

Subject card

Subject name and code	Methods for marking molecules, PG_00207365						
Field of study	Biology						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study 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	1		ECTS credits		3.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Laboratory of Microbial Biochemistry -> Department of General and Medical Biochemistry -> Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Dorota Kuczyńska-Wiśnik				
	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		6.0		39.0	75
Subject objectives	Ability to use various techniques for labeling biological molecules; planning biological experiments requiring labeling of molecules; analysis of data obtained after experimental labeling of biological molecules.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOLMU2_W08] the graduate has a thorough knowledge and understanding of the wealth of contemporary approaches and experimental techniques in biological sciences and their use to solve given tasks	Recognizes experimental techniques based on isotopic and non-isotopic labeling of biological molecules	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
	[BIOLMU2_W03] the graduate has thorough knowledge and understanding of research problems at the border of biological sciences that require the use of advanced tools	Recognizes research problems at the border of molecular biology, cytology and physiology requiring the use of techniques for labeling biological molecules and cell organelles	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
	[BIOLMU2_U11] the graduate is able to independently plan his/her own professional/scientific career in a direction that uses the obtained qualifications	obtains qualifications necessary for further research work, enabling planning experiments using labeled biological molecules	[SU1] oral statement/conversation/ discussion
	[BIOLMU2_K07] the graduate is ready to systematically update biological knowledge and information on its practical applications	Updates knowledge about methods of labeling biological molecules and its practical application	[SK1] oral statement/conversation/ discussion [SK2] presentation/project/paper/ report [SK5] implementation of a problem task
	[BIOLMU2_U03] the graduate is able to critically analyze and select biological information, especially from electronic sources	demonstrates the ability to select an appropriate labeling technique to solve a given research problem and the ability to critically analyze data obtained after experiments using labeled macromolecules	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU4] test/exam - oral or written
Subject contents	Isotopic methods of labeling nucleic acids, proteins, lipids, carbohydrates and other biologically active substances. Non-isotopic techniques for labeling biological macromolecules. In vivo and in vitro labeling. Markers of individual cell organelles. Methods for detecting signals after labeling biological molecules. Practical use of methods for labeling biological molecules in solving research problems.		
Prerequisites and co-requisites	Knowledge of the structure and properties of nucleic acids, proteins, lipids and polysaccharides. Courses taken: organic chemistry, biochemistry and molecular biology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam with open questions (tasks) and tests(	51.0%	75.0%
	presentation with discussion	51.0%	25.0%
Recommended reading	Basic literature	Original lecture based on articles from specialist journals	
		G.T. Hermenson (2013) Bioconjugate techniques. Academic Press	
	Supplementary literature	C. Kessler (2000) Nonradioactive analysis of biomolecules. Springer	
		A. Golemis, P. D. Adams (ed) (2005) Protein-protein interactions: a molecular cloning manual. CSHL Press A.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Suggest methods of obtaining 125I-labelled IgG antibodies for use in Western blotting. Introduce and discuss the chosen procedure		
	Direct labeling of nucleic acids by chemical modification involves obtaining derivatives that can be coupled with other molecules. Modifications can be made...		
Work placement	Not applicable		

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