

**FEDERAL STATE BUDGETARY EDUCATIONAL INSTITUTION  
OF HIGHER EDUCATION  
«BASHKIR STATE MEDICAL UNIVERSITY»  
OF THE MINISTRY OF HEALTHCARE OF RUSSIAN FEDERATION**

DEPARTMENT REPRODUCTIVE HUMAN HEALTH  
WITH COURSE OF IMMUNOLOGY

APPROVED by  
Head of the department

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**Methodical recommendations For students  
to the practice session on the topic:  
«Principles of immunoprophylaxis and immunotherapy»**

Discipline: Clinical Immunology  
Specialty: 31.05.01. «General education»  
Course 4  
Semester 7  
Hours: 4

Ufa - 2021

Methodological instructions for students for practical lessons in the discipline "Clinical Immunology " were developed by the faculty of the department in accordance with the work program of the academic discipline (Ufa, 2021), the curriculum (2021) and taking into account the requirements of the Federal State Educational Standard of Higher Education 3 ++ according to specialty 31.05.01 General education (M., 2020).

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(Kurcer M. A.)

## 1. The theme and its relevance: "Principles of immunoprophylaxis and immunotherapy.»

Immunobiological medicines are drugs whose active substances are of biological origin (or are artificially synthesized analogues of natural substances) and are intended for specific prevention (immunoprophylaxis), diagnosis and treatment (immunotherapy) of infectious or allergic diseases. Immunobiological drugs act either on the immune system, or through the immune system, or the mechanism of their action is based on immunological principles. These drugs are used for the prevention, treatment and diagnosis of infectious diseases and those non-communicable diseases in the development of which the immune system is involved. Immunobiological medicines are used to activate, suppress, or normalize the immune system.

Immunobiological medicines may include stabilizers, adjuvants, preservatives, and other substances that improve the quality of drugs. All of them act on the basis of immunological principles and / or affect the immune system.

The introduction of immunobiological drugs into the human body leads to the development of artificially acquired active (vaccines, toxoids) or passive (human immunoglobulins are normal and specific) immunity. Immunobiological drugs are widely used for the prevention and treatment of infectious, non-infectious and oncological diseases, allergies, immunopathological conditions, immunodeficiency and other diseases, as well as in transplantology. They are often the only way to fight infectious diseases.

Only thanks to vaccination on the globe, it was possible to eliminate smallpox, polio on most continents, and dramatically reduce the incidence of measles, mumps, and rubella. In the treatment of a number of toxinemic infections (botulism, tetanus, and others), serotherapy, that is, the use of antitoxic serums and immunoglobulins, is of leading importance.

Currently, there are 5 main groups of Immunobiological medicines (A. A. Vorobyov). The first group - Immunobiological medicines obtained from live or killed microbes (bacteria, viruses, fungi) or microbial products and used for specific prevention and treatment: live and inactivated vaccines, subunit vaccines, toxoids, bacteriophages, probiotics.

The second group - Immunobiological medicines based on antibodies (AB): immunoglobulins, immune sera, immunotoxins, AB-enzymes, receptor AB, mini-AB.

The third group - immunomodulators for immunocorrection, treatment and prevention of infectious, non-communicable diseases, immunodeficiency states. This group includes exogenous and endogenous immunomodulators.

The fourth group - adaptogens-complex chemicals of plant origin, with a wide range of biological activity, acting on the immune system.

The fifth group includes diagnostic drugs and systems for the specific diagnosis of infectious and non-infectious diseases, which can be used to identify antigens, AB, enzymes, metabolic products, biologically active substances, and foreign cells.

## 2. Learning purpose: mastering knowledge about the concept of Immunity, types. Factors of non-specific resistance, knowledge of pathogenesis of each type of reaction and clinical manifestations.

To form professional competencies, the student must know:

- indications for immunoprophylaxis and immunotherapy;
- anatomical and physiological features of the functioning of organs and systems during immunoprophylaxis and immunotherapy;
- features of the immune response during immunoprophylaxis and immunotherapy;
- contraindications for immunoprophylaxis and immunotherapy;
- complications from during immunoprophylaxis and immunotherapy.

To form professional competencies, the student must be able to:

- сбор анамнеза, определение плана обследования органов и систем пациента для определения показаний к иммунопрофилактике и иммунотерапии;
- определите план дополнительного обследования пациента перед иммунопрофилактикой и иммунотерапией;

- оценить результаты клинических и лабораторно-инструментальных данных для определения показаний к иммунопрофилактике и иммунотерапии;
  - оценить результаты клинических и лабораторно-инструментальных данных для выявления осложнений после иммунопрофилактики и иммунотерапии;
- master the following competencies: GC 1, GC 6, GPC 5, PC 1, PC 5\_.

### 3. Materials for self-preparation to master this topic:

#### Self-training questions:

1. Give the concept of "Immunobiological medicines»
2. Indications for the use of the Immunobiological medicines.
3. Classification of the Immunobiological medicines.
4. Classification of vaccines.
5. Purpose of vaccination.
6. The composition of vaccines.
7. Periods of formation of specific antibodies during the initial administration of the vaccine.
8. The concept of "Associated vaccines".
9. Postvaccinal reactions.
10. Types of toxoids.
11. Immunobiological medicines based on specific AB.
12. The concept of "Monoclonal antibodies".
13. Diagnostic immunobiological preparations.
14. Immunomodulators, their classification.

### 4. Type of lesson: practical lesson

#### 5. Duration: 4 hours

#### 6. Equipment: computer, projector

#### 7. The content of the lesson..

- 7.1. Control of the initial level of knowledge and skills. Self-control assignments: students' decision on individual sets of test assignments on the topic

#### Self-control tasks: students' decision on individual test sets on the topic:

##### **Task 1.** Antiresus-gamaglobulin is used..

- A) For the treatment of hemolytic disease of newborns associated with the incompatibility of the rhesus of the mother and the fetus.
- B) To prevent rhesus conflict at the time of repeated delivery to Rh-negative mothers.
- C) For the treatment of staphylococcal infection, influenza, whooping cough.

##### **Task 2.** Which of these structural elements of the influenza virus can induce the creation of antibodies that have pronounced protective actions against influenza?

- A) Neuraminidase.
- B) Hemagglutinin.
- C) Nucleic acid.
- D) The shell.

##### **Task 3.** Antibodies specific to the hemagglutinin of the influenza virus neutralize this virus...

- A) By activating the complement along the classical pathway.
- B) Causing virus aggregation.
- C) By inhibiting the binding of the virus to the cell receptor and preventing it from entering the cell.
- D) Violation of the function of viral aminidase.

##### **Task 4.** The effectiveness of interferon treatment is higher with...

- A) Combined treatment.
- B) Isolated use of the drug.
- C) There is no significant difference.

##### **Task 5.** Is there a synergistic effect of chemotherapy drugs and interferon?

- A) Yes.

- B) No.
- C) There is no definite pattern.

**Task 6.** Indications for intravenous administration of immunoglobulins:

- A) congenital immunodeficiency
- B) secondary immunodeficiency
- C) bacterial infection
- D) viral infection
- E) allergy
- (F) Endotoxic shock.

**Task 7.** Which immunomodulators are most effective in secondary immunodeficiency caused by virus persistence

- A) Timalin
- (B) Polyoxidonium
- C) Myelopid
- D) Galavit
- E) Sodium nucleinate

**Task 8.** Specify the main effects that are provided by the inclusion of immunostimulants in the complex of antitumor therapy.

- A) Reduction of the tumor.
- B) Reduction of T-suppression.
- C) Stimulation of the immune response.
- D) Suppression of the immune response.

**Task 9.** Which of the following drugs with immunosuppressive properties are used to treat autoimmune diseases?

- A) CyclospoinA.
- B) Azathioprine.
- © Cyclophosphamide.
- (D) Methotrexate.
- E) None of the above.

**Task 10.** In which autoimmune diseases is immunosuppressive therapy the method of choice?

- A) Autoimmune uveitis.
- B) Bazed's disease.
- C) Insulin-dependent diabetes.
- D) Systemic lupus erythematosus.
- E) Rheumatoid arthritis.
- F) None of the above.

**Task 11.** Types of vaccines...

- A). live,
- B). inactivated,
- C). chemical,
- D). recombinant,
- E). anatoxins
- F). needle-shaped

**Task 12.** Indications for preventive vaccinations...

- A). planned events,
- B). on epidemic indications.
- C). on demand

**Task 13.** Homologous immune sera and immunoglobulins are obtained:

- A) by hyperimmunization of animals
- B) by single immunization of animals
- C) from the blood of donors
- D) by attenuation
- E) from the blood of twins

**Task 14.** Heterologous sera and immunoglobulins are administered:

- A) the entire dose at once
- B) fractional by the method of A.M. Bezredko
- C) intramuscularly
- D) intravenously
- E) intradermally

**Task 15.** The most severe complication with the use of heterologous sera and immunoglobulins:

- A) toxic reactions
- B) urticaria
- C) serum sickness
- D) anaphylactic shock
- E) dysbacteriosis

**Task 16.** The principles of obtaining attenuated strains of microorganisms were developed by:

- A) E. Jenner
- B) R. Koch
- C) P. Ehrlich
- D) D. Bergey
- E) L. Pasteur

**Task 17.** Anatoxins contain:

- A) somatic antigen
- B) neutralized bacterial exotoxins
- C) neutralized bacterial endotoxins
- D) bacterial exotoxins
- E) antitoxins

**Task 18.** Diphtheria toxoid causes the formation of immunity:

- A) antibacterial
- B) antitoxic
- C) anti-idiotypic
- D) antiviral
- E) mixed

7.2. Analysis with the teacher of the key questions necessary for the development of the topic of the lesson.

7.3. Presentation by the teacher of the methodology for assessing the state of factors of non-specific protection of the body in the laboratory.

7.4. Independent work of students under the supervision of a teacher (draw in a notebook the stages of phagocytosis, the main schemes of complement activation).

7.5. Control of the final level of assimilation of the topic:

The teacher checks the students' oral answers to the questions of self-preparation.

Checking the presence of drawings of phagocytosis stages and the main schemes of complement activation in the notebooks.

Materials for monitoring the level of development of the topic:

- a set of test tasks,
- situational tasks.

Place of self-training: study room for independent work of students.

**Educational and research work of students on this topic (conducted during school hours): working with the main and additional literature.**

## The main literature

Serial№	Title	Author(s)	Year, place of publication	Number of copies	
				In library	At the department
1	2	3	4	7	8
▶	<b>Basic Immunology: Functions and Disorders of the Immune System</b> [Текст] : [учебноеиздание]	<b>A. K. Abbas, A. H. Lichtman, S. Pillai.</b>	Elsevier, 2016 – 335 p.	80	0

## Additional literature

Serial №	Title	Author(s)	Year, place of publication	Number of copies	
				In library	At the department
1	2	3	4	7	8
	Lectures in immunology: курс лекций	Maianskii, A. N.	N. Novgorod: Publishing house NSMA, 2004 – 256 p.	40	0
•	<b>IMMUNOLOGY</b>	<b>Khaitov R.M.</b>	<b>2008 – 256 c.on-line.</b>	<b>access mode:</b> ЭБС «Консультант студента»  <a href="http://www.studmedlib.ru/book/ISBN9785970407042.html">http://www.studmedlib.ru/book/ISBN9785970407042.html</a>	unlimited access
•	<b>Fundamental Immunology.</b>	<b>Lippincott Williams &amp; Wilkins</b>	<b>2008 –on-line</b>	<b>access mode:</b> Database«LWW Medical Book Collection 2011»  <a href="http://ovidsp.ovid.com">http://ovidsp.ovid.com</a>	unlimited access

