

Course code	Course group	Volume in ECTS credits	Course valid from	Course valid to	Reg. No.
BIO5011	c	6			

Course type (compulsory or optional)	Compulsory
Course level (study cycle)	I cycle
Semester the course is delivered	Spring
Study form (face-to-face or distant)	Face-to-face

Course title in Lithuanian

Molekulinė imunogenetika

Course title in English

MOLECULAR IMMUNOGENETICS

Short course annotation in Lithuanian (up to 500 characters)

Supažindinama su pagrindinėmis imunologijos mokslo tyrimo kryptimis, tyrimo objektais bei naudojamais metodais. Nagrinėjama šios mokslo šakos šiuolaikinė būklė ir jos vystymosi raida.. Supažindinama su imunokompetentinių ląstelių morfologija, funkcijomis, aptariama limfinių organų sandarą ir reikšmė imuniniame atsake. Aptariamos citokinų ir kitos molekulės dalyvaujančios imuninio atsako reguliavime. Analizuojami antigenų sintezės ir sąveikos su antikūnais imunogenetiniai pagrindai ir šių procesų genetinė kontrolė, jų įvairovę sąlygojančių genų veiklos mechanizmai. Studentai supažindinami su pagrindiniais imunologinių tyrimų metodais ir atlieka praktinius darbus naudojant įvairius imunologinius metodus.

Short course annotation in English (up to 500 characters)

The course is designed to acquaint the students with main trends in immunological investigations, the subjects of investigations, and methods employed. The present condition of this branch of science and its development is analysed. The students are acquainted with morphology and functions of immunocompetent cells, the structure and role of lymphatic organs in immune response are considered. Cytokine and other molecules that take part in regulating immune response are discussed. Immunogenetic fundamentals of antigen synthesis and interaction with antibodies and genetical control of these processes, as well as mechanisms determining the variety of the gene activity are analysed. Students are acquainted with the principal methods used in immunologic investigations and they do practical work using different immunological methods

Prerequisites for entering the course

Basic knowledge of biology, chemistry and biochemistry is needed

Course aim

The aim of the course is to acquaint the students with main trends in immunological investigations, the subjects of investigations, and methods employed. To analyse the present condition of this branch of science and its development. To elucidate the main issues of this branch of science revealing processes of immunogenesis of immunocompetent cells by presenting classification, morphology and functions of immunocompetent cells. To analyse immunogenetic mechanisms of antigen synthesis and their

interaction with antibodies.

Links between the study programme outcomes, the course outcomes and the criteria of learning achievement evaluation

Study programme outcomes	Course outcomes	Criteria for learning achievement evaluation
<p>1. To apply fundamental laws of physics, chemistry, biology, biochemistry, biophysics and genetics, as well as methods of high mathematics to recognise and analyse biological systems and objects;</p> <p>2. To analyse the diversity, the morphological structure of the subject of biology, ways of nutrition, reproduction and life cycles, classification, systems of the biological subject, regularities of their functioning and interaction,;</p> <p>4. To work with cells, organisms, populations. To assess the processes taking place within a cell, to work with cell cultures in the laboratory conditions, to apply the results obtained to modelling new biological systems, to evaluate intercellular relations, interactions between separate individuals and populations.</p>	<p>to define the subject of immunological investigations;</p>	<p>Are capable of solving problems of general immunology, think in an analytical way. Use terminology of immunology freely, understand basic regularities of immunology</p>
	<ul style="list-style-type: none"> • to characterise trends in immunological and immunogenetic research; • to characterise the current condition of immunological science and its development; 	
	<ul style="list-style-type: none"> • to classify immunocompetent cells • to characterise the morphology of immunocompetent cells; 	
	<ul style="list-style-type: none"> • to characterise functions of immunocompetent cells; 	
	<ul style="list-style-type: none"> • to analyse mechanisms of synthesis of antigens and their interaction with antibodies; • to analyse genetic control of synthesis of antigens and their interaction with antibodies; 	
	<ul style="list-style-type: none"> • to characterise the diversity of immunocompetent cells determining mechanisms of the activity of genes; 	
	<ul style="list-style-type: none"> • to characterise the structure of antigens of blood groups; • to characterise the genetic structure of loci controlling these antigens; 	
<ul style="list-style-type: none"> • to define principles and major methods of immunobiotechnology 		

<p>6. On the basis of the data collected to evaluate structures of populations, the environmental impact on populations, relations between populations and separate species.</p> <p>7. To apply modern research methods, to work on the principles of good laboratory practice, rules of bioethics, to collect, to process, to store and prepare research material in a laboratory and field conditions.</p>		
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Link between course outcomes and the content

Course outcomes	Content (topics)
<p>to define the subject of immunological investigations;</p> <ul style="list-style-type: none"> • to characterise trends in immunological and immunogenetic research; • to characterise the current condition of immunological science and its development; • to classify immunocompetent cells • to characterise the morphology of immunocompetent cells; • to characterise functions of immunocompetent cells; • to analyse mechanisms of synthesis of antigens and their interaction with antibodies; • to analyse genetic control of synthesis of antigens and their interaction with antibodies; • to characterise the diversity of immunocompetent cells determining mechanisms of the activity of genes; • to characterise the structure of antigens of blood groups; • to characterise the genetic 	<ol style="list-style-type: none"> 1. Introduction to immunology. 2. Conception of the immune system. 3. Organs and tissues of the immune system. 4. The immune system of skin. 5. Cells of the immune system: lymphocytes B and T, NK cells. 6. Macrophages, their functions and expressed molecules. 7. Immune function of myeloid cells and molecules expressed by them. 8. . The system of the complement. Receptors for complement proteins. 9. Cytokines and cytokine receptors. 10. Antigens and structures recognising antigens. 11. Immunoglobulins. Structure. Functions. Genes of immunoglobulins, – izotypes, alotypes, monoclonal antibodies 12. Main histocompatibility system, transplantation immunity. 13. Autoimmunity, immunodeficiency 14. Hypersensitivity reactions - I., II., III., IV. type

structure of locusses controlling these antigens; • to define principles and major methods of immunobiotechnology.	
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Study (teaching and learning) methods

Lectures, analysis of scientific literature, development of practical skills during laboratory work, practical solution of problems, independent studying of literature.

Methods of learning achievement assessment

Intermediate and final testing of knowledge, the level of knowledge is established according to the criteria for learning achievement assessment and is expressed by a corresponding grade according to an absolute ten point grading scale.

Distribution of workload for students (contact and independent work hours)

Studying of the subject by hours: lectures – 15 hours, laboratory work – 10 hours, consultations, examinations – 2 hours, independent work (preparation for laboratory work, a colloquium and an examination) – 20 hours. A total of 47 hours.

Structure of cumulative score and value of its constituent parts

A written intermediate test (colloquium) accounts for 33 % of the final assessment of students' knowledge. Laboratory work constitutes 17 %. An examination constitutes 50 % of the assessment of final knowledge, is assessed only after individual tasks and laboratory work have been completed and having fully accounted for them.

Recommended reference materials

No.	Publication year	Authors and the title of publication	Publishing-house	Number of copies in		
				University library	Self-study rooms	
Basic material						
1.	2012	Lomas-Francis. <u>The Blood Group Antigen FactsBook.2</u>	USA	-	-	On the Internet
2.	2012	Alt. <i>Advances in Immunology</i>	USA	-	-	On the Internet
3.	2002	Nairn R., Helbert M. <i>Imunology for medical students</i>	Mosby	1		-
4.	2006	Šitkauskienė B. <i>Imunodeficitai</i>	KMU Publishing-house, Kaunas	1		-
5	2001	D. Adomaitienė, N.	Kaunas	20		15

		Janulevičiūtė, R. Kazakevičius, V. Vaičiuvėnas. <i>Klinikinės imunologijos įvadas</i>	Šviesa publishing- house			
6	2008	S. N. Rumyantsev. <i>Heredity Immunity: Fundamental Principles and Exploitation in Life and Health Care</i>	Nova Biomedical			On the Internet
Additional literature						
1	2009.	Gerd-Rudiger Burmester, M. D <i>Наглядная иммунология.</i>	Москва			
2	1998	L.Griciūtė, D. Adomaitienė. <i>Kancerogenezė ir vėžio biologija</i>	Vilnius			
3	1998	A. Sruoga, A. Paulauskas. <i>"Imunologija su imunogenetikos pagrindais. Praktikos darbai</i>	Vilnius- Kaunas	20		

Course programme designed by

Prof. habil.dr Aniolas Sruoga