MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA

**Federal State Budgetary Educational Institution
of higher education
«I.N. Ulianov Chuvash State University»**
(FSBEI of HE «I.N. Ulianov Chuvash State University»)

Medical Faculty

Department of Internal Diseases

«APPROVE»
Vice-rector for Academic Affairs
_________________ I.E. Poverinov

«_13_» _04_______ 2022

Working programs of the discipline (module) «Иммунология / Immunology»

Direction of training / specialty 31.05.03 Стоматология / Dentistry
Graduate's qualification Врач-стоматолог / Dental Practitioner

Direction (profile) / specialization «Dentistry»

Form of training – очная / intramural
Course – 2
Term – 3
Total academic hours/credit points – 108/3
The year of beginning the training – 2022

Cheboksary - 2022

The fundamental document for compiling the working program of the discipline (module) Федеральный государственный образовательный стандарт высшего образования - специалитет по специальности 31.05.03 Стоматология (приказ Минобрнауки России от 12.08.2020 г. № 984)

Approved by:
associate professor , Candidate of Medical Sciences S.I.Kudryashov

The working program was approved at the meeting of the Department of Internal Diseases,
25.03.2022, protocol № 12
Head of the department L. M. Karzakova

Approved by
Dean of the Medical Faculty V.N. Diomidova
Acting Head of the Educational and Methodological Department E.A. Shirmanova

1. The purpose and objectives of training in the discipline (module)

The purpose of the discipline - formation of students' modern ideas about the structure and function of the immune system, the causes of the development and pathogenesis of immunopathological conditions in humans, methods of immunodiagnostics and treatment of immuno-mediated diseases.

The objectives of the discipline - - to form an idea of the immune system as one of the most important systems in the body;

- to give knowledge about the structure of the immune system, its age-related features, mechanisms of development and functioning,

- to give knowledge about the causes of development, pathogenesis of immune disorders and clinical manifestations of major immunodeficiency, allergic, autoimmune and other diseases of the immune system;

- to provide up-to-date knowledge about the main methods of assessing the immune status,

- to form methodological foundations for the development of tactics for the treatment and prevention of diseases of the immune system manifested in the oral cavity.

2. The place of practical training in the structure of the educational program of higher education

The discipline «Иммунология / Immunology» относится к обязательной части учебного плана refers to the mandatory part in the curriculum of the educational program of higher education (hereinafter referred to as the EP of HE) in the field of training / specialty 31.05.03 Стоматология, direction (profile) / specialization of the program «Dentistry».

Previous academic disciplines (modules) and (or) practices that form the knowledge, skills and abilities necessary for training in the discipline (module):

Безопасность жизнедеятельности / Health and Safety

Knowledge, skills and abilities formed as a result of training in a discipline (module) are necessary when teaching in the following disciplines (modules) and (or) practices:

Патофизиология / Pathophysiology

Топографическая анатомия и оперативная хирургия головы и шеи / Topographic Anatomy and Operative Surgery of the Head and Neck

Материаловедение в ортопедической практике / Materials Science in Orthopedic Practice

Судебная медицина / Forensic Medicine

Патологическая анатомия / Pathological Anatomy

3. Planned learning outcomes in the discipline (module), correlated with the planned learning outcomes

Planned learning outcomes in the discipline (module), correlated with the planned learning outcomes

Code and name of the competence	Code and name of the competence achievement	Descriptors for the indicator of competence achievement (learning)
ОПК-9 Способен оценивать морфофункциональные, физиологические состояния и патологические процессы	ОПК-9.1 Способен распознавать морфофункциональные, физиологические состояния и патологические	Know the structure and organization of the immune system; factors of natural immunity; molecular and cellular bases of adaptive immunity; mechanisms

в организме человека для решения профессиональных задач / He/she is able to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems	процессы в организме человека / He/she is able to recognize morphofunctional, physiological states and pathological processes in the human body	of immune response formation Be able to interpret the indicators of the main links of immunity Possess the skills of establishing immunological disorders in the human body
ОПК-9 Способен оценивать морфофункциональные, физиологические состояния и патологические процессы в организме человека для решения профессиональных задач / He/she is able to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems	ОПК-9.2 Способен анализировать морфофункциональные, физиологические состояния и патологические процессы в организме человека / He/she is able to analyze morphofunctional, physiological states and pathological processes in the human body	Know the normal values of the main links of immunity Be able to analyze violations of the main links of immunity Possess modern immunological research methods in medicine.
ОПК-9 Способен оценивать морфофункциональные, физиологические состояния и патологические процессы в организме человека для решения профессиональных задач / He/she is able to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems	ОПК-9.3 Способен диагностировать морфофункциональные, физиологические состояния и патологические процессы организма человека / He/she is able to diagnose morphofunctional, physiological states and pathological processes in the human body	Know the characteristic changes in the main links of immunity in the most common diseases Be able to diagnose violations of the main links of immunity Possess modern immunological research methods in medicine.

4. Structure, scope and content of the discipline (module)

Educational activities in the discipline (module) are carried out:

- in the form of students' face-to-face work with the teaching staff of the organization and (or) persons involved by the organization to implement the educational programs on other terms (hereinafter - contact work);

- in the form of students' independent work.

Face-to-face work can be classroom-based, extramural, as well as it can be conducted in an electronic information and educational environment (EIEE).

Learning sessions in the discipline (module) and interim assessment of students are conducted in the form of face-to-face work and in the form of students' independent work.

During learning sessions in the discipline (module) face-to-face work includes: lecture -type classes, seminar-type classes and (or) group consultations, and (or) individual work of students with the teaching staff of the organization and (or) persons involved by the

organization to implement the educational programs on other terms (including individual consultations).

Legend:

Lec – lectures, Lab – laboratory work, Pr – practical classes, ICW – individual face-to-face work, IW – independent work.

4.1. Content of the discipline (module)

Section name	The section's content	Formed competences	Competence achievement indicator
Structure and organization of the immune system	Topic 1. Immunology as a modern medical and biological science.	ОПК-9	ОПК-9.1, ОПК-9.2, ОПК-9.3
	Topic 2.Antigens		
	Topic 3. The concept of immunocompetent cells. The structure of the immune system.		
Factors of innate immunity	Topic 4. Macrophages and neutrophils. Pattern recognizing receptors of innate immunity		
	Topic 5. Humoral factors of natural immunity. Complement system		
	Topic 6. Inflammatory mediators		
Adaptive immune response	Topic 7. Humoral immune response		
	Topic 8. Immunoglobulins.		
	Topic 9. Cellular immune response		
	Topic 10. Control of the immune response.		
	Topic 11. Effector reactions of adaptive immunity		
	Topic 12. Anti-infectious immunity		

4.2. Scope of the discipline and types of academic work

Forms of control and types of academic work	Labor intensity of the discipline (module)	
	3	total

1. Face-to-face work:		64,2	64,2
In-class learning in total, including:		64	64
Лекционные занятия (Лек)		16	16
Лабораторные занятия (Лаб)		48	48
Индивидуальная контактная работа (ИКР)		0,2	0,2
2. Independent work of the student:		43,8	43,8
3. Intermediate certification (exam) (зачет)		За	За
Total:	academic hours	108	108
	credit units	3	3

№ item	The section's (theme's) name	Face-to face work, including in the electronic information and educational environment, academic hours				IW, academic hours	Total, academic hours
		Lect.	Pr.	Lab.	ICW		
	Structure and organization of the immune system						
1	Topic 1. Immunology as a modern medical and biological science.	2		4		4	10
2	Topic 2.Antigens	2		4		4	10
3	Topic 3. The concept of immunocompetent cells. The structure of the immune system.	2		4		4	10
	Factors of innate immunity						
4	Topic 4. Macrophages and neutrophils. Pattern recognizing receptors of innate immunity	2		4		4	10
5	Topic 5. Humoral factors of natural immunity. Complement system	2		4		4	10
6	Topic 6. Inflammatory mediators	2		4		4	10
	Adaptive immune response						
7	Topic 7. Humoral immune response			4		4	8
8	Topic 8. Immunoglobulins.	2		4		4	10

9	Topic 9. Cellular immune response	2		4		4	10
10	Topic 10. Control of the immune response.			4		4	8
11	Topic 11. Effector reactions of adaptive immunity			4		3,8	7,8
12	Topic 12. Anti-infectious immunity			4	0,2		4,2
Total academic hours		16		48	0,2	43,8	108

4.3. Summary of the discipline (module), structured by sections (topics)

Раздел 1. Structure and organization of the immune system

Тема 1. Topic 1. Immunology as a modern medical and biological science.

Лекционное занятие. Lecture 1. Introduction to Immunology

Лабораторное занятие. Laboratory lesson 1. Immunity as a way to protect the body.

Тема 2. Topic 2.Antigens

Лекционное занятие. Lecture 2. Antigens

Лабораторное занятие. Laboratory lesson 2. Antigens

Тема 3. Topic 3. The concept of immunocompetent cells. The structure of the immune system.

Лекционное занятие. Lecture 3. The structure of the lymphoid system.

Лабораторное занятие. Laboratory lesson 3. The structure of the immune system. Central organs of the immune system

Раздел 2. Factors of innate immunity

Тема 4. Topic 4. Macrophages and neutrophils. Pattern recognizing receptors of innate immunity

Лекционное занятие. Lecture 4. Receptors of innate immunity.

Лабораторное занятие. Laboratory lesson 4. Macrophages and neutrophils

Тема 5. Topic 5. Humoral factors of natural immunity. Complement system

Лекционное занятие. Lecture 5. The complement system

Лабораторное занятие. Laboratory lesson 5. Complement system

Тема 6. Topic 6. Inflammatory mediators

Лекционное занятие. Lecture 6. Inflammatory mediators.

Лабораторное занятие. Laboratory lesson 6. Inflammatory mediators

Раздел 3. Adaptive immune response

Тема 7. Topic 7. Humoral immune response

Лабораторное занятие. Laboratory lesson 7. Humoral immune response

Тема 8. Topic 8. Immunoglobulins.

Лекционное занятие. Lecture 7. Immunoglobulins.

Лабораторное занятие. Laboratory lesson 8. Immunoglobulins

Тема 9. Topic 9. Cellular immune response

Лекционное занятие. Lecture 8. Cellular immune response.

Лабораторное занятие. Laboratory lesson 9. Cellular immune response

Тема 10. Topic 10. Control of the immune response.

Лабораторное занятие. Laboratory lesson 10. Genetic control of the immune response.

Тема 11. Topic 11. Effector reactions of adaptive immunity

Лабораторное занятие. Laboratory lesson 11. Effector reactions of adaptive immunity

Тема 12. Topic 12. Anti-infectious immunity

Лабораторное занятие. Laboratory lesson 12. Anti-infective immunity

5. Educational technologies

To implement the competence-based approach in the study of the discipline (module), extensive use of active and interactive methods of conducting classes in the educational process is provided:

6. Forms of control and types of evaluation materials for the discipline (module)

Intermediate attestation - evaluation of intermediate and final results of training in the discipline (module).

6.1. Sample list of questions for the credit test

1. History of the development of immunology
2. Antigen, definition, properties of antigen
3. Antigens, classification of antigens
4. Antigens of microorganisms, their characteristics.
5. Types of immunity.
6. Antigens. The structure of the antigen. Hapten.
7. Innate immunity, definition. Classification of factors of innate immunity.
8. Phagocytosis, stages of phagocytosis. Incomplete phagocytosis.
9. Complement. Complement system: classical, lectin, alternative activation pathways.
10. Lysozyme, a role in immunity. Mechanism of action.
11. Cellular factors of innate immunity.
12. Macrophages, their function in immunity.Pathogen-recognizing receptors: TLRs, NLRs.
13. EC, their role in immunity.
14. Immune system: central and peripheral organs.
15. Immunocompetent cells, origin, maturation, functions.
16. Antigen-presenting cells.
17. The main histocompatibility complex.
18. Features of immunity in various bacterial infections.
19. Cellular, Th-1 mediated immunity.
20. Apoptosis.
21. Humoral, Th-2 mediated immunity.
22. Mediators of the immune system. Cytokines. Classification.
23. T-lymphocytes, differentiation of T-lymphocytes.
24. Antigens, chemical nature, properties. The concept of T-dependent and T-independent antigens. Superantigens.
25. Endogenous immunoregulators, thymus and bone marrow hormones and their role in immunity.
26. Mechanisms of presentation and recognition of antigens. The concept of surface markers of immune cells.
27. B.lymphocytes, differentiation, role in immunity.
28. Immunoglobulins of class M, characteristics

29. Class A immunoglobulins, serum and secretory. Role in local immunity.

30. Antigen-antibody reaction. Mechanism, specificity. Serological diagnostics of infectious diseases.

31. Live attenuated vaccines, principles of preparation, examples

32. Immunological tolerance, definition, types, biological significance.

6.2. Sample list of questions for the examination

The exam is not provided.

6.3. Suggested themes of term papers (projects)

Term papers are not provided.

6.4. Suggested themes of term projects

Course projects are not provided.

6.5. Suggested topics of calculation and graphic works

Calculation and graphic works are not provided.

7. Educational, methodological, informational and software support of the discipline (module)

The electronic catalog and electronic information resources provided by the scientific library of the FSBEI of HE "I. N. Ulianov Chuvash State University" are available at the link http://library.chuvsu.ru/

7.1. Regulatory documents, standards and rules

1. Professional standard "Allergologist-immunologist" (approved by the order of the Ministry of Labor and Social Protection of the Russian Federation dated March 14, 2018 138n).

2. Federal State Educational Standard in the specialty 31.08.26 Allergology and Immunology (the level of training of highly qualified personnel)

(approved by the order of the Ministry of Education and Science of the Russian Federation dated August 25, 2014 N 1068)

3. Order of the Ministry of Health of the Russian Federation dated 07.11.2012 N 606n "On approval of the Procedure for providing medical care to the population in the profile "Allergology and immunology".

4. Order of the Ministry of Health and Social Development of the Russian Federation of October 9, 2009 N 819n "On approval of the Procedure for providing medical care by organ transplantation".

5. Order of the Ministry of Health and Social Development of the Russian Federation of April 16, 2010 N 243n "On the organization of specialized medical care".

6. Order of the Ministry of Health and Social Development of the Russian Federation dated February 4, 2010 N 60n "On approval of the procedure for providing medical care to patients with allergic diseases and diseases associated with immunodeficiency".

7. The Code of Professional Ethics of a doctor of the Russian Federation. Adopted by the First National Congress of Doctors of the Russian Federation (Moscow, October 5, 2012).

7.2. Recommended basic educational and methodological literature

№ item	Name
1	Зверев В. В., Бойченко М.Н Медицинская микробиология, вирусология и иммунология : Том 1 [Электронный ресурс]:учебник. - Москва: ГЭОТАР- Медиа, 2019. - 448 с. – Режим доступа: https://www.studentlibrary.ru/book/ISBN9785970444511.html

2	Хаитов Р. М. Иммунология:учебник (на английском языке) : [для медицинских вузов]. - Moscow: GEOTAR-Media, 2019. - 263с.

7.3. Recommended supplementary educational and methodological literature

№ item	Name
1	Сбойчаков В. Б., Карапац М. М. Микробиология, вирусология и иммунология: руководство к лабораторным занятиям [Электронный ресурс]:учебное пособие. - Москва: ГЭОТАР-Медиа, 2018. - 320 с. – Режим доступа: https://www.studentlibrary.ru/book/ISBN9785970448588.html

7.4. List of resources of the "Internet" information and telecommunication network

№ item	Name	Link to the resource
1		

7.5. Software, professional databases, information and reference systems, electronic educational resources and electronic library systems

Software, professional databases, information and reference systems provided by the Informatization Department of the FSBEI of HE "I.N. Ulianov Chuvash State University" are available for download at the link http://ui.chuvsu.ru //. The Unified Register of Russian programs for electronic computers and databases, including freely distributed ones, is available at the link reestr.minsvyaz.ru/reestr /.

7.5.1. Licensed and freely distributed software

Microsoft Windows operating System and/or Unix-like operating system and/or mobile operating system;

Office software packages:

Microsoft Office and/or LibreOffice

and (or) OpenOffice and (or) analogues;

Browsers, including Yandex.Browser.

List of software:

7.5.2. Lists of professional databases and (or) information reference systems and (or) electronic library systems and (or) electronic educational resources

8. Material and technical support of the discipline

Classrooms for lecture-type classes in the discipline are equipped with a teacher's automated workplace consisting of: a personal computer/laptop, multimedia equipment with a screen and (or) SMART interactive whiteboard/SMART TV.

The premises for students' independent work are equipped with computer equipment enabling to connect to the Internet and provide access to the electronic information and educational environment of the FSBEI of HE "I.N. Ulianov Chuvash State University".

№ item	Lesson type	Brief description and characteristics of the composition of installations, measuring and diagnostic equipment, computer equipment and experimental automation tools
1	Зачёт	Учебная аудитория для проведения занятий лекционного и семинарского типа, текущего контроля и промежуточной аттестации. Учебная мебель. Оборудование: учебная доска Стационарное и/или переносное мультимедийное оборудование.
2	ИКР	Учебная аудитория для проведения групповых и индивидуальных консультаций. Учебная мебель. Оборудование: учебная доска. Стационарное и/или переносное мультимедийное оборудование.
3	Лаб	Учебная аудитория для занятий семинарского типа, текущего контроля и промежуточной аттестации. Оборудование: учебная доска, учебная мебель, вытяжной шкаф, фотометр фотоэлектрический КФК-3-01, переносное мультимедийное оборудование (проектор, экран, ПК или ноутбук)
4	Лек	Учебная аудитория для проведения занятий лекционного и семинарского типа, текущего контроля и промежуточной аттестации. Учебная мебель. Оборудование: учебная доска Переносное мультимедийное оборудование и/или стационарное мультимедийное оборудование. Ноутбуки.
5	Ср	Помещение для самостоятельной работы обучающихся. Оборудование: компьютерная техника с подключением к сети Интернет и доступом к электронной информационно-образовательной среде ФГБОУ ВО «Чувашский государственный университет имени И.Н. Ульянова»

9. Means of adapting the discipline teaching to the needs of persons with physical conditions

If necessary, persons with physical conditions can be offered one of the following options for perceiving information, taking into account their individual psychophysical characteristics:

1) using e-learning and distance learning technologies.

2) using special equipment (enginery) and software in accordance with the students' health restrictions in the Training Centers for Persons with Disabilities and Physical Conditions (hereinafter referred to as special needs) available at the university.

In the course of training, if necessary, the following conditions are provided for persons with visual, hearing and musculoskeletal disorders:

- for persons with visual impairments: educational and methodological materials in printed form in enlarged font; in the form of an electronic document; in the form of an audio file (conversion of educational materials into audio format); in printed form in Braille; individual consultations involving a tactile interpreter; individual assignments and consultations.
- for people with hearing impairments: educational and methodological materials in printed form; in the form of an electronic document; video materials with subtitles; individual consultations involving a sign language interpreter; individual assignments and consultations.
- for persons with disorders of the musculoskeletal system: educational and methodological materials in printed form; in the form of an electronic document; in the form of an audio file; individual assignments and consultations.

10. Guidelines for students to perform independent work

The purpose of the student's independent work (IW) is to consolidate the theoretical knowledge gained and to acquire practical skills in using and performing research of algorithms and data structures when designing application software programs. IW includes independent study of educational issues, preparation for laboratory classes, performing calculation and graphic work, preparation for a test and an exam.

The list of questions and tasks for independent work to prepare for laboratory classes is given in the corresponding methodological instructive regulations in the description of each laboratory work.

The list of questions and tasks for independent work to carry out calculation and graphic work is given in the relevant methodological instructive regulations.

Independent work of students is an integral part of the educational process. The purpose of independent work is to prepare a modern competent specialist and to form abilities and skills for continuous self–education and professional improvement.

The implementation of this goal involves solving the following tasks:

- qualitative development of theoretical material in the discipline under study, deepening and expanding theoretical knowledge in order to apply them at the level of interdisciplinary connections;
- systematization and consolidation of the acquired theoretical knowledge and practical skills;
- formation of skills in the search and use of normative, legal, reference and special literature, as well as other sources of information;
- development of cognitive abilities and activity, creative initiative, independence,

responsibility and organization;

- formation of independent thinking, abilities for self-development, self-education, self-improvement and self-realization;

- development of research skills;

- formation of the ability to solve practical problems (in professional activity) using acquired knowledge, abilities and skills.

Independent work of students in allergology and immunology includes extracurricular independent work on the study of basic and additional educational literature, the use of modern information technologies to search for information on newly introduced technologies in allergology and immunology, classroom independent supervision of patients with allergo- and immunopathology. This work is carried out under the supervision of a teacher during practical and laboratory classes. For compulsory extracurricular independent work in the work program, additional study hours are allocated for sections of the discipline.

11. Methodological instructive regulations for students studying the discipline (module)

The discipline "Immunology" allows students to instill the skills necessary in the activities of a dentist for immunodiagnostics and the use of immunotropic therapy, assessment of immune status. Therefore, students should rely mainly on the knowledge and skills acquired during lectures and practical classes. This provides the necessary basis for further in-depth study of other disciplines. However, this knowledge needs to be activated. For independent preparation for laboratory classes, study of educational issues, preparation for the test, the following sources can be recommended:

• lecture notes and materials of laboratory classes;

• educational literature of the relevant profile.

At the beginning of the course, the teacher informs students about the forms, types and content of independent work, explains the requirements for the results of independent work, as well as forms and methods of control and evaluation criteria.

11.1. Methodological instructive regulations for preparing for seminar-type classes

Not provided

11.2. Methodological instructive regulations for preparing for an examination

Not provided

11.3. Methodological instructive regulations for preparing for a test

Preparation of students for passing the test includes:

- viewing the program of the training course;

-identification of sources necessary for the preparation (textbooks, additional literature, etc.) and their study;

- use of lecture notes, materials of laboratory classes;

- consulting with a teacher.

Preparation for the test begins with the first lesson in the discipline, at which students receive a general teacher's attitude and a list of basic requirements for current and final reporting. At the same time, it is important to systematically master the material from the very beginning, guided, first of all, by the list of questions for the test, to take notes of sources important for solving educational tasks. During the semester, the replenishment, systematization and adjustment of student developments, the development of new and consolidation of already studied material take place.

11.4. Methodological instructive regulations for performing computational and graphical

Not provided

11.5. Methodological instructive regulations for performing a control work

Not provided

11.6. Methodological instructive regulations for performing a course work (project)

Not provided

List of additions and changes

The name and details (if any) of the document attached to the Working Program of the discipline (module) containing the text of updates	Department's decision		Full name of department head:
	Date	Protocol №	