teachers	prof. dr hab. Krzysztof Rolka	

Lesson types

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	5.0	40.0	75

Subject objectives

introduction students with all issues listed in the lecture program content, discussion of the stereochemistryof peptides and proteins, familiarizing students with the basic classes of endogenous peptides, theirstructures and functions teaching students how to design of peptides, peptidomimetics of the presumedbiological activity familiarizing students with peptidic drugs

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field.	Lists examples of peptide drugs. Characterizes methods for examining structure-activity relationships. Characterizes the main methods of combinatorial chemistry.	[SW4] test/exam - oral or written
[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.	Understands the need for continuous education. Is aware of the importance of peptides and their derivatives in functioning body. Demonstrates cautious criticism in accepting information, especially available information. in the mass media.	[SK4] test/exam - oral or written
[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	Characterizes endogenous peptides and discuss their importance for functioning microorganisms, plants and animals. Based on the definition of torsion angles defines the three dimensional structure of peptides and proteins.	[SW4] test/exam - oral or written
[CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.	Describes selected methods for the analysis of endogenous organic compounds	[SW4] test/exam - oral or written

Subject contents

Peptide bond geometry, definitions of torsion angles of polypeptide chains. Canonical secondary structuresand higher order structures. Application of combinatorial chemistry methods to select peptides with assumedbiological activity (design, chemical synthesis and deconvolution of peptide libraries). Peptide and proteinhormones. Plant peptides. Peptides with antibacterial and antifungal properties. Peptides with anti-canceractivity. Peptide vaccines. Peptides with immunological activity. Peptides isolated from venoms of variousanimal species and peptide toxins. Opioid peptides. Prospects for the use of peptides in medical therapy anddiagnostics. Study of the relationship between the structure and activity of biologically active peptides.Physicochemical methods for determining the spatial structures of peptides.

Prerequisites and co-requisites

Knowledge of organic, bioorganic and biochemistry, including: chemical formulas and mechanisms of actionof basic groups of biomolecules (carbohydrates, proteins, peptides, nucleic acids) and basic metabolicpathways, know the basic methods of analyzing biomolecules (liquid chromatography, gel electrophoresis,mass spectrometry, proton resonance magnetic), basics of organic spectroscopy.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Positive grade received in written exam composed of 5 open questions covering issues listed in the course contents	51.0%	100.0%

Recommended reading

Basic literature	Handbook of biologically active peptides (A.J. Kerstin, red.) Elsevier 2006,Combinatorial peptide and nonpeptide libraries (G. Jung, red.) VCH 1996,N. Sewald, H. Jakubke, Peptides: chemistry and biology, Wiley-VCH Verlag,Monographic papers provided by the lecturer
Supplementary literature	Monographic publications provided or recommended by the lecturer.
eResources addresses	

Example issues/ example questions/ tasks being completed	1. List examples of pituitary hormones, give their short description.2. Outline the role of the dihedral angles of the peptide main chain in formation of peptide secondarystructure. List examples of canonical secondary structure.3. Give at least five examples of peptidic toxins.4. Give at least 5 examples of peptides used as drugs, give their short description.5. Advantages and limitations of using peptides as drugs.6. Outline the general strategy use in design of biologically active peptides.
Work placement	Not applicable

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