

**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:  
«Allergic diseases.»**

Discipline: Clinical Immunology  
Specialty: 31.05.03. «Dentistry»  
Course 2  
Semester 3  
Hours: 4 Hours

Ufa - 2021

Methodological instructions for students for practical lessons in the discipline " 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 31.05.03 Dentistry (M., 2020).

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(Kurcer M. A.)

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

Allergy - a specific hypersensitivity to antigens (allergens) as a result of inadequate immune system response. The modern definition understands allergy as an increased perverted specific reaction of macroorganism to the re-contact of the body with the antigen (allergen).

According to official statistics in Russia, 10 to 15% of the population is exposed to allergic diseases. The results of the study of the incidence and prevalence of allergic diseases in different countries show that these diseases currently affect up to 20-40% of the population.

The prevalence of allergic diseases has higher rates in regions (areas) with environmentally unfavourable conditions caused by anthropogenic effects on the environment, and depends on the nature of allergenic both climate and geography; hence the need for constant regional monitoring and control of allergic morbidity.

Thus, the incidence of allergic rhinitis according to in-depth studies is from 7 to 12% (international statistics - up to 20% of the population); asthma - 7 to 11% of the population.

The problem of allergic diseases is the most important medical and social problem of our time, the importance of which will certainly increase in the years to come. The solution of the actual practical medical issues of this problem depends to a large extent on the level of training in allergy and immunology not only of allergists, but also of general practitioners, whose main task is to consists in the timely initial selection of patients with suspected diagnosis of allergic diseases (and their lung forms) and the referral of patients to specialized medical and preventive units.

**The first classification** of allergies was proposed by Robert Cook in 1947. Immediate hypersensitivity and delayed-type were highlighted. The mechanisms and clinical manifestations of them are different.

**Immediate hypersensitivity** is caused by antibodies (IgE, IgG, IgM) against allergens. It develops a few minutes or hours after exposure to the allergen: the vessels expand, increase their permeability, develop itching, rash, swelling. With the help of specific antibodies or clone antigenoractive B-lymphocytes allergy can be transferred from the patient healthy. Possible specific desensitization of the patient, which in some cases gives a lasting effect.

**Delayed-typehypersensitivity** is mediated by the cellular link of immunity. HRT reactions occur after a second encounter with the allergen after 6-8 hours and later. This type of allergy can occur in the form of contact allergies, reactions to skin-allergic sample, slow-motion allergy to proteins. Transfer of allergy from a patient to a healthy one is possible only with a cell pool. Specific therapy is usually ineffective.

## 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:

- anatomical and physiological features of organs and systems involved in the formation of allergies;
- methods of diagnosis of different types of allergic reactions;
- clinical manifestations of different types of allergic reactions.

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

- **collect anamnesis, determine the patient's examination plan for organs and systems;**
- **determine the plan of additional examination of the patient;**
- **evaluate the results of clinical and laboratory-instrumental data;**
- **formulate a diagnosis in accordance with the modern classification;**
- **assign a treatment plan;**
- **prescribe methods of primary and secondary prophylactically.**
- **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). Allergy theory. Major and minor allergens.

- 2). Allergy definition, etiology of allergic reactions.
- 3). Classification of allergic reactions.
- 4). Stages of allergic reactions.
- 5). Clinical manifestations of each type of allergic reactions.
- 6). The main methods of diagnosing allergic reactions.
- 7). The main methods of preventing allergic reactions
- 8). Antigen-specific immune therapy. Principles of therapy. Possibilities.

#### 4. Occupation view: practice

5. Duration: 4 hours

6. Equipment: computer, projector

#### 7. The plan of the lesson.

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

#### Task 1. Answer the questions

##### Variant 1

#### 1. Allergy clinics manifest themselves on:

- A. repeated contact with the allergen
- B. of primary contact with the allergen
- C. primary and repeated contact with the allergen

#### 2. In type I hypersensitivity, synthesized IgEs are attached:

- A. Fc-fragment to Fc receptors of basophils of blood and mast cells of the mucous membranes
- B. of the Fc-fragment to the complement, which is activated along the classical path with the formation of anaphylatoxins (C5a, C3a)
- C. to the macrophage and induce local inflammation

#### 3. The clinic is type III hypersensitivity, when immune complexes form directly in the bloodstream (AG and AT are simultaneously in blood plasma):

- A - vasculitis phenomenon
- B - Arthritis
- C - aspergillosis

##### Variant 2

#### 1. Anaphylaxis can manifest itself in the form of:

- A -local (on the skin and mucous) and systemic (anaphylactic shock) reaction
- B - local (on the skin and mucous) systemic (anaphylactic shock) reaction

#### 2. Desensitization by The Bezredky is a method used to prevent complications after:

- A - introduction of therapeutic and preventive serums
- B - introduction of therapeutic and preventive vaccines
- C - skin-allergic samples

#### 3. The main stages in the development of allergic reactions according to ADO:

- A. immunological, pathochemical, pathophysiological
- B. macrophage, lymphocytic, humoral
- C. inductor, effector
- D. hidden, visible

##### Variant 3

#### 1. In type I, hypersensitivity facilitates the switch of IgM-precursors of B-lymphocytes to IgE who carry:

- A. Interleukin -4
- B. Necrotizing tumor factor - $\alpha$
- C. Interleukin -1
- D. Interleukin -2

**2. Anemia, leukocytopenia, thrombocytopenia, agranulocytosis are clinic of:**

- A. type II allergic reaction
- B. type I allergic reaction
- C. type III allergic reaction

type IV allergic reaction

**3. The main stages in the development of allergic reactions by A.D.Ado:**

- A. immunological, pathochemical, pathophysiological
- B. macrophagy, lymphocytic, hummoral
- C. inductor, effector
- D. hidden, visible

**Task 8.**

**Typical tasks.**

**Situation №1.**

An ambulance team was called to the patient L., 35 years old. About 20 minutes ago, there were complaints of anxiety, a sharp headache, difficulty breathing, skin rashes all over the body with itching. It was found that 30 minutes before the arrival of the ambulance team, the patient with bilateral small-focal pneumonia was given the first injection of ampicillin intramuscularly. At the age of 20, when treated with antibiotics for acute purulent otitis, there was a reaction in the form of a short-term rash. Objectively: the patient is inhibited, on the skin of the face, trunk and extremities - blisters of various sizes, discharge character, on a hyperemic base. Cold, clammy sweat. The respiratory rate is 56 /min, the exhalation is prolonged, whistling wheezes are heard. The borders of the heart are not expanded, the tones are muted. Blood PRESSURE is 60/20 mm Hg. art., pulse 160 min<sup>-1</sup>, thread-like.

1. What disease can be assumed in this patient?
2. What is the type (give a name) of allergic interaction of allergens and antibodies according to the classification of Jell and Coombs?
3. What is the type of reaction according to Cook's classification?
4. Can ampicillin be considered a full-fledged allergen?
5. What is the pathogenesis of clinical manifestations in this pathology?
6. What first aid measures are needed in this situation.
7. What preventive measures could prevent such a condition?

**Situation №2.**

Patient V., 38 years old, after local anesthesia at the dentist's office, suddenly had a sharp pain that spread throughout the abdomen, increasing with movements and when trying to take a horizontal position, so the patient is in a semi-sitting position. In addition, I am concerned about nausea, there was a single vomiting. On palpation, there is pain in the entire anterior abdominal wall, muscle tension in the anterior abdominal wall, and a positive shchetkin-Blumberg symptom. Objectively: the patient is pale, with a sticky, cold sweat on his face. Respiratory rate-34 min<sup>-1</sup>, blood PRESSURE-90/40 mm Hg. St., heart rate-110 min<sup>-1</sup>, thread-like. The patient was injected with baralgin intramuscularly, and an ambulance was called due to a suspected acute abdomen. Previously, the patient noted allergic reactions to certain medications (including local anesthetics) in the form of urticary rash.

1. What disease can be assumed in this patient?
2. What is the type (give a name) of allergic interaction of allergens and antibodies according to the classification of Jell and Coombs?
3. What is the type of allergic reaction according to cook's classification?
4. What was the cause of the disease?
5. What mistake did the dentist make?
6. What first aid measures are needed in this situation?
7. What preventive measures could prevent such a condition?

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	unlimited access

				Collection 2011» <a href="http://ovidsp.ovid.com">http://ovidsp.ovid.com</a>	
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