

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 2025		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	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_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
	[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_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
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 Renaissance of Molybdenum Metallo drugs?, 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 Renaissance 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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