GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Virusology, PG_00039052		
Field of study	Biotechnology		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2022/2023
Education level	second-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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Microbiology -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Beata Zalewska-Piątek	
	Teachers	dr hab. Beata Zalewska-Piątek dr hab. inż. Marta Wanarska	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	30.0	0.0	0.0	60

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	60	10.0	30.0	100

Subject objectives

The aim of course of Virology is to provide the current knowledge about the viruses and their molecular biology, based on the latest research. The program of Virology course includes general information concerning the characteristics and classification of viruses and their replication, propagation in the laboratory, pathogenicity and virulence, and avoiding the immune response. Additionally, the modern approaches to the diagnosis and treatment of viral infections are characterized.

Learning outcomes

Course outcome	Subject outcome	Method of verification

Subject contents	LECTURE Virus definition, classification and nomenclature (taxonomy). Phylogeny and morphology of viruses. Viral syndromes. Replication life cycle of viruses (DNA viruses, RNA viruses with positive and negative polarity). Differentiation of the genetic structure of viruses. Pathomechanism of viral infections. Pathogenicity and virulence. Routes of infection and spread of the viruses in the host organism. The course of viral diseases (acute viral infections of short-term, acute latent infections, mortal infections, not-acute infections). Defense mechnisms of viruses. Methods of virus multiplication (semi-continuous and continuous cell lines, organ cultures, multiplication of viruses in eggs, cloning of viral genes) and viral detection (cytopathic effect, plaque method, viral hemagglutination, hemadsorption, *in situ* hybridization, viral interference). Laboratory diagnostics of viral infections. Methods of the fast diagnostics of viruses and their antigens (serological, molecular, microscopic and classical). Isolation of viruses in cell culture. Detection of specific anti-viral antibodies. Elimination of viruses from the primary site of infection or organs of the host. Intrauterine and perinatal viral infections. The pathogenesis of viral fetal infections. Fetal immune resistance to infection. Rubella, cytomegalovirus disease, general herpes, varicella zoster and herpes zoster (shingles), AIDS, hepatitis B. Viral infections in patients with immunodeficiency. Basic mechanisms of resistance to viral infections. Antiviral immune resistance (non-specific, innate and specific defense mechanisms). Avoiding the immune defense mechanisms by viruses. Harmful immune responses. Types of immunodeficiencies. Primary and secondary immunodeficiencies. Influenza virus and flu. Identification of the etiological agent of influenza, epidemics and pandemics. Types of influenza virus, antigenic differences, nomenclature and genetic variation. Routes of infection and the clinical course of influenza. Laboratory diagnostics. Influenza vaccines. Antiviral drugs. The epidemiological and virological surveillance of influenza. LABORATORY Bacterial polymeric adhesive systems as carriers of heterologous antigenic determinants - glycoprotein D of Herpes simplex virus and Dr fimbriae of *E. coli* strains. Isolation of native and chimeric fimbriae of Dr and Dr-HSV type from the surface of bacterial cells, purification and dialysis. Electrophoresis of protein samples. Immunidentification of proteins by Western blott (electrotransfer, detection based on the polyclonal anti-Dr and monoclonal anti-HSV antibodies). Exercise 1 and 2. The propagation of bacteriophage M13mp in bacterial cells. Transformation of bacterial cells of the *E. coli* with the DNA of M13mp phage vector with a fragment of the *lac* operon. Analysis of phage plaques on agar medium. Isolation of M13 phage genetic material, in the form of 1- and 2-stranded DNA. Exercise 3 and 4. Analysis of the results. Final test. Exercise 5.
Prerequisites and co-requisites	Fundamentals of molecular biology and basics of immunology are required.
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
There is the composite mark including laboratory and lecture. FINAL SCORE (%) = Laboratory score - final test (%) x 0.5 + Lecture score - two tests (%) x 0. 5.	60.0%	100.0%

Recommended reading	Basic literature	**Immunology.** Roitt I., Brostoff J., Male D. Translation edited by Żeromski J. Słotwinski Verlag. 2000. **Molecular Virology.** Collie L., J. Oxford. Translation edited by Łuczak M. PZWL. 2001. **The Bacteriophages.** Calendar R. Oxford University Press. 2006. **Fundamentals of molecular virology.** Piekarowicz A. P 2012.
	Supplementary literature	**Basic Virology.** Wagner E.K., Hewlett M.J. Blackwell Publishing. 2004.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Structure of the viruses. Diagnostic methods for the identification of viruses. Immune resistance to viral infections. Characteristics of influenza virus.	
Work placement	Not applicable	