

Ministry of health care of Ukraine  
Highest state scientific institution of the Ukraine  
«Ukrainian medical stomatological academy»

"Approved"

at a meeting of the Department of Experimental  
and Clinical Pharmacology with Clinical  
Immunology and Allergology

**Head of the department**

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**Methodical guidance  
for students' self-directed  
work when preparing for practical session**

Academic discipline	Clinical Immunology and Allergology
Semantic module №2	Allergic, toxic and allergic diseases
Topic <b>10</b>	<b>Atopic disease. Immune mechanisms of allergy development. Allergodiagnosics. Emergency care in allergy</b>
Year of study	5
Faculty	medical

### 1. Relevance of the topic:

Over the past two decades, the frequency of allergic diseases has increased dramatically, especially in developed countries and in countries with adverse environmental conditions. Scientists predict that the twentieth century will be the century of allergic diseases. Today there are more than 20000 allergens and their number continues to grow. Under commonly understood allergic manifestations of hypersensitivity of the immune system to an allergen (antigen) by repeated contact with it, it is clinically characterized by damage in the first place the body tissues through which penetrates allergen.

The reasons for increasing the frequency of allergic diseases appear various factors: changes in the structure of infectious diseases, hereditary factors and environmental factors.

### 2. Specific learning objectives

1. Conduct a survey and physical examination of patients with allergic and atopic diseases.
2. To determine the etiologic (group of allergens) and pathogenetic (types of immune reactions) factors of allergic diseases.
3. Explain the basics of allergy research methods (laboratory tests, skin tests, provocation tests, etc.).
4. To prepare a plan of examination of patients with allergic diseases, to justify the use of basic diagnostic methods used in allergy, to determine the indications and contraindications for their claim, possible complications.
5. Identify the different variants of the course and complications of allergic diseases.
6. Clearly call drugs that should be administered in case of emergency in allergy.
7. Be able to define the main provisions of atopic march to know the principles of the differential diagnosis of bronchospastic syndrome and atopic neatoiches who genesis.

### 3. Basic knowledge, skills necessary for studying the subject (interdisciplinary integration)

The name of the previous disciplines	These skills
Anatomy I	Knowing the structure of the thymus, lymph nodes, Peyer's patches, spleen, bone marrow. To conduct physical examination of patients.
Physiology	To know the functioning of the central and peripheral organs of the immune system. Master the basics of clinical and laboratory studies.
Biochemistry	Learn the basics of biochemical laboratory studies. Action and effect of various cytokines groups of biologically active substances.
Microbiology and Virology	Know the immune response, diagnosis of bacterial and viral infections. Master the basics of special microbiological methods.
Therapy	Know the pathogenesis and clinical manifestations of allergic diseases and secondary immunodeficiencies. To be able to collect immunological and allergic history.
Phtisiatry	Learn the mechanisms of development of cells internally the dependence of the immune response. The course and clinical manifestations of tuberculosis.
Infection disease	Learn the pathogenesis, clinical manifestations of bacterial and viral infections. To be able to diagnose bacterial and viral infections.

### 4. Tasks for work during preparation for the classes.

4.1. The list of key terms, parameters, characteristics which the student is to assimilate while preparing for the class:

Term	Definition
Allergical illness	This group of diseases which are based on damage caused by the immune reactions to exogenous allergens
Anabiltic	Antigen-specific immune response is mediated predominantly E-antibodies

	in which the tissues of the released histamine, causing local or general allergic reactions.
Eozinofiles	Class granulocyte containing pellet and filled with chemical substances capable of damaging parasites, and enzymes that cause the development of inflammatory reactions
Hay fever ( <i>hay fever</i> )	A variety of allergies, the occurrence of which is related to the impact on the human organism pollen; the main manifestation of this type of allergy is an inflammation of the nasal mucosa, sometimes conjunctivitis (vernal conjunctivitis (vernal conjunctivitis)).
IL-5	Eosinophilic factor. Activates eosinophils and prolongs their persistence in the neighborhood of eosinophilic inflammation.

#### 4.2. Theoretical questions for the class:

1. The reasons for Allergic disorders. Stages of formation of allergic reactions.
2. Allergy and atopy. Classification allergens. The causes and mechanisms of allergic conditions.
3. Methods of diagnosis of allergy: laboratory techniques, skin tests and provocative tests.
4. Principles of anti-allergic therapy and emergency care in allergy.
5. Hay fever, allergic rhinitis, allergic conjunctivitis: etiology, immunopathogenesis, clinical allergodiagnosics basic principles immunotherapy.
6. Features immunopathogenesis of asthma, the basic principles of the differential diagnosis bronchospastic syndrome.

#### 4.3. Practical works that are performed in class:

1. Learn how to determine the need for clinical and allergy testing.
2. Conduct a survey and physical examination of patients of allergy (allergic history to be able to collect, to determine the presence of a genetic predisposition to form Allergic pathology).
3. To prepare a plan of examination of patients with allergic diseases.
4. Master the skills to perform skin allergy tests (skin prick tests).
5. Mastering these skills assessment allergy laboratory tests.
6. Master the skills and perform evaluate its performance.
7. To conduct differential diagnosis, justify and formulate the diagnosis of major allergic diseases based on data analysis of laboratory and instrumental examination at the main allergic diseases on the basis of data analysis.

#### Content topics

**Allergen** - a substance that causes the development of allergic reactions. Differs from the allergen atigena? The most important thing - the end result of their actions. If the introduction of the substance leads to the development of an allergic reaction, then it is called an allergen, if by the immune - antigen. Thus, allergens have all the properties of antigens: Macromolecule, primarily proteins of natural, foreign to this organism, antigenicity, immunogenicity and specificity. Allergic reactions can also cause haptens - they become allergens only after the connection with the proteins of the body tissue and the formation of the so-called conewgard(or complex) antigens.

Classification of allergens (AD Ado, Polner AA, 1963):

I. Exogenous:

- 1) Noncommunicable - domestic; epidermal; pollen; food; industrial; drugs
- 2) Infectious - bacterial; yeast; viral

II. Endogenous:

- 1) Materials: lens tissue, thyroid gland, semen, myelin.
- 2) Acquired: due to changes in the ownership structure of protein molecules.

#### Stages of development of allergies

**Sensitization** - is immunologically-mediated hypersensitivity to antigens (allergens) exogenous (or endogenous) origin.

Ado AD (1970) identifies three stages of reaction:

1) Immunology: re-entering the allergen into the body, the formation of antibodies and (or) the sensitized lymphocytes, their association with an allergen (in the organism was again or persists in the body).

2) pathochemical: the formation of biologically active mediators, and their exit from the cell.

3) A pathophysiological stage (or the stage of clinical manifestations). Pathogenic action of mediators formed in the cells, organs and tissues of the body.

### **Immunological stage of allergic diseases**

It is considered proven that the allergic reaction is a kind of immunological (purely defensive), but the fundamental difference from the first is that they are accompanied by damage to their own organs and tissues.

### **DIAGNOSIS OF ALLERGIC DISEASES**

The vast majority of allergic diseases are manifested by such basic syndromes:

Below is a sequence (stages) of diagnosis of allergic diseases:

1. Collection of complaints and in-depth history.
2. An objective examination of the patient.
3. Conduct of skin allergy tests.
4. The provocative tests.
5. Functional tests.
6. Laboratory and instrumental examination.
7. Consulting other professionals.

Mandatory methodological terms allergy skin testing is to carry out two control samples: negative and positive controls. The first is carried out to exclude the increased sensitivity to soluble liquid WTO swarm - to confirm the normal reaction of the skin to histamine. The presence of hypersensitivity to the liquid which was dissolved allergens making false positive skin reaction to allergens, and the lack of positive response to histamine indicates unresponsiveness and skin, that is, makes it impossible to skin allergy testing.

Depending on the degree of penetration into the skin test allergen is divided into:

- drip,
- applicator,
- skarifikative,
- prick test,
- intradermal.

### **Methods of laboratory th indentifi Katz s al l about Ergen in**

They immunology and the second type of reakction	Kind AG	Laboratory method
1.	Noncommunicable AG, food, drugs	IFA, PACT provider, immunofluorescence tests and munobloting m, cross-m radio munoelektroforez, skin tests
2.	Medicines, chemicals, organic substances	S immunofluorescence tests, Coombs method, precipitation method, punch-test
3.	Ergen Autoal	And FA LHP
4.	Infections of sul AG	RBTL AND ML

Currently, the most widely used in the world prick test (skin prick test), primarily due to its sensitivity and specificity. At impossibility of staging trial on the forearms and can be performed on the skin of the back. Make certain conclusions after each test is possible only when the coincidence of the results with history data.

### **Principles of treatment of allergic diseases**

This section outlines the main principles of treatment of allergic diseases. Selected issues treatment of specific forms of allergic diseases will be further described in the relevant sections.

Treatment of allergic diseases consists of 4 main areas:

1. Education of patients.
2. elimination therapy.
3. Allergovaccination (specific immunotherapy).
4. pharmacotherapy.

**If hay fever season in dusting as appropriate:**

- Limit exposure to the air;
- hang wet gauze vents;
- Do not open the windows in the car;
- daily wet cleaning rooms;
- eliminate the consumption of foods, medicines, which may include pollen, or other parts of plants.

Patients should not eat:

- Honey, that is, for obvious reasons, include a variety of pollen;
- Carefully eat apples, citrus fruits, strawberries;
- It is not advisable to eat raw vegetables (carrots, beans).

**At an allergy to household allergens it is recommended:**

- Use a special coating on the bed (made in Ukraine);
- Wash clothes in hot water (at least 70 ° C.)
- Maintain humidity no higher than 50% of the apartment;
- Replace carpeting on the linoleum, wood coverings, parquet;
- Remove all the "dust collectors", that is, objects and things that are adsorbed to the dust itself;
- Vacuum cleaning of 1 m once a week with a HEPA filter, delaying allergens;
- Take me five acaricide - special solutions for the destruction mikrocell (Acarosan, Acardust), benzyl benzoate, 3% solution of tannin;
- Periodically make things in the cold, to irradiate the UFO.

**Anafilactic shock (immediate care)**

The I. Elimination antigen or limiting its coverage.

- 1) cessation of drug administration;
- 2) harness, in / to the injections or insect bite;
- 3) injecting the sting (injection), epinephrine hydrochloride 0.1% - 0.5 ml;
- 4) antitoxic serum, penicillin I linaza.

II. The elimination of hypovolemia:

- 1) adrenaline hydrochloride 1-2 ml of 0.1% solution slowly / in (but not more than 2.0 mL, even in the absence of the effect) in 100-200 ml of an isotonic solution;
- 2) reopoligljukin 400.0 ml  
5% glucose solution - 400.0 ml  
with 0.2% norepinephrine  
gidrotartrata 3-5ml.

Control of blood pressure, central venous pressure (preferably a central vein catheterization).

Continuous ECG - monitoring.

III. Treatment of acute respiratory shortage:

- 1) tracheal intubation;
- 2) mechanical ventilation with 100% oxygen for 3-5 minutes, passing a 40% mixture with air;
- 3) edema of the larynx - tracheostomy (on the endotracheal tube)
- 4) 2.4% aminophylline solution of 10.0 ml / in.

The I V. Specific therapy.

- 1) SCS (nonspecific inhibitors of immune reactions) -  
I / 150-180 mg prednisolone,

hydrocortisone 450-800 mg,  
dexamethasone 25-30 mg (et al.).

2) A positive effect is also: adrenaline (see above) - stimulates adeno cyclase and inhibits the release of the BAR; aminophylline (see above.) - inhibits phosphodiesterase.

3) Antihistamines I generation:

diphenhydramine 1% - 1.0 ml, suprastin 2% - 2.0 ml, tavegil 0.1% - 2.0 ml.

Contraindications pipolfen (diprazina) (potentiates hypotension).

V. Symptomatic therapy:

1) stabilization of hemodynamics: Korglikon / in 0.06% - 1.0 ml, cardiac glycosides, bradycardia - 0.1% atropine sulfate - 0.5 ml.

2) Anticonvulsant drugs.

3) Correction of acid-base balance sodium carbonate 4% - 200,0ml / O.

### **Materials for students' self-directed work.**

#### **A. Tests for the self-control:**

**1. What type of allergic reactions (by Gell -Cumbs) characteristic of angioedema?**

Anaphylactic +

Cytotoxic

Immunokomplex

Delayed

Defect of the complement system

**2. What type of allergic reactions (by Gell-Cumbs) characteristic of allergic alveolitis?**

Anaphylactic

Cytotoxic

Immunokomplex

Delayed

defect of the complement system

**3. What type of allergic reactions (by Gell-Cumbs) characteristic of agranulocytosis?**

Anaphylactic

The cytotoxic +

Immune

Delayed

W defect of the complement system

**4. asthma attacks in bronchial asthma causes:**

a) histamine;

b) serotonin;

c) Bradykinin;

g) prostaglandins;

d) leukotrienes;

e) all of the above factors. +

**5. Antiinflammatory drugs for the treatment of bronchial asthma in the first place are as follows:**

a) inhaled corticosteroids; +

b) drugs cromoglitic acid

c) leukotrieniv antagonists;

g) Theophylline;

d) selective beta-2 agonists, short-acting.

**6. What type of allergic reactions (by Gell -Cumbs) is characteristic of hemolytic anemia?**

Anaphylactic

The cytotoxic +

Immune

Delayed

defect of the complement system

**7. What type of allergic reactions (by Gell-Cumbs) is characteristic of hereditary angioedema?**

- Anaphylactic
- Cytotoxic
- Immune
- Delayed
- defect complement system +

**8. What type of allergic reactions (by Gell -Cumbs) typical for atopic variant of rash?**

- Anaphylactic +
- Cytotoxic
- Immune
- Delayed
- defect of the complement system

**9. leukotrieniv antagonists include:**

- a) akolat;
- b) the singular;
- c) Zaditen;
- d) none of the above.

**10. The use of a spacer is necessary to:**

- a) reducing the risk of systemic effects of inhaled glucocorticosteroids
- b) a decrease in the likelihood of developing oral candidiasis; +
- c) increasing the efficiency of the inhaler in children up to 4 years.

**B. Tasks for the self-control:**

**1.** A woman of 20 years for 8 years in August - September there rhinitis, conjunctivitis, and last year joined asthma or cough with shortness of breath. If skin testing revealed sensitivity to ragweed pollen. What IL is crucial in the synthesis of antibodies, causing the disease?

- a) IL 5 +            g) IL3;
- b) IL 1;            d) 6 IL.
- at) IL 2;

**2. The patient complains of swelling of the face and neck, hoarseness, runny nose, shortness of breath. An hour before eating a small amount of strawberries. Your diagnosis?**

- A* Atopic dermatitis
- B* Anaphilactic shock
- C* Allergical reaction
- D* Angioedema +
- E* Sex and the NHS

**3.** The patient was 65 years complains of dyspnea, cough with sputum pink, which foams, feeling short of breath, fear of death. About objectively: orthopnea. The skin is pale, akrotsianoz, cold clammy sweat. Breathing hard, the bottom-rear sections on both sides - wet small- and wheezing. BH-40 / min. Cardiac sharply muted. At the apex of the heart - the rhythm of the canter. What is the diagnosis?

- A* Infarkt light
- B* Astmatic status
- C* lobar pneumonia
- D* The swelling +
- E* Tromboembolia

**4.** For the conduction anesthesia man 35 years without a burdened anamnesis was introduced 2 mL of 1% lidocaine. A few minutes later the patient appeared dizziness, perspiration, weakness, blurred vision, severe pallor, nausea, shortness of breath. Pulse weak filling and tension, heart rate - 118 / min, BP - 60/20 mm Hg. Art, BH -. 28 / min. What is the most effective medication for the immediate treatment of this patient?

- A* Chloride s th calcium and th
- B* Noradrenal and n and g and drotartrat

- C** Prednazolon
- D** Adrena hydrochlorid
- E** Dimedrol or suprastin

**5.** Patient 35 years complains of choking and rhinorrhea. An hour before this took a tablet of diclofenac sodium. From history we know that sick rhinosinusitis. A month ago, I underwent polypectomy. Set diagnosis.

- a) Aspirin +
- b) chronical bronchitis
- c) mukovistsidosis;
- d) allergical rinitis.

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