

**MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS  
EDUCATIONAL INSTITUTION  
BELARUSIAN STATE MEDICAL UNIVERSITY**

Контрольный  
экземпляр

**APPROVED**

by First Vice-Rector, Professor  
S.V. Gubkin



09.07.2018  
Reg. # UD-4.617/1819 /edu

**CLINICAL IMMUNOLOGY AND ALLERGOLOGY**

**Curriculum of higher educational institution  
in the educational discipline for the specialty:**

**1-79 01 01 «General Medicine»**

Minsk, BSMU 2018

The curriculum is based on the standard curriculum "Clinical Immunology, Allergology", approved on the 09th of November 2017, registration No ТД-Л 617/тип.

**COMPOSED BY:**

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**RECOMMENDED FOR APPROVAL:**

by the 2nd Department of Internal Diseases of Educational Institution "Belarusian State Medical University" ( 19.06.2018, protocol number 13 )

by the Science and Methodology Council of Educational Institution "Belarusian State Medical University" (05.07.2018, protocol number 2019/2).

## EXPLANATORY NOTE

Clinical Immunology and Allergology is an academic discipline including systematized scientific knowledge and techniques concerning structure and functions of the normal and pathological human immunity system; epidemiology, etiology and pathogenesis of various types of immunopathology; methods and means of diagnosis, treatment and prevention of human diseases, which are based on violations in the system of immunity and/or immunological mechanisms of development.

The curriculum for the academic discipline "Clinical Immunology and Allergology" is aimed at learning the latest scientific data on etiology, pathogenesis, diagnosis, treatment and prevention of basic immunodeficiency conditions, allergic and autoimmune diseases. The hallmark of the curriculum is its application orientation for internists.

The purpose of teaching and learning the discipline of "Clinical Immunology and Allergology" consists of clinical thinking formation as well as acquisition of scientific knowledge by students on etiology, pathogenesis, diagnostics, differential diagnostics and principles of treatment and prevention of diseases caused by immunological processes.

Learning objective for the training discipline is to implement the formation of academic competence that is based on the knowledge of:

- the basic concepts of immunology and allergology;
- epidemiology, etiology, pathogenesis, clinical manifestations of immunopathological diseases;
- immunogenic risk factors for development and exacerbation of diseases..

Teaching objective for the training discipline is to implement the formation of social, personal and professional competences that is based on the knowledge and application of:

- the latest achievements of national medicine;
- diagnostic methods, integrated treatment and prevention of immunopathological diseases;
- methods of providing medical care in emergency situations.

Teaching and successful learning of the discipline "Clinical Immunology, Allergology" is carried out on the basis of the student's acquired knowledge and skills in the following sections of academic disciplines:

**Philosophy.** The basic philosophic laws and categories. Cognition as reflection of the reality. Methods and forms of scientific cognition. Various concepts of cognition. Religious, atheistic, moral perception, science and culture. Matter and cognition. Philosophy of medicine. Classification of sciences in medicine. Scientific cognition process features in medicine. Values and evaluation in medical cognition and activity.

**Latin.** Latin and Greek word-formative elements and a certain minimum of terminology in Latin.

**Medical biology and general genetics.** Cell biology. Genotype and phenotype. Individual development, types, periods of development. Regeneration as a structural

basis of homeostasis. Organs and functions evolution principles. Ecology. Human ecology specificity. The interaction between humans and biological objects. Structure and classification of human chromosomes. Basic research methods in cytology. Mitosis. Genetic and cytological maps of chromosomes. Methods of studying genetics: cytogenetic, biochemical method, somatic cell genetics, DNA diagnostics. Prenatal methods for identifying of hereditary diseases. Hereditary metabolic diseases. The concept of transplantation immunity. HLA system. Stem cells. General parasitology fundamentals.

**Medical and biological physics.** Biophysical mechanisms of various types of physical factors impact on the body. Methodical basis of electrophoresis. Hemodynamics physical fundamentals. Optical examination methods. Electron microscopy fundamentals. Spectral analysis fundamentals. Photocolorimetry and spectrophotometry fundamentals. Luminescence analysis fundamentals. Radionuclide diagnostics fundamentals.

**General chemistry.** Mineral composition of the body, the need for chemical components, the use of chemicals as a means of therapeutic action. Physical and chemical properties of different classes of chemical substances that determine their toxicity and danger to a human. Electrolyte composition of the blood, blood buffer system. The acid-base status.

**Bioorganic chemistry.** Classification of organic compounds. Carbohydrates, lipids, amino acids, proteins, heterocyclic compounds, nucleic acids functions and properties. Classification of vitamins and their role in the body.

**Biological chemistry.** The main parameters of the internal environment homeostasis. The biological role, structure and patterns of protein, fat, carbohydrates, vitamins, minerals and trace elements metabolism. Metabolic cycles of xenobiotics. Blood proteins (total protein, protein fractions), methods for determination. Definition of dysproteinemia and paraproteinemia. Primary screening blood chemical parameters.

**Human anatomy.** Body organs and systems structure and functions. Embryogenesis. Age features of morphological structures. Classification of internal organs by their topography, origin, structure, and functions. Anatomy of the immune system organs.

**Pathological anatomy.** Structural basis of diseases and pathological processes, characteristic morphological changes of internal organs in major human diseases. Morphogenesis and pathomorphosis of diseases. Principles of diseases classification.

**Normal physiology.** Principles of organs and systems functioning, mechanisms of their regulation and self-regulation. The main homeostasis parameters. Age physiology. Biorhythmology (chronobiology). Healthy body performance parameters, used in medical practice, their physiological values. Physiology of the blood and cardiovascular system. Hematopoiesis. Cytokines. Hematopoietins. Apoptosis. The modern scheme of hematopoiesis. The theory of stem cells. Age features of hematopoiesis. Leukopoiesis. White blood cells, their types, quantity, methods of quantification. The concept of the T- and B-lymphocytes. Thrombopoiesis. Blood

groups. ABO, HLA, Rh and other systems. The basic principles of donor blood selection. Risk factors for a recipient.

**Pathological physiology.** The reasons, the basic mechanisms of development and outcomes of typical pathological processes. Patterns of organs and body systems functions alteration in case of environmental factors influence. Body reactivity and its role in pathology. Pathophysiology of hemostasis, metabolism, endocrine system, blood, respiratory system. Diseases outcomes. Inflammation. Acute phase response. Fever. The biological role of fever. Typical metabolic disorders. Extreme conditions (collapse, shock, coma). The morphological features of cell types in normoblastic and megaloblastic hematopoiesis, morphological features of regenerative and degenerative forms. Synovial fluid. Pathological deviations detected during examination.

**Histology, cytology, embryology.** Tissues and organ systems embryogenesis. Microscopic, ultramicroscopic structure of blood cells: white blood cells, red blood cells, platelets. Morphological classification of white blood cells (granulocytes and agranulocytes). Hemogram. The concept of physiological blood regeneration. Stages of blood cells development. Maturation of myeloid and lymphoid cells. Effector immune cells formation. Regulation of hematopoiesis. Lymphoid system organs (central and peripheral), their general morphofunctional characteristics. Red bone marrow. Its role in the hematopoiesis and immune system. Localization of erythropoiesis, leukopoiesis and platelet foci. Secondary lymphoid organs. Humoral and cellular immunity cells differentiation. Lymph nodes: development, structure. Methods of manufacturing preparations for light microscopy. Micropreparations types.

**Microbiology, virology, immunology.** Immunocompetent cells: classification, functions. Main histocompatibility complex molecules class I, II, III. CD-antigens. Main groups of cytokines. Interleukins, chemokines, tumor necrosis factors. The complement system, components and fragments functions. Regulation of the complement system activation. Methods of determining the activity of the complement system. Phagocytes, classification. Phagocytic reaction, stages, mechanisms of intracellular bactericidity. Methods of phagocytosis examinations. Parameters of phagocytic reaction. Methods of its detection and significance in clinical practice. B-system of immunity. B-cells receptors and antigens. B-cells development. Antigen-specific B-cell receptor. Methods for number and functional activity of B-lymphocytes determination. Microorganisms antigens. Cross-reactive antigens. Antibodies: structure, properties. The classification of antibodies: classes, subclasses, isotypes, allotypes, idiotypes. Methods of immunoglobulin concentration determination. Serological tests, practical application. Immunofluorescence reactions. ELISA and radioimmunoassay. Immunoblotting. Immune electron microscopy. T-system of immunity. T-cells development, receptors, antigens and subpopulation. T-helper cells. Control of the immune response by T-cells. T-dependent antigens. T-cells activation. Apoptosis, anergy. The cellular immune response. The immunological memory. Methods for determining of the number and functional activity of T-cells. Transplantation immunity. Histocompatibility antigens. The genetic control. Types of transplantation reactions, mechanisms of development. Immunological tolerance: mechanisms, utility. Anti-infective immunity and its types (antitoxic, antibacterial,

antifungal, antiparasitic). Maternal immunity: mechanisms, utility. Allergology: definition, objectives. Allergy. Allergens. The stages of allergy development. Allergic reactions types. Methods for allergic diseases *in vivo* and *in vitro* diagnostics. Immune status of an organism: the principles, levels, and methods of evaluation. Immunogram. Immunodeficiency states: the methods of identification, principles of correction and control. Autoimmune diseases pathogenesis: principles of paraclinical diagnostics, major laboratory assays. The anti-tumor immunity. Characteristics of tumors antigens. Virology. Interaction between a virus and a susceptible cells. Cell's receptors for a virus. Viral DNA and RNA reproduction strategy. Types of viral infection of cells. Host cells changes in viral infection. General principles of viral infections diagnostics. Express-assays. Serological assays: the principles of performing, diagnosis criteria. Bacteriological assays. Bacteremia, sepsis and septicopyemia diagnosis. Types of immunity. Immune response types. Host immune status assessment methods. Immunodeficiencies. Immunocorrection. Immunotherapy and immunization fundamentals. Vaccination.

**General hygiene and military hygiene.** Hygienic principles of a healthy life in persons with regard to age. Climate and human health. Medical aspects of acclimatization. Causes of secondary immunodeficiencies.

**Pharmacology.** The classification of drugs. Pharmacodynamics and pharmacokinetics. Mechanisms of drugs action, side effects.

**Internal medicine propaedeutics.** Clinical and laboratory methods of patient assessment. Creating a plan of laboratory examination of patients depending on the primary organ involvement. Anemia and major hemostasiopathy types diagnosis. Laboratory criteria of pathologic conditions, their interpretation. Allergic diseases diagnostics. Human immunodeficiency virus (HIV), acquired immune deficiency syndrome (AIDS) diagnostics.

**Radiation diagnostics and radiotherapy.** Radionuclide diagnostics principles.

**Dermatology.** Skin lesions semiotics. Major pathologic changes in the skin: acute and chronic inflammation, acanthosis, parakeratosis. Hyperkeratosis, granulosis, spongiosis, acantholysis, epidermolysis, ballooning degeneration, papillomatosis, atrophy. External (mucocutaneous) signs of immunopathology and allergy, systemic connective tissue diseases: laboratory and histological assays. Clinical and laboratory diagnostics of allergic dermatoses. Cytological and histological diagnostics of vesicular dermatitis.

**Neurology and neurosurgery.** Laboratory and clinical diagnosis of abnormalities in the systems that regulate blood aggregation state in cerebrovascular disorders (antiphospholipid syndrome, consumption coagulopathy). Clinical and laboratory diagnostics of the nervous system infectious and inflammatory diseases (polymerase chain reaction (PCR) of the blood, cerebrospinal fluid, specific immune responses), oligoclonal antibodies determination in infections, infectious-allergic and demyelinating diseases of the central nervous system. Hereditary degenerative diseases of the nervous system diagnostics methods.

responses), oligoclonal antibodies determination in infections, infectious-allergic and demyelinating diseases of the central nervous system. Hereditary degenerative diseases of the nervous system diagnostics methods.

**Pediatrics.** Medical Genetics fundamentals. Genetic counseling. Buccal swab assessment. DNA typing.

**Internal diseases.** Clinical hematology. Blood cells antigenic systems. Inheritance of the ABO and Rh systems antigens. Methods of ABO and Rh systems antibodies determination. HLA-system antigens. Coombs assay. Anemia: laboratory diagnostics. Anticoagulation blood system, laboratory parameters of its assessment. Antiphospholipid syndrome, laboratory diagnostics methods. Interpretation of changes in hemogram and myelogram in leukemia, multiple myeloma. Utility of cytogenetic studies in hematology. Immunophenotyping of blood cells. Leukemia. Paraproteinemic hematological malignancies. Myelograms cytochemistry. The characteristics of paraproteins, cryoglobulins. Tumor markers: role in the body, clinical and diagnostic value. Main immunological aspects of cardiac diseases. Basic techniques of immunological diagnostics of rheumatic diseases and systemic diseases of connective tissue.

**Polyclinic therapy.** Immunopathology diagnostics in the polyclinic settings. Clinical and laboratory examination at the stage of regular medical check-up.

**Infectious diseases.** Immunological methods of various forms of infectious conditions diagnostics.

**As a result of studying the discipline "Clinical Immunology and Allergology" the student should**

**know:**

- different forms of immunological aberrations development mechanisms (immunodeficiency, allergy, autoimmune diseases);
- possibilities and limitations of the main immunodiagnostics methods;
- normal tests values used for diagnostics of major autoimmune and allergic diseases;
- etiology, classification, pathogenesis, clinical manifestations, diagnostics and differential diagnostics, methods of prevention and treatment of the most frequent primary and secondary immune disorders;
- etiology, classification, pathogenesis, clinical manifestations, diagnostics and differential diagnostics, methods of prevention and treatment of the most common allergic diseases;
- indications for use of various types of immunotherapy and limitations due to possible adverse reactions to medications;

**be able to:**

- determine the indications for immunodiagnostics and implement clinical interpretation of the results;

- make differential diagnosis of diseases on the basis of Clinical Immunology and Allergology data acquisition, use expert advice in determining the final clinical diagnosis;

**master:**

- the technique for interpreting test results used to diagnose major autoimmune and allergic diseases;
- the technique for interpreting the results of general laboratory and immunological monitoring of the effectiveness of pathogenetic therapy.

The curriculum for the academic discipline "Clinical Immunology and Allergology" includes five topics.

**Total number** of hours for the study of the discipline is 64 academic hours. Classroom hours according to the types of studies: lectures - 10 hours, practical classes - 30 hours, student independent work (self-study) - 24 hours.

Current assessment is carried out according to the syllabus of the specialty in the form of a credit (9th semester).

Form of higher education - full-time.

**ALLOCATION OF ACADEMIC TIME  
ACCORDING TO SEMESTERS OF STUDY**

Code, speciality	Semester	Number of academic hours					Form of current assessment
		total	in-class	including		out-of-class self-studies	
				lectures	laboratory studies (practical classes and seminars)		
1-79 01 01 "General medicine"	9	64	40	10	30	24	credit



## TOPICAL PLAN

Section (subject) name	Classes hours	
	lections	practicals
1. Organization of immunological and allergological medical care in the Republic of Belarus. Clinical value of immunity. Immunopathology, types. Immunodiagnosis. Immune status	2	6
2. Immunodeficiencies: primary and secondary. Diagnostics and treatment.	2	6
3. Allergy. Allergens. Types of hypersensitivity. Diagnosis of allergies. Principles of treatment and prevention of allergic diseases. Anaphylactic shock	4	6
4. Allergic skin diseases. Drug hypersensitivity, food, insect, latex allergy. Urgent and anti-relapse therapy of allergic diseases	-	6
5. Autoimmune rheumatic diseases, autoimmune diseases of kidneys, liver, blood system, endocrine glands, other organs and systems		
6. Immunopathology of reproduction. Transplantation immunity. Paraneoplastic syndromes. Principles of immunotherapy and immunoprophylaxis	2	6
<b>Total:</b>	10	30

## EDUCATIONAL MATERIAL CONTENTS

### **1. Organization of immunological and allergological medical care in the Republic of Belarus. Clinical value of immunity. Immunopathology, types. Immunodiagnosis. Immune status**

Clinical Immunology and Allergology, the relation with other areas of medicine. Stages of development of Immunology and Allergy as a science. Subject and objectives of the academic discipline. Stages of development of Immunology and Allergology as a science, clinical significance. Organization of specialized medical care in Immunology and Allergology. Indications for referral to immunoallergological examination. Organization of in-patient departments, offices and laboratories of Clinical Allergology and Immunology in Belarus. Duties of a doctor in providing care to patients with immunopathologic states. Establishing a diagnosis and medical-social assessment in immunopathologic states.

**Structure and functions of the immunity system.** Role of congenital and adaptive immunity in the development of immunopathology. Immunological tolerance. Regulation of the immune response. Immunogenetics: genetic mechanisms of the diversity of antibodies and receptors, genetic bases of immunopathology, genodiagnostics and gene therapy. Influence of ecological and anthropogenic factors on the state of the immunity system and the development of immunopathology.

**Immunodiagnosis. Evaluation of the immune status.** Antigens of human cells and tissues. Differentiation of CD-antigens. System of human leukocyte antigens (HLA-system). HLA-typing. Importance for immunological prognosis of diseases, transplantation of bone marrow, tissues and organs. Antigens of HLA-system having diagnostic value. Immune status. Types and principles of evaluation. Clinical and laboratory indicators of the immunity system (leukocytes, gamma globulins, ESR, etc.): T- and B-lymphocytes and their subpopulations. Immunophenotyping. Immunoglobulins A, G, M, E, D of blood and exudates. The value of the deviations from norm. Granulocytes, monocytes, clinical significance of abnormalities. Parameters of the complement system and immunodiagnostics, their clinical significance.

Antigen-specific diagnostics. Methods for detection of antigens and antibodies, their clinical application in the diagnosis of infectious and non-infectious pathology. Immune complexes, their detection and significance in the formation of various pathological syndromes. Immunoferment, radioimmunoassay, immunofluorescent methods. Indications for their use and interpretation of the results.

Clinical analysis of patients with pathology of the immune system: collection of complaints and anamnesis of the disease; objective examination of the patient; working-out examination plan; interpretation of the results of laboratory and instrumental investigations; substantiation of a diagnosis, determining treatment tactics.

### **2. Immunodeficiencies: primary and secondary. Diagnostics and treatment**

**Primary immunodeficiencies:** definition, epidemiology, classification. Clinical, laboratory and genetic criteria of immunodeficiency. Clinical forms and manifestations of immunodeficiency in children and adults. Humoral, cellular and combined immunodeficiencies. Deficiencies of the complement system. Defects of phagocytosis. Hereditary neutropenia. Autologous immunodeficiency syndromes of congenital immunity (familial cold autoinflammatory syndrome, familial Mediterranean fever, etc.). Diagnosis of primary immunodeficiency in children and adults, treatment methods. Characteristics of antibacterial and antiviral therapy of immunodeficiencies. Limitations for vaccination and immunostimulation. Substitution immunotherapy. Transplantation of bone marrow, stem cells, thymus, genetically engineered methods. Use of blood products.

**Secondary immunodeficiency diseases,** causes, classification. Immunodeficiencies associated with viral, bacterial, parasitic infections. HIV infection, clinical signs, stages. Chlamydia, mycoplasmosis and insufficiency of cellular immunity.

Purulent infections (staphylococcal, streptococcal, etc.) as a consequence of immunodeficiency. Sepsis, the manifestation of immunodeficiency and auto-inflammatory syndrome. Secondary immunodeficiency diseases with an infectious syndrome having eating disorders (cachexia, malabsorption, obesity), metabolic diseases, etc. ; after exposure to biological, physical, chemical agents, radiation, etc.

Iatrogenic immunodeficiencies.

Clinical analysis of patients with immunodeficiencies; objective examination of the patient; working-out examination plan; interpretation of the results of laboratory and instrumental investigations; substantiation of a diagnosis, determining treatment tactics, prevention of exacerbations of the disease.

### **3. Allergy. Allergens. Types of hypersensitivity. Diagnosis of allergies. Principles of treatment and prevention of allergic diseases. Anaphylactic shock**

**Allergy.** Epidemiology of allergic diseases. Ecology and allergy. Risk factors affecting the prevalence of allergic diseases. Allergens, classification. Exoallergens of noninfectious origin (domestic, epidermal, alimentary, pollen, pharmacological), chemicals. Exoallergens of infectious origin (bacterial, fungal, viral, helminthic), their nature, properties. Manufacturing of diagnostic allergens principles and their standardization. Endoallergens (autoallergens). Atopy and anaphylaxis. Classification of allergic reactions. Allergic reactions of immediate and delayed types. Nonspecific hypersensitivity and hyperreactivity of the body, their clinical significance.

**Diagnosis of allergies.** Allergic anamnesis. Clinical and laboratory signs of allergy. Indications for allergen-specific examination. The importance of general and allergen-specific IgE, carrying out provocative (cutaneous and other) tests on the patient.

Principles of treatment and emergency care for allergic diseases. Antimediators, antihistamines and other medicines. Glucocorticosteroids. Nonspecific and allergen-specific immunotherapy.

**Serum sickness and post-vaccination reactions.** Etiology and pathogenesis, the nature of antigens, antibodies, the role of immune complexes. Serum sickness clinical presentation, diagnosis, treatment, prevention. Contraindications to administration of immune sera (absolute, relative). Patch testing. Types of vaccine-related allergic reactions. Measures to prevent postvaccinal reactions. Treatment of postvaccinal reactions.

**Anaphylaxis, types. Anaphylactic and anaphylactoid shock.** Causes of development of anaphylactic shock, role of allergens and nonspecific agents, pathogenesis and clinical manifestations. Emergency therapy for shock, tactics of managing patients after an acute period. Prevention of anaphylactic reactions.

Clinical analysis of patients with anaphylactic shock, postvaccinal reaction: consideration of patient complaints and a history of the disease; objective status; working-out examination plan; interpretation of the results of laboratory and instrumental investigations; substantiation of a diagnosis, determining treatment tactics, prevention of anaphylactic shock.

#### **4. Allergic skin diseases. Drug hypersensitivity, food, insect, latex allergy. Urgent and anti-relapse therapy of allergic diseases**

**Allergic dermatitis, atopic dermatitis, contact allergic dermatitis, photoallergic dermatitis:** clinical manifestations, diagnosis, treatment, prevention of exacerbations.

**Food and alimentary allergy.** Types of food intolerance. Food and alimentary (additives) allergens, predisposing factors. Generalized and localized clinical manifestations of food allergy. Differential and specific diagnostics of food allergy (food diary, elimination tests, provocative tests), treatment, elimination diets, nonspecific and specific therapy.

**Insect allergy.** Reaction to stinging by Hymenoptera insects. Diagnosis of insect allergy, clinical manifestations, emergency therapy. Allergic reactions to the bites of bloodsucking insects. Treatment and prevention of insect allergy.

**Drug and medicamentall hypersensitivity.** Types of intolerance to drugs. Medicinal preparations and medicines as allergens. Classification of drug hypersensitivity, pathogenesis, diagnosis and differential diagnosis, anamnesis, skin tests, provocative tests, laboratory methods, clinical evaluation, clinical manifestations (shock, fever, serum-like syndrome, vasculitis). Lesions of the skin and mucous membranes. Layell, Stevens–Johnson syndromes. Visceral lesions of blood, kidneys, heart, nervous system and other organs due to drug hypersensitivity. Prophylaxis of drug hypersensitivity. Professional drug hypersensitivity in medical workers, pharmacists, workers of medical plants. Medication hypersensitivity, types, treatment. Latex allergy, cross allergens. Prevention of drug hypersensitivity in patients and health professionals.

Emergency (in urticaria, angioedema) and anti-relapse therapy of allergic diseases.

Clinical analysis of patients with drug hypersensitivity, food and insect allergy: collection of complaints and anamnesis of the disease; objective examination of the

patient; working-out examination plan; interpretation of the results of laboratory and instrumental methods of examination; substantiation of the diagnosis, determining treatment tactics, prevention of recurrence of allergy.

### **5. Autoimmune rheumatic diseases, autoimmune diseases of kidneys, liver, blood system, endocrine glands, other organs and systems**

Autoimmune diseases characteristics. Autoimmune diseases causes and pathogenic mechanisms. Alteration of tolerance to "own". Auto-inflammatory process as a consequence of genetically determined dysfunction of the immune system. Cross-immune reactions, role of an infections. Association with the HLA-phenotype. Types of autoantibodies. Mixed forms of pathologic state and cross-syndromes.

**Immunodiagnosis of rheumatic diseases. Systemic diseases of connective tissue.** Systemic lupus erythematosus, clinical criteria. Lupus-like complement-deficient and other syndromes and masks of the disease, immunodiagnosics, principles of treatment, immunological control. Dermatomyositis / polymyositis (primary and secondary), immunopathogenesis, diagnosis, differential diagnosis, treatment. Mixed connective tissue disease. Sjogren's syndrome.

**Systemic vasculitis:** classification, principles of diagnosis and treatment. Henoch-Schonlein purpura. Microscopic polyangiitis, granulomatosis with polyangiitis, eosinophilic granulomatous vasculitis, nonspecific aortoarteritis, giant cell arteritis, rheumatic polymyalgia: clinical manifestations, diagnosis, treatment.

**Autoimmune blood diseases** (hemolytic anemia, neutropenia, immune thrombocytopenia, lymphopenia, agranulocytosis), **nervous system** (multiple sclerosis, encephalomyelitis, myasthenia gravis, etc.), **bowel** (autoimmune gastritis, gastric ulcer and duodenal ulcers, celiac disease, Crohn's disease, ulcerative colitis), **liver** (autoimmune hepatitis, primary biliary cirrhosis), **endocrine glands** (insulin-dependent diabetes mellitus, thyroiditis, diffuse toxic goiter), **renal** (glomerulonephritis, IgA nephropathy), **skin** (psoriasis, lichen planus, pemphigus, Duhring dermatitis).

Clinical analysis of patients with systemic connective tissue diseases, systemic vasculitis: collection of complaints and anamnesis of the disease; objective examination of the patient; working-out examination plan; interpretation of the results of laboratory and instrumental methods of examination; substantiation of diagnosis, determining of treatment tactics, prevention of exacerbations of the disease.

### **6. Immunopathology of reproduction. Transplantation immunity. Paraneoplastic syndromes. Principles of immunotherapy and immunoprophylaxis**

**Immunopathology of reproduction.** System of immunity of reproductive organs and tissues. The role of the placenta in the antigenic tolerance of "mother-fetus". The placenta is an immunocompetent organ. Immunopathology of endometriosis, trophoblastic disease, hydatidiform mole, choriocarcinoma. Immunodiagnosics and immunotherapy.

Immunological relationships of mother and fetus organisms. Value of the HLA system in the physiological development of the fetus and miscarriage. Immunogenetic relationships in spouses and infertility. Immunological methods of correction.

Immunological mechanisms of infertility in women and men. Antigens of sperm and spermatozoa, antibodies to them in men and women, causes of generation, methods of detection, the importance of infertility.

Pregnancy and immune modulation. Immune status of pregnant women. Immunopathology of pregnancy: immune disorders in gestosis, diseases with metabolic disorders, nephropathy, anemia of pregnant women, mechanisms of miscarriage and postponement of pregnancy. Role of immune complexes and cytokines. Antiphospholipid syndrome and miscarriage.

Methods of diagnosis and treatment of "mother-fetus" conflicts, prevention, immunodiagnosics, immunotherapy. Hemolytic disease of newborns. Isoimmunization of the mother with rhesus and other erythrocyte antigens. Rh-factor. Risk of isoimmunization. The tactics of managing patients with mother-fetus conflicts.

Women's milk is a source of immunoregulators. Cells and cytokines of milk.

### **Paraneoplastic reactions and syndromes.**

**Transplantation immunity.** Types of transplants. Transplantation of bone marrow, thymus, stem cells, embryo cells. Selection of the donor and recipients. Immunological complications. Post-transplantation reactions. Principles of selection of donors. Histocompatibility matching The "graft versus host" reaction, chimerism. Liver, heart, kidney transplant. Immunopathological signs of allograft rejection reaction.

### **Principles of immunotherapy and immunoprophylaxis**

**Immunoprophylaxis of infections.** Vaccination. Types of vaccines. Principles, methods, vaccination schemes. Indications and contraindications for vaccination. Characteristics of use of live attenuated vaccines and anatoxins. Immunological methods for assessing the indications and effectiveness of vaccination. Complications of vaccination and their prevention.

**Immunosuppressants.** Nonspecific passive suppressive immunotherapy. Glucocorticoids. Cytostatics as immunosuppressants. Evaluation of the effect of immunosuppressors. Complications of immunosuppressive therapy. Immunosuppressive effect of ionizing radiation and other physical factors

Monoclonal antibodies as immunosuppressors, preparation, mechanism of action, application for treatment.

**Immunorehabilitation.** Adaptogens. Physiotherapy, barotherapy, massage, reflexotherapy. Sanatorium and resort factors and rehabilitation of the immunity system. Diets as a factor of immunocorrection and immunorehabilitation.

Clinical analysis of patients with paraneoplastic syndrome: collection of complaints and anamnesis of the disease; objective examination of the patient; working-out examination plan; interpretation of the results of laboratory and instrumental methods of examination; substantiation of the diagnosis, determining of treatment tactics.

### EDUCATIONAL DISCIPLINE CURRICULAR CHART

Section/topic #	Section/topic number	number of hours		Self-studies	Equipment	Form of control
		lectures	practical			
1.	Organization of immunological and allergological medical care in the Republic of Belarus. Clinical value of immunity. Immunopathology, types. Immunodiagnosis. Immune status	2	6	5	Manuals, sets of laboratory tests, tests.	interview, clinical rounds with discussion of "thematic patients", control questioning, test.
2.	Immunodeficiencies: primary and secondary. Diagnostics and treatment	2	6	5	Presentations, situational tasks, immunograms, sets of laboratory tests, tests.	interview, seminar report situational, tasks, clinical rounds with discussion of "thematic patients", control questioning, test, essay, electronic test.
3.	Allergy. Allergens. Types of hypersensitivity. Diagnosis of allergies. Principles of treatment and prevention of allergic diseases. Anaphylactic shock	4	6	5	Manuals, situational tasks, sets of laboratory tests, tests. Multimedia projector, computer class.	interview, clinical rounds with discussion of "thematic patients", situational tasks, control questioning, test, electronic test.

4	Allergic skin diseases. Drug hypersensitivity, food, insect, latex allergy. Urgent and anti-relapse therapy of allergic diseases	-	6	5	Manuals, presentations, tables, immunograms, sets of laboratory tests, Multimedia projector, computer class.	interview, seminar report, situational tasks, clinical rounds with discussion of "thematic patients", control questioning, test, essay, electronic test.
5.	Autoimmune rheumatic diseases, autoimmune diseases of kidneys, liver, blood system, endocrine glands, other organs and systems	-			Presentations, situational tasks, sets of laboratory tests, tesis.	interview, seminar report, clinical rounds with discussion of "thematic patients", control questioning, test, essay, electronic test. <b>CREDIT</b>
6	Immunopathology of reproduction. Transplantation immunity. Paraneoplastic syndromes Principles of immunotherapy and immunophylaxis	2	6	4		
	<b>Total:</b>	<b>10</b>	<b>30</b>	<b>24</b>		



## INFORMATION AND INSTRUCTIONAL UNIT

### LITERATURE

#### Basic (relevant):

1. Adkinson N.F. Middleton's Allergy: Principles and Practice/ N. F. Adkinson [et al.]. – Saunders, 2013. – 1082 p.
2. Essentials of Clinical Immunology/ H. Chapel [et al.]. – Wiley-Blackwell, 2014. – 376 p.
3. Grammer L.G. Patterson's Allergic Diseases/ L.G. Grammer. – LWW, 2018. – 960 p.
4. O'Hehir R. E. Middleton's Allergy Essentials/ R. E. O'Hehir, S.T Holgate, A. Sheikh. – Elsevier, 2016. – 424 p.
5. Sampson H.A. Allergy and Clinical Immunology (Mount Sinai Expert Guides)/ H.A. Sampson, S.L. Frirdman. – Wiley-Blackwell, 2015. – 480 p.

#### Additional:

6. Geha R. Case Studies in Immunology: A Clinical Companion/ R. Geha, L. Notarangelo. – Garland Science, 2016. – 384 p.
7. Khan D. Drug Allergy Testing/ D. Khan, A. Banerji. – Elsevier, 2017. – 250 p.
8. Rich R.R. Clinical Immunology: Principles and Practice/ R.R. Rich [et al.]. – Elsevier, 2018. – 1392 p.
9. Shirley J. The Washington Manual of Allergy, Asthma, and Immunology Subspecialty Consult/ J. Shirley, A. Kau. – LWW, 2012. – 224 p.
10. Spickett G. Oxford Handbook of Clinical Immunology and Allergy/ Spickett G. – Oxford: Oxford University Press, 2013. – 656 p.

#### Constantly updated medical electronic databases

1. American Academy of Allergy, Asthma and Immunology  
[www.aaaai.org](http://www.aaaai.org)
2. European Academy of Allergy and Clinical Immunology  
[www.eaaci.net](http://www.eaaci.net)
3. The World Allergy Organization (WAO)  
[www.worldallergy.org](http://www.worldallergy.org)
4. US National Library of Medicine  
<https://www.ncbi.nlm.nih.gov/pubmed/>
5. Allergen nomenclature  
[www.allergen.org](http://www.allergen.org)

## LIST OF AVAILABLE DIAGNOSTIC TOOLS

The following forms are used for competences assessment:

1. Oral form:
  - interviews;
  - seminar reports;
  - situational tasks;
  - clinical rounds with discussion of "thematic patients".
  
2. Written form:
  - tests;
  - control questioning;
  - essays.
  
3. Technical form:
  - electronic tests.

### ESTIMATED LIST OF PRACTICAL SKILLS

1. Determination of indications for carrying out immunodiagnostics.
2. Interpretation of laboratory tests used to diagnose autoimmune and allergic diseases, monitoring the effectiveness of the treatment.

### LIST OF LECTURES

1. Organization of immunological and allergological medical care in the Republic of Belarus. Clinical value of immunity. Immunopathology, types. Immunodiagnosis. Immune status.
2. Immunodeficiencies: primary and secondary. Diagnostics and treatment.
3. Allergy. Allergens. Types of hypersensitivity. Diagnosis of allergies. Principles of treatment and prevention of allergic diseases. Anaphylactic shock.
4. Allergic skin diseases. Drug hypersensitivity, food, insect, latex allergy. Urgent and anti-relapse therapy of allergic diseases.
5. Immunopathology of reproduction. Transplantation immunity. Paraneoplastic syndromes. Principles of immunotherapy and immunoprophylaxis.

### LIST OF PRACTICALS

1. Organization of immunological and allergological medical care in the Republic of Belarus. Clinical value of immunity. Immunopathology, types. Immunodiagnosis. Immune status.
2. Immunodeficiencies: primary and secondary.
3. Allergy. Allergens. Types of hypersensitivity. Diagnosis of allergies. Principles of treatment and prevention of allergic diseases. Anaphylactic shock.

4. Allergic skin diseases. Drug hypersensitivity, food, insect, latex allergy. Urgent and anti-relapse therapy of allergic diseases.

5. Autoimmune rheumatic diseases, autoimmune diseases of kidneys, liver, blood system, endocrine glands, other organs and systems.

Immunopathology of reproduction. Transplantation immunity. Paraneoplastic syndromes. Principles of immunotherapy and immunoprophylaxis.

### **LIST OF TASKS AND CONTROL MEASURES FOR STUDENT'S SELF STUDY OF THE ACADEMIC DISCIPLINE**

Time allotted for the self-study can be used by students for:

- preparation for lectures, practical classes;
- preparation for the credit;
- learning of topics (issues) proposed for the self study;
- preparation of thematic reports, essays, presentations;
- preparation of the thematic selection of literature sources, Internet sources.

Basic methods of self-study organization:

- writing and presentation of an essay;
- report presentation;
- studying of topics and issues not proposed for lectures and seminars..

Control of the self-study is carried out in the form of:

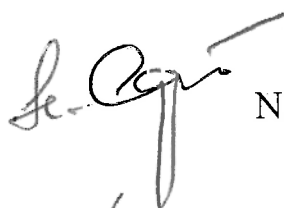
- test;
- oral interview, test;
- evaluation of the oral response to the question, report, paper or task solving at practical classes;
- checking essays.

### CURRICULUM APPROVAL PROTOCOL

Name of the discipline which requires approval	Name of the department	Proposals for changes in the content of the curriculum of institution of higher education for the academic discipline	Conclusion of the department that developed the curriculum (with date and the number of protocol)
1. Internal Diseases	Departments of Internal Diseases	No proposals	(protocol No 13, 19.06.2018)
2. Surgical diseases	Department of Surgical Diseases	No proposals	
3. Obstetrics and gynecology	Department of Obstetrics and Gynecology	No proposals	
4. Oncology	Department of Oncology	No proposals	

**COMPOSED BY:**

Head of the 2nd Department of  
Internal Diseases of Educational  
Institution "Belarusian  
State Medical University",  
MD, PhD, Professor



N.F. Soroka

Assistant Professor of the 2nd  
Department of Internal Diseases of  
Educational Institution "Belarusian  
State Medical University"



S.V. Sharuba

The design of the curriculum and accompanying documents meet the requirements.

Dean of the Faculty of General Medicine

« 6 » 07 2018 г.

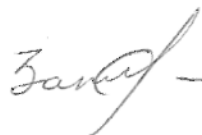


A.I. Volotovski

Methodologist-expert of  
Educational Institution "Belarusian

State Medical University

« 6 » 07 2018 г.



O.R. Kachan

## Information about the authors (the developers) of the curriculum

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