



Subject card

Subject name and code	Immunology, PG_00054758						
Field of study	Biotechnology						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
Education level	first-cycle studies		Subject group		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	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Katedra Biotechnologii i Mikrobiologii -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Lucyna Holec-Gąsior				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	15.0	45
	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	45		3.0		27.0	75
Subject objectives	The aim of the course is to provide knowledge of basic issues in the field of immunology.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W06		Student - defines and explains basic immunological processes; - knows and understands the basics of development and mechanisms of functioning of the immune system; - understands and can explain the meaning of concepts used in immunology and understands the mechanisms regulating the course of immune reactions.		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	K6_U06		Student - uses basic techniques and research tools used in the immunological laboratory; - performs basic analysis of the results of immunological tests detecting the presence of antibodies and antigens in biological material; - can independently perform simple immunological tests and distinguish the morphology of lymphatic organs and different populations of leukocytes; - performs simple tests of immunological parameters in the laboratory.		[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		

Subject contents	Lecture <ol style="list-style-type: none">1. Introduction to the immune system. The essence of the immune system. Main components and essential features of the immune response. Innate immunity (anatomical barriers, secretory molecules and cellular elements). Acquired immunity.2. Cells involved in the immune response and their receptors. Interactions between cells in the process of immune response.3. Lymphatic system. Central and peripheral lymphatic organs structure and functions.4. Complement system as an element of non-specific immunity.5. Antigens. Types of antigens. Basic concepts, definitions. Characterization of antigens.6. Antibodies and their receptors. Functions, structure. Types and structure of antibodies.7. Major histocompatibility complex (MHC) antigens. MHC molecules structure and functions. Human major histocompatibility complex (HLA).8. Antigen recognition. Antigen recognition by a B lymphocyte (antigen-antibody reactions; antibody specificity, affinity, avidity, cross-reactions). Antigen recognition by T lymphocytes (presentation of exogenous and endogenous antigen).9. Protective vaccinations.10. Immune reactions used in diagnostics. Seminar Anti-infective immunity. Immune response in fungal and parasitic infections. Immune tolerance. Cancer immunology. Transplantation and its rejection. Hypersensitivity reactions. Autoimmune diseases. Primary and secondary immunodeficiencies. Production of monoclonal antibodies. Application of immunology in modern diagnostics and scientific research. Conventional vaccines. New generation vaccines. Psychoneuroimmunology. Evolution of immunity. Immunohematology. Reproductive immunology. The immune system of the skin and mucous membranes. New directions of research in immunology. Antibodies as reagents in immunochemistry.														
	Laboratory Laboratory classes - a block of five exercises, 3 hours each <ol style="list-style-type: none">1. Introduction to immunology exercises. Occupational health and safety in the immunology laboratory, discussion of occupational health and safety regulations.2. Central and peripheral immune system and blood immune cells. Microscopic analysis of the morphological structure of central and peripheral lymphatic organs and individual types of leukocytes (viewing ready-made microscopic preparations).3. Serology reactions between antigen and antibody <i>in vitro</i>. Preparation of serum for serological tests; agglutination - detection of antigens using known antibodies and/or detection of specific antibodies using known antigens - qualitative and quantitative tests (serum titer).4. Precipitation reactions. Testing the activity of antisera by ring precipitation and gel immunodiffusion.5. Functional assessment of immune system cells. Isolation of cells in a density gradient and determination of cell viability.														
	Prerequisites and co-requisites	Knowledge of basic molecular biology issues required.													
	Assessment methods and criteria	<table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>written test</td><td>60.0%</td><td>50.0%</td></tr><tr><td>oral presentation</td><td>60.0%</td><td>25.0%</td></tr><tr><td>short tests, worksheets, reports</td><td>60.0%</td><td>25.0%</td></tr></table>	Subject passing criteria	Passing threshold	Percentage of the final grade	written test	60.0%	50.0%	oral presentation	60.0%	25.0%	short tests, worksheets, reports	60.0%	25.0%	
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Recommended reading	Basic literature	<ol style="list-style-type: none">1. Roitt I., Brostoff J., Male D. Immunology. Medical Publisher PZWL, 2006.2. Gołab J, Jakóbisiak M, Lasek W, Stokłosa T. Immunology. PWN Scientific Publisher, 2014.3. Fanger M.W., Whelan A., Lydyard P. M. Immunology. Short lectures. PWN Scientific Publisher, 20174. Węgleński P. Molecular genetics. PWN Scientific Publisher, 2012 (chapter on immune processes).5. Ptak M., Ptak W., Szczepanik M. Basics of immunology. PZWL Medical Publisher, 2010.													
	Supplementary literature	-													
	eResources addresses	Adresy na platformie eNauczanie:													

Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. What is the structure of the immune system? 2. What elements are involved in the immune response? 3. What is innate immunity and what are its mechanisms? 4. What is acquired immunity and what are its mechanisms? 5. What cells are involved in the immune response and what are their receptors? 6. What is the structure of the lymphatic system? 7. What is complement system? 8. What is an antigen and what are the types of antigens? 9. What are antibodies and what are their receptors? 10. What is the structure and function of MHC molecules? 11. How are antigens recognized by B lymphocytes and T lymphocytes? 12. What are preventive vaccinations? 13. What types of antibacterial and antiviral vaccines are there? 14. What are the basic reactions between antigen and antibody <i>in vitro</i>?
Work placement	Not applicable

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