

**PRIVATE HIGHER EDUCATIONAL INSTITUTION
"INTERNATIONAL ACADEMY OF ECOLOGY AND MEDICINE"
Department of internal medicine with a course in psychiatry and narcology**

**WORKING PROGRAM
EDUCATIONAL DISCIPLINE**

" Clinical immunology and allergology "

LEVEL OF HIGHER EDUCATION Second (master's) level
DEGREE OF HIGHER EDUCATION Master
FIELD OF KNOWLEDGE 22 Health care
SPECIALTY 222 Medicine

Reviewed and approved
at the meeting of the Academic Council
Protocol No. 1, dated August 01, 2016

Kiev 2016

Working program of education discipline “ Clinical immunology and allergology “ for the preparation of students of higher education of the second (master’s) level of higher education in specialty 222 Medicine.

Description of the academic discipline:

Name indicators	Field of knowledge, specialty, level higher education	Characteristics of the educational disciplines
		daytime form teaching
Number credits – 2.0	Branch of knowledge 22 Health Care (code and name)	Normative
	Specialty: 222 "Medicine"	Year preparation 5th
General number hours – 60		Semester IX, X
		Lectures 5 hours
	Level of higher education: Master's degree	Practical 25 hours
		Independent work 30 hours
		Final control:
		Differential test

The purpose and tasks of the educational discipline

Purpose: The purpose of studying the discipline of clinical immunology and allergology is the formation of future doctors' understanding of the mechanisms of functioning of the immune system as a single complex; the use of this knowledge in practical activities when solving specific clinical issues and atypical situational problems, as well as mastering the methods of clinical and laboratory diagnosis, treatment, prevention of immune disorders and immunodeficiency diseases, which are the basis of recurrent , chronic infectious diseases , allergic, autoimmune diseases, oncology , lymphoproliferative and other processes.

Task:

- to get a modern idea of clinical immunology and allergology as a discipline as a whole;
- to form an idea about the significance of immunopathological changes in the development of various diseases and the dynamics of general patterns of immunological parameters at different stages of the body's immune response in normal and pathological conditions;
- assess the patient's immune status according to basic immunolaboratory methods and principles of interpretation of immunograms ;
- learn modern principles of immunodiagnosis of allergic diseases;
- learn the basic principles of immunoprophylaxis, immunotherapy, get acquainted with

methods of monitoring the effectiveness of immunotropic treatment, types of immunorehabilitation .

The process of studying the discipline is aimed at forming elements of the following competencies :

IR - The ability to solve complex tasks and problems in a certain field of professional activity or in the learning process, which involves conducting research and/or implementing innovations and is characterized by the complexity and uncertainty of conditions and requirements.

ZK1 - Ability to abstract thinking, analysis and synthesis.

ZK2 - Ability to know and understand the subject area and professional activity.

ZKZ - Ability to communicate in the state language.

ZK4 - Ability to learn and master modern knowledge, use information and communication technologies; the ability to search, process and analyze information from various sources.

ZK5 - Ability to adapt and make a reasoned decision in a new situation. ZK6 - Ability to work in a team.

ZK7 - Ability to evaluate and ensure the quality of the work performed.

ZK8 - Ability to act on the basis of ethical considerations, socially, responsibly and consciously.

SK1 - Skills of communication and clinical examination of the patient during diagnosis and treatment.

SK2 - Ability to determine the necessary list of clinical laboratory and instrumental studies and evaluate their results during diagnosis and treatment.

SCZ - Ability to establish a preliminary and clinical diagnosis.

SK4 - The ability to determine the principles of treatment, the necessary mode of work and rest, and the nature of nutrition.

SK5 - Ability to diagnose emergency conditions

SK6 - Ability to determine tactics and provide emergency medical assistance.

SK8 - Ability to perform medical manipulations.

Expected detailed learning outcomes. As a result of studying the academic discipline, the student must:

Know:

- symptoms and course of diseases
- methods of diagnostic and therapeutic procedures appropriate for specific disease states
- methods of diagnostic and therapeutic procedures appropriate for specific disease states
- ethical, social and legal conditions for practicing the medical profession and the principles of health promotion, based on scientific evidence and accepted standards

Be able:

- identify medical problems and prioritize medical management
- identify life-threatening conditions that require immediate medical intervention
- plan the diagnostic procedure and interpret its results
- maintain patient's medical records
- critically evaluate the results of scientific research and adequately justify the position
- interpret the results of laboratory tests and identify the causes of abnormalities
- implement appropriate and safe therapeutic treatment and predict its effects
- plan own learning activities and constantly learn in order to update own knowledge
- plan diagnostic, therapeutic and prophylactic procedures
- plan specialist consultations
- carry out a physical examination of a child of all ages
- carry out a medical interview with the child and his or her family
- inspire the learning process of others
- communicate with the patient and his family in an atmosphere of trust, taking into account

- the needs of the patient
- communicate and share knowledge with colleagues in a team

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Is ready to:

- to be guided by the well-being of a patient
- to establish and maintain deep and respectful contact with patients and to show understanding for differences in world views and cultures
- respect medical confidentiality and patients' rights
- take actions towards the patient on the basis of ethical norms and principles, with an awareness of the social determinants and limitations of the diseases
- perceive and recognize own limitations and self-assessing educational deficits and needs
- promote health-promoting behaviors
- use objective sources of information
- formulate conclusions from own measurements or observations
- implement the principles of professional camaraderie and cooperation in a team of specialists, including representatives of other medical professions, also in a multicultural and multinational environment
- formulate opinions on the various aspects of the professional activity
- assume responsibility for decisions taken in the course of their professional activities, including in terms of the safety of oneself and others.

Content of the educational discipline Immune status, assessment principles and ways of correction

TOPIC #1. Structure and principles of functioning of the immune system.

Definition and types of immunity. Central and peripheral organs of the immune system. Factors of innate immunity: cellular (monocyte-macrophage system, killer and granulocyte cells), humoral (complement system, cytokines, etc.). Antigens and their characteristics. Specific immunity, its features, stages of formation and cooperation of immunocompetent cells that participate in the formation of the immune response. Populations (T- and B-lymphocytes) and subpopulations (T- helper types 1 and 2, T-regulatory, T-CTL) of lymphocytes, stages of their maturation and differentiation, their function. Immunoglobulins , structure, functions. Thymus-dependent and thymus-independent mechanisms of antibody synthesis. Structure and properties of circulating immune complexes. The main histocompatibility complex : structure, properties, function. Regulation of immunity.

Features of immunological anamnesis. Clinical methods of evaluating the immune system. Instrumental methods of assessing the immune system. Laboratory methods of evaluation of the immune system. Humoral innate factors of protection. Assessment of cellular immunity. Comprehensive assessment of local immunity.

A comprehensive approach to assessing a person's immune status. Immunogram , interpretation of results. Possibilities and limitations of immunological methods in the clinic. Peculiarities of making an immunological diagnosis.

Age characteristics of bone marrow, thymus and peripheral lymphoid organs. Age-related features of the functioning of immunocompetent cells. Age-related features of cytokine production. Age-specific features of the development of inflammatory reactions.

Thymus and aging. Immunoregulatory processes in old age. Immune theories of aging. Immunopathology in the elderly.

TOPIC #2. Immunological research methods. Basic rules for assessing immune status.

A comprehensive approach to assessing a person's immune status. Features of immunological anamnesis. Clinical methods of assessing the state of the immune system. Instrumental methods of assessing the state of the immune system. Definition of the main symptoms and syndromes of immune disorders.

Laboratory methods for assessing the state of the immune system: humoral innate protective factors; assessment of cellular immunity; comprehensive assessment of local immunity.

Immunogram , interpretation of results. Possibilities and limitations of immunological methods in the clinic. Peculiarities of making an immunological diagnosis.

Immunodeficiency diseases and Immune-dependent pathology

TOPIC #3. Congenital and acquired immunodeficiency diseases.

Congenital immunodeficiency diseases: definition, classification, mechanisms of development. Clinical signs, immunodiagnostics, doctor's tactics, approaches to treatment: combined, T- and B-dependent immunodeficiencies caused by a violation of the phagocytic link of immunity and a deficiency of complement proteins .

Acquired immunodeficiency diseases: definition, causes, mechanisms of development, classification, diagnosis. The role of acquired immunodeficiency diseases in the pathogenesis of various diseases . Early detection of secondary immunological deficiency in the body. Basic approaches to treatment and prevention, taking into account clinical manifestations and features of the course.

Classification of immunotropic drugs, mechanism of action, side effects. Principles of clinical use of immunotropic drugs, indications and contraindications for prescribing.

TOPIC #4. Immune aspects of autoimmune pathology

Definition of the concept of autoimmune reactions, autoimmune disease. Mechanisms

of disruption of immunological tolerance, the role of genetic factors. Immunodiagnosis, immunopathogenesis. The role of immunological research methods in the early verification of the diagnosis of autoimmune diseases. Autoimmune component in the immunopathogenesis of various human diseases. Modern approaches to the use of immunotropic drugs of the new generation in the treatment of patients with autoimmune pathology.

Allergic diseases.

TOPIC #5. Atopic diseases.

The role of genetic factors and the environment in the immunopathogenesis of allergies. Modern ideas about allergy and atopy. Atopy as a systemic disease.

Types and main stages of immunological reactions. Allergological examination methods (allergological history, physical examinations, skin tests) Modern aspects of allergological diagnostics. Screening methods in allergy assessment. Elimination and provocative tests in allergology.

Principles of treatment of allergic diseases. Allergen-specific immunotherapy, indications and contraindications. Features of the immunopathogenesis of bronchial asthma, pollinosis, allergic rhinitis, urticaria, etc. Drug allergy: causes, immunopathogenesis, clinic, allergy diagnosis and prevention.

TOPIC #6. Allergic (non- atopic) diseases

Classification of hypersensitivity reactions according to Gel and Coombs. The main mechanisms of the occurrence and development of immunopathological conditions, their role in the development of various diseases. Mechanisms of development of anaphylactic reactions. Mechanisms of development of humoral cytotoxic reactions. Mechanisms of reaction development of immune complex formation. Mechanisms of development of pathological immune reactions mediated by T-sensitized lymphocytes. Mechanisms of auto-sensitization caused by antibodies.

Types of non- atopic diseases, immunopathogenesis, immunodiagnosis, clinical manifestations and differential diagnosis. Allergic diseases (serum disease, exogenous allergic alveolitis, etc.): immunopathogenesis, clinic, immunodiagnosis, immunotherapy. Differential diagnosis of diseases caused by allergic processes and pseudo-allergic reactions. Principles of antiallergic therapy and immunotropic treatment methods in allergology.

The structure of the academic discipline

The subject of the lesson	Lectures	Practical	Independent work
Immune status, assessment principles and ways of correction			
Topic #1. Structure and principles of functioning of the immune system.	3	3	-
Topic #2. Immunological research methods. The main rules for assessing immune status	-	3	-
Topic #3. Immune inflammation and infectious diseases. HIV infection	-	3	10
Immunodeficiency diseases and Immune-dependent pathology			
Topic #4. Diseases of the immune system. Immunodeficiency	2	3	-

diseases. Principles of immunodiagnostics, immunotherapy, immunorehabilitation and immunoprophylaxis.			
Topic #5. Basics of transplantation immunity	-	2	10
Topic #6. Tumor immunology	-	2	10
Topic #7. Immune aspects of autoimmune pathology	-	2	-
Allergic diseases			
Topic #8. Atopic diseases	0,5	3	-
Topic #9. Allergic (non- atopic) diseases	0,5	3	-
Final control	-	1	-
Total	5	25	30

Topics of lectures

No	Topics
1	Principles of functioning of the immune system, clinical and laboratory assessment of its disorders.
2	Diseases of the immune system. Immunodeficiency diseases. Principles of immunodiagnostics, immunotherapy, immunorehabilitation and immunoprophylaxis.
3	Allergic diseases. Classification, diagnosis and treatment

Topics of practical classes

No	Topics
1	Structure and principles of functioning of the immune system.
2	Immunological research methods. The main rules for assessing immune status
3	Congenital and acquired immunodeficiency states
4	Immune aspects of autoimmune pathology
5	Atopic diseases
6	Allergic (non- atopic) diseases
7	Final control

Topics of practical classes

No	Topics
1	Immune inflammation and infectious diseases. HIV is an infection. Mechanisms of immune protection in bacterial and viral infections. The role of the immune system in antifungal immunity and protection against helminths. The importance of the state of the immune system in development opportunistic and protozoan infections. Immunological methods in the diagnosis of infectious diseases . Immune response in acute inflammatory process. Dynamics of indicators of leukogram , proteinogram and immunogram in acute, recurrent and chronic inflammation. Types and features of specific immunoprophylaxis of infectious diseases . Immune-dependent reactions and complications during vaccination. Etiology, immunopathogenesis , immunodiagnosis and immunotherapy of HIV/AIDS. Dynamics of the immunogram of HIV-infected and AIDS patients. Immunoprophylaxis of HIV infection.

2	Basics of transplantation immunity. Basic concepts, terminology (auto-, allo-, xeno-graft). Pre-transplantation monitoring. Mechanism of allograft rejection: subacute, acute and chronic. Post-transplant infectious complications, diagnostic criteria. Immunosuppressive therapy: mechanisms of action, principles of appointment, complications. New immunological methods of diagnosis and therapy in transplant specialists.
3	Immunology of tumors. Antitumor and pro-tumor mechanisms of interaction of the immune system of the "host" organism and the "tumor". Factors of immunological resistance of the tumor. The concept of tumor-associated antigens. Immunosuppressive effect of tumors. Immune changes in cancer patients. Immunodiagnostics, including differential according to CD-phenotype of tumor cells. Modern approaches to immunotherapy of patients with oncological diseases.

9. Teaching methods

Practical classes: conversation, solving clinical situational problems, practicing patient examination skills, training exercises on differential diagnosis and treatment of immune and allergic diseases.

Independent work: independent work with the textbook, independent work with the bank of test tasks Step-2, independent solution of clinical tasks.

10. Control methods and criteria for evaluating learning results **Current control:** oral survey, testing, evaluation of practical skills, solution of situational clinical tasks, evaluation of activity in class. **Final control:** differential assessment

The structure of the current assessment in the practical session:

1. Evaluation of theoretical knowledge on the subject of the lesson:
methods: survey, solving a situational clinical problem; maximum score - 5, minimum score - 3, unsatisfactory score - 2.
2. Evaluation of work with a patient on the subject of the lesson:
methods: assessment of: a) communication skills of communicating with the patient and his parents, b) the correctness of prescribing and evaluating laboratory and instrumental studies, c) compliance with the differential diagnosis algorithm, d) substantiation of the clinical diagnosis, e) drawing up a treatment plan, the maximum score is 5, the minimum rating - 3, unsatisfactory rating - 2;

Current assessment criteria for practical training:

"5"	The student has a fluent command of the material, takes an active part in discussing and solving a situational clinical problem, confidently demonstrates practical skills during the examination of a sick child and the interpretation of clinical, laboratory and instrumental research data, expresses his opinion on the topic of the lesson, demonstrates clinical thinking.
"4"	The student has a good command of the material, participates in the discussion and solution of a situational clinical problem, demonstrates practical skills during the examination of a sick child and the interpretation of clinical, laboratory and instrumental research data with some errors, expresses his opinion on the topic of the lesson, demonstrates clinical thinking.
"3"	The student does not have sufficient knowledge of the material, is unsure of participating in the discussion and solution of a situational clinical problem, demonstrates practical skills during the examination of a sick child and the interpretation of clinical, laboratory and instrumental research data with significant
"2"	The student does not master the material, does not take part in the discussion and solution of the situational clinical problem, does not demonstrate practical skills during the examination of a sick child and the interpretation of clinical, laboratory and instrumental research data.

Final certification Only those students who do not have academic debt and have an average score for the current educational activity of at least 3.00 are admitted to the final certification. The student's differential assessment is assessed on a 4-point (traditional) scale, conducted by interviewing and completing written tasks (situational task, treatment algorithm, evaluation of immunograms or leukograms, test tasks). The grade for the differentiated assessment is the arithmetic mean for the answers to 2 theoretical/practical questions (one question from the sections: general immunology; clinical immunology and allergology) and the completion of 2 written tasks.

11. Distribution of points received by students of higher education

The grade for the discipline consists of 50.0% of the grade for the current academic performance and 50.0% of the grade for the exam.

The average score for the discipline is translated into a national score and converted into points on a multi-point scale.

The conversion of the traditional grade for a discipline into a 200-point grade is carried out by the information and computing center of the university using the "Contingent" program.

Table of conversion of a traditional assessment into a multi-point assessment:

National assessment for discipline	The sum of points for the discipline
"5"	180-200
"4"	150 -179
"3"	120-149

Points from the discipline are independently converted both to the ECTS scale and to the four-point scale. ECTS scale points are not converted to a four-point scale and vice versa. Further calculations are carried out by the information and computing center of the university.

Conversion of the traditional grade from the discipline and the sum of points on the ECTS scale

Total points for all types educational activity	Rating ECTS	Rating by national scale	
		for exam, diff. offset	for offset
180-200	A	perfectly	counted
160-179	B	fine	
150-159	C	satisfactorily	
130-149	D		
120-129	E		
50-119	FX	unsatisfactorily with the possibility of refolding	not counted with possibility rearrangement
0-49	F	unsatisfactorily with mandatory repeated studying the discipline	not counted with mandatory repeated studying the discipline

12. List of theoretical questions for differential assessment

1. Basic biological tasks and functions of the body's immune system.
2. Classification of organs of the immune system. Apoptosis (concept and role in the functioning of the body).
3. Differences between specific and nonspecific immune response.
4. The main factors of non-specific immune response.
5. The main factors of the specific (adaptive) immune response.
6. Antigen presentation : role in the formation of the immune response.
Antigen presenting cells.
7. Phagocytosis: role in implementation of non-specific and specific immune response. By phagocytizing cells.
8. Humoral factors of non-specific immune protection of the body.
9. Killer cells: main types, their functions and features.
10. Granulocytes: functions and role in the immune response. Diagnostic significance in various pathological conditions.
11. Agranulocytes: functions and role in the immune response. Diagnostic significance in various pathological conditions.
12. Complement system. Biological consequences of complement system activation. Ways of activation.
13. B-lymphocytes: markers and functions. Diagnostic significance in various pathological conditions.
14. T-lymphocytes: types and main markers. Diagnostic significance in various pathological conditions.
15. T- helpers of types I and II: differences in mechanisms of action.
16. Immunoglobulins : structure, function, classes. Diagnostic significance in various pathological conditions of Ig M and Ig G
17. Immunoglobulins : structure, function, classes. Diagnostic significance in various pathological conditions of Ig E and Ig AND
18. Cellular and humoral immune response of adaptive immunity: features and differences.
19. Cytokines: main classes and their functions.
20. histocompatibility complex . Classes of antigens and their role in the formation of the immune response.
21. histocompatibility complex . Concept. Location Mechanisms of imitation.
22. Factors of antibacterial immune protection of the body. Cellular and humoral immune response.

23. Antiviral immune response.
24. Mechanisms of body protection against multicellular parasites.
25. Classification of immunodeficiency states. Diagnostic criteria.
26. Classification of immunodeficiency states. Primary immunodeficiency states with disorders in the humoral (B-cell) and T-cell chain: main syndromes, features of the clinical course, diagnosis, principles of therapy.
27. Classification of immunodeficiency states. Primary immunodeficiency states with phagocyte function deficiency, complement system insufficiency and combined primary immunodeficiency states: main syndromes, features of the clinical course, diagnosis, principles of therapy.
28. Secondary immunodeficiency states: causes, classification, features of the clinical course, diagnosis, principles of therapy.
29. Classification of transplants. Mechanisms of rejection reactions. Types of rejection reactions.
30. Types of rejection reactions. Stages of rejection reactions. The concept of "pre-existing" antibodies.
31. Features of pre- and post-transplantation immunological monitoring.
32. Concepts of carcinogen, oncogene . Classification of oncogenes . Causes of tumors.
33. Division of tumors by sensitivity to immune response. The sequence of the body's immune response to the presence of a tumor.
34. The mechanism of cell-induced cytotoxicity (the mechanism of action of killer cells).
35. The role and mechanisms of participation in antitumor protection of the body of T- killers , T-helpers of type I, natural killers , LAK cells, specific antibodies.
36. Factors of immunoresistance of tumors and tumor cells. Antigens of tumor cells. Oncomarkers .
37. Principles of tumor immunotherapy: main groups of drugs. Immunoprophylaxis of tumors
38. The concept of immune hypersensitivity . Classification according to Gel and Coombs
39. The concept of immune hypersensitivity . Modern classification of hypersensitivity reactions .
40. Mechanisms of development of anaphylactic reactions. Diseases caused by anaphylactic reactions.
41. Mechanisms of development of cytotoxic reactions. Diseases caused by cytotoxic reactions.
42. Mechanisms of development of immune complex reactions. Diseases caused by immune complex reactions.
43. Mechanisms of development of cell-mediated reactions. Diseases caused by cell-mediated reactions.
44. Mechanisms of the development of reactions of the stimulating type. Diseases caused by reactions of the stimulating type.
45. Concepts - autoimmune reaction and autoimmune disease. Differences between them. Classification of autoimmune diseases.
46. Methods of diagnosis of autoimmune diseases.
47. Principles of treatment of autoimmune diseases.
48. Causes of allergic pathology. Stages of pathogenesis of allergic reactions.
49. Classification of allergens.
50. Pseudoallergy : concepts and causes.
51. Allergological history (components). Clinical manifestations of allergic diseases. Provocation tests with allergens.
52. Laboratory methods of diagnosis of allergic diseases.
53. Skin allergy tests : types; conducting method; interpretation of results.
54. Drugs for antiallergic therapy: drug groups and main representatives.
55. Antihistamines . The difference between antihistamine drugs of the first generation and the second.

56. Glucocorticosteroid drugs for course therapy of atopic diseases and emergency care.
57. Drugs for the basic therapy of bronchial asthma: drug groups and main representatives.

A list of practical skills, the acquisition of which is monitored during differential calculation

13. Assessment of the state of the immune status of the body based on leukogram and immunogram data .
14. HIV/AIDS: etiology, features of the clinical course; diagnostics; differential diagnosis; principles of therapy and prevention.
15. Clinical criteria characterizing the presence of primary and secondary immunodeficiency states.
16. Serum sickness (clinical manifestations, diagnosis, principles of treatment).
17. Exogenous allergic alveolitis (classification, clinical manifestations, diagnosis, principles of treatment).
18. Rheumatic arthritis (clinical manifestations, diagnostic criteria, principles of treatment).
19. Systemic lupus erythematosus (clinical manifestations, diagnostic criteria, principles of treatment).
20. Criteria for diagnosing bronchial asthma.
21. Criteria for diagnosing intermittent bronchial asthma.
22. Criteria for making a diagnosis of mild persistent bronchial asthma.
23. Criteria for making a diagnosis of persistent moderate bronchial asthma.
24. Criteria for making a diagnosis of severe persistent bronchial asthma.
25. The concept of control of bronchial asthma. Degrees of controllability of the course of bronchial asthma. Criteria.
26. Prescribe graded therapy for bronchial asthma (grade I).
27. Prescribe graded therapy for bronchial asthma (grade II).
28. Prescribe graded therapy for bronchial asthma (grade III).
29. Prescribe graded therapy for bronchial asthma (grade IV).
30. Assign treatment to a patient with an exacerbation of bronchial asthma at the outpatient and inpatient stages.
31. Prescribe examination and treatment for a patient with year-round allergic rhinitis (mild and moderately severe).
32. Prescribe examination and treatment for a patient with seasonal allergic rhinitis (mild and moderately severe).
33. Algorithm of treatment measures for anaphylactic shock.
34. Prescribe the treatment of an acute local allergic reaction that occurred as a result of an insect bite.
35. Prescribe the treatment of an acute systemic allergic reaction that occurred as a result of an insect bite.
36. Assign emergency care to a patient with acute allergic urticaria and Quincke's edema .
37. Algorithm of medical care for a patient with a drug allergy with a local reaction in the form of a predominant skin lesion.
38. Evaluate the results of laboratory tests (leukogram , immunogram) in a patient with an atopic disease.
39. Methodology of peak flowmetry and evaluation of its results. Basic speed spirometric indicators.

40. The exclusion or limitation of which products is provided by the hypoallergenic diet.

Methodological support:

1. Work program of the academic discipline Syllabus of the academic discipline
2. Multimedia presentations Situational clinical tasks Methodical development of practical classes
3. Electronic bank of test tasks by subdivisions of the discipline.

Recommended Books

Main:

1. Clinical immunology and allergology. - Educational manual of medical universities of IV accreditation level and medical faculties of universities (edited by: O.M. Bilovol , P.G. Kravchun , V.D. Babajan , L.V. Kuznetsova). - Kharkiv "Grif". - 2011. - 550 p.
2. Drannyk G.N. Clinical immunology and allergology / Handbook for students , doctors — interns , immunologists , allergists , doctors healing profile everyone specialties . - 4 ed ., add . //Kyiv : - LLC "POLIGRAPH PLUS".-2011. - 482 p.
3. Bazhora Y.I., Honcharuk S.F. Clinical immunology and allergology . Educational allowance _ 3rd ed ., revised . and half _ / Yu.I. Bazhora , S.F. Honcharuk - Odessa: Prese - courier , 2015. - 288 p.

Additional literature

1. Basics of clinical immunology (учебное allowance for medical universities) / trans. with English _ 3. Chepel , M. Khayny , S. Mysbach , N. Snowden // M: GZOTAR- Media , 2013. -416p.
2. Rabson A. Fundamentals of medicine immunology : trans. and English _ // M: Mir, - 2016. -319 p.
3. Handbook of Allergology, 2nd ed., revised. and add . / Charge _ Prof. B. M. Pukhlyka . - Kyiv: "Doctor-Media" LLC, 2011. - 394 p.
4. Global Atlas of ALLERGY. Published by the European Academy of Allergy and Clinical Immunology 2014.

Approved:

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