University of Gdańsk

Subject card

Subject name and code	Graduate study lecture - Innovative metallopharmaceuticals in diagnostics and treatments, PG_00117693		
Field of study	Chemistry		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	academic	Assessment form	credit
Conducting unit	Department of Bioinorganic Chemistry -> Faculty of Chemistry -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Agnieszka Chylewska	
	Teachers		

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	1. familiarization with the basic factors influencing the biological activity of a metallopharmaceutical 2. development of skills in integrating knowledge from the interface of chemistry and medicine regarding the practical use of drugs based on metal ion complexes 3. introduction to examples of metal-based drugs used in everyday life 4. introduction to the basics of designing and obtaining metallopharmaceuticals from the last 15 years

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	1. knows and recognizes metallopharmaceuticals; 2. knows how to design the structure of a metallopharmaceutical; 3. understands how to plan synthesis; 4. understands and can explain the significance of factors influencing the biological activity of metal ion complexes; 5. uses terminology related to the nomenclature and structure of metallopharmaceuticals; 6. provides specific examples of metallopharmaceuticals used in practice as anticancer, anti-inflammatory, antimicrobial drugs, and in medical diagnostics; 7. correctly identifies types of metallopharmaceuticals.	[SW4] test/exam - oral or written
[CHEMMU2_U02] Critically assesses the results of conducted, performed observations and theoretical calculations and discusses errors.	Has the ability to critically assess the results of conducted experiments, observations made, and/or theoretical calculations.	[SU4] 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 significance of metallopharmaceuticals in everyday life, including their use in medical diagnostics and treatment of diseases.	[SK4] test/exam - oral or written

Subject contents

Metallopharmaceuticals - systematics and factors determining activity. Metallic drugs of significant importance in medical diagnostics and treatment - design, synthesis, structure, mechanisms of action and cellular targets, anti-inflammatory drugs. Metallopharmaceuticals in medical diagnostics.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	51.0%	100.0%

Recommended reading

Basic literature

1. Metallopharmaceuticals in Therapy a New Horizon for Scientific Research, Curr. Med. Chem., 25: 1729-1791, 2018.
2. Metal complexes in cancer therapy an update from drug design perspective, Drug Des. Devel. Ther. 11: 599-616, 2017.
3. Molybdenum Metallopharmaceuticals Candidate Compounds The Ranaissance of Molybdenum Metallodrugs?, Curr. Med. Chem., 23: 3322- 3342, 2016.
4. Ruthenium metallopharmaceuticals, Coord. Chem. Rev. 232: 69-93, 2002.
5. Copper Complexes as Anticancer Agents, Anti-Cancer Agents Med. Chem. 9: 185-211, 2009.
6. Dicarba-closo-dodecarborane-containing half-sandwich complexes of ruthenium, osmium, rhodium and iridium: biological relevance and synthetic strategies, Chem. Soc. Rev., 41: 3264-3279, 2012.
7. Ruthenium (II/III)-Based Compounds with Encouraging Antiproliferative Activity against Non-small-Cell Lung Cancer. Chem. Eur. J. 2012, 18, 14464-14472, 2012.
8. Advances in cobalt complexes as anticancer agents, Dalton Trans. 44: 13796-13808, 2015.
9. Effects of NAMI-A and some related ruthenium complexes on cell viability after short exposure of tumor cells, Anti-cancer Drugs, 11: 665-672, 2000.
10. Thioamido coordination in a thioxo-1,2,4-triazole copper(II) complex enhances nonapoptotic programmed cell death associated with copper accumulation and oxidative stress in human cancer cells, J. Med. Chem. 50: 1916-1924, 2007.
11. M. Cieślak-Golonka, J. Starosta, M. Wasielewski, Wstęp do chemii koordynacyjnej PWN, 2010.

	Supplementary literature	1. Metallopharmaceuticals in Therapy a New Horizon for Scientific Research, Curr. Med. Chem., 25: 1729-1791, 2018. 2. Metal complexes in cancer therapy an update from drug design perspective, Drug Des. Devel. Ther. 11: 599-616, 2017. 3. Molybdenum Metallopharmaceuticals Candidate Compounds The Ranaissance of Molybdenum Metallodrugs?, Curr. Med. Chem., 23: 3322- 3342, 2016. 4. Ruthenium metallopharmaceuticals, Coord. Chem. Rev. 232: 69-93, 2002. 5. Copper Complexes as Anticancer Agents, Anti-Cancer Agents Med. Chem. 9: 185-211, 2009. 6. Dicarba-closo-dodecarborane-containing half-sandwich complexes of ruthenium, osmium, rhodium and iridium: biological relevance and synthetic strategies, Chem. Soc. Rev., 41: 3264-3279, 2012. 7. Ruthenium (II/III)-Based Compounds with Encouraging Antiproliferative Activity against Non-small-Cell Lung Cancer. Chem. Eur. J. 2012, 18, 14464-14472, 2012. 8. Advances in cobalt complexes as anticancer agents, Dalton Trans. 44: 13796-13808, 2015. 9. Effects of NAMI-A and some related ruthenium complexes on cell viability after short exposure of tumor cells, Anti-cancer Drugs, 11: 665-672, 2000. 10. Thioamido coordination in a thioxo-1,2,4-triazole copper(II) complex enhances nonapoptotic programmed cell death associated with copper accumulation and oxidative stress in human cancer cells, J. Med. Chem. 50: 1916-1924, 2007.
	eResources addresses	Basic https://bg.ug.edu.pl/ - Books, e-books and articles. Supplementary https://bg.ug.edu.pl/ - Articles.
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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