

**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:  
«Autoimmune diseases»**

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

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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## 1. The theme and its relevance: "Autoimmune diseases»

Apparently, the first to raise the question of the reasons for the absence of immunological reactions to self antigens was the immunologist at the turn of the 19th and 20th centuries. P. Ehrlich. Having no rational approaches to getting an answer to this question, he formulated an axiomatic formula (fear of self-poisoning).

The problem of discrimination between one's own and another's acquired particular relevance in the 1950s. of the last century in connection with the proof of the immunological nature of transplant rejection, the discovery of the phenomenon of immunological tolerance and the first successes in studying the nature of autoimmune diseases. The need to solve this problem gave birth to the clonal selection theory of F. M. Burnet, perhaps the most productive theory in the history of immunology.

In accordance with one of the main postulates of this theory, lymphocytes carry on their surface receptors for antigen recognition, and these extremely numerous receptors are distributed in a population of lymphocytes clonally in such a way that each clone carries a receptor of one specificity.

Another postulate was that the nature of the reaction of lymphocytes to antigen binding depends on the degree of maturity of the cell and the organism: immature cells that prevail before the onset of the "immunological maturity" of the organism die in response to contact with the antigen, while mature cells are activated, which serves as the basis for the immune response. . That is why all clones of lymphocytes, whose receptors recognize the body's own antigens, have time to be eliminated before the period of immunological maturation.

Clones of lymphocytes that recognize foreign (not belonging to the body) molecules are preserved and, when these antigen molecules enter the immunologically mature organism, provide its protection by developing an immune response. None of the provisions of this theory has been refuted, although many have been clarified or reformulated.

A consequence of this theory was the possibility of inducing non-response (tolerance) to antigens introduced into the body before the onset of immunological maturity, which was proved by P. Medawar and his colleagues. They succeeded in inducing immunological tolerance to alloantigens (Burnet's own attempt to obtain tolerance to viral antigens was unsuccessful).

Thus, the currently generally accepted idea has developed that the absence of an immune response to self antigens is a consequence of the formation of immunological tolerance at a certain stage of ontogenesis (mainly by the time of birth or the first days of postnatal life).

Currently, active and passive mechanisms of self-tolerance formation are distinguished. There are four main active mechanisms for the formation of autotolerance (Table 1, Figure 1):

- 1) elimination of autospecific clones (central mechanism of autotolerance);
- 2) editing genes for autospecific receptors;
- 3) induction of anergy of autospecific clones (peripheral mechanism of autotolerance);
- 4) suppression of the autospecific response by regulatory cells (the dominant mechanism of autotolerance).

## 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:

- Anatomy-physiological features of non-specific resistance;
- the role of each factor of non-specific resistance in anti-infective protection;
- clinical manifestations of insufficiency of various factors of nonspecific resistance.

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

- determine the intensity of innate immunity;
- detect the presence of agglutination and establish the titer of normal antibodies;
- collect anamnesis, determine the plan of examination of the patient by organs and systems, which will allow to assess the functioning of factors of nonspecific resistance of the immune system;
- determine the plan for additional examination of the patient;
- evaluate the results of clinical and laboratory-instrumental data;
- 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. Self-tolerance and mechanisms of its formation
2. Mechanisms of natural autotolerance
3. Characteristic of autoimmune processes
4. Organ-specific and organ-non-specific autoimmune diseases
5. The role of infectious agents and environmental factors in the development of autoimmune diseases
6. Principles for diagnosing autoimmune diseases
7. Treatment of autoimmune diseases

#### 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

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] : [учебное издание]	<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/ ISBN978597040 7042.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

## TASKS

1. The patient has previously been diagnosed with insulin-dependent diabetes mellitus type I.

Questions: What indicators should be determined to confirm the diagnosis? Write the normal indicators and levels of indicators indicating the developed disease.

2. The patient was previously diagnosed with autoimmune thyroiditis.

Questions: What indicators should be determined to confirm the diagnosis? Write the normal indicators and levels of indicators indicating the developed disease.

3. The patient was previously diagnosed with Crohn's disease - a severe autoimmune disease of the small intestine.

Questions: What indicators should be determined to confirm the diagnosis? Write the normal indicators and levels of indicators indicating the developed disease.

4. The patient was previously diagnosed with autoimmune atrophic gastritis. Chronic autoimmune gastritis accounts for 15-18% of all forms of chronic gastritis. The disease is characterized by diffuse atrophy of the gastric mucosa with a violation of its physiological regeneration, a decrease in the number of glandular cells, a disorder of secretory, motor function.

Questions: What indicators should be determined to confirm the diagnosis? Write the normal indicators and levels of indicators indicating the developed disease.

5. The patient was previously diagnosed with rheumatoid arthritis - a chronic systemic inflammatory disease, accompanied by damage to the joints, less often serous membranes and small vessels.

Questions: What indicators should be determined to confirm the diagnosis? Write the normal indicators and levels of indicators indicating the developed disease.