MINISTRY OF HEALTH OF UKRAINE

LVIV NATIONAL MEDICAL UNIVERSITY NAMED AFTER DANYLO HALYTSKY

"APPROVED"
The first vice-rector for scientific and pedagogical work
corresponding member of AMS of Ukraine
professor M.R. Gzegotsky
17.09. 2021

WORKING PROGRAM OF DISCIPLINE

CLINICAL IMMUNOLOGY AND ALLERGOLOGY"

for training of specialists of the second (master's) level of higher education field of knowledge 22 "Healthcare"

specialty "222 "Medicine" VI year

Approved
at the faculty meeting at the department of clinical immunology and allergology

« 30 » august in 2021
Protocol №1

Head of the department prof. V.V. Chopyak

Approved
by the field-specific methodological commission for therapeutic discipline

«16» september in 2021
Protocol №6

Head of the field-specific methodological commission prof. O.M. Radchenko

Lviv 2021

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LVIV NATIONAL MEDICAL UNIVERSITY NAMED AFTER DANYLO HALYTSKY

Department of Clinical Immunology and Allergology

WORKING PROGRAM OF DISCIPLINE

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for training of specialists of the second (master's) level of higher education field of knowledge 22 "Healthcare"

specialty “222 “Medicine”

VI year

LVIV - 2021

The basis of the program for the 6th year is composed by the staff of the Department of Clinical Immunology and Allergology with a course of medical genetics (head of the department - Prof. Kurchenko A.I., PhD. Associate Professor Fedoruk H.V.) of the O. O . Bogomolets National Medical University in co-authorship with employees of single-profile departments:

- Department of Clinical Immunology and Allergology, Danylo Halytskyi Lviv National Medical University (Head of the Department, Doctor of Medical Sciences Prof. Chopyak V.V.;

- Department of Endocrinology, Clinical Immunology and Allergology, Bukovynian State Medical University (Professor of the Department - Koval H.D.).

REVIEWERS:

Yu..A Bisyuk - MD, Professor of Clinical Immunology, Allergology and Laboratory Medicine of the The Shupyk National Medical Academy of Postgraduate Education

OM Girina - MD, Professor, Head of the Department of General Practice (Family Medicine) of the O. O . Bogomolets National Medical University

The program was discussed and approved:

At the meeting of heads of departments and courses of clinical immunology and allergology of higher medical educational institutions of the Ministry of Health of Ukraine on June 18, 2021 (Kyiv, O. O . Bogomolets National Medical University.)

Commission on "Medicine" of the Scientific and Methodological Council of the Ministry of Education and Science of Ukraine (Minutes №13 of June 25, 2021).

The working program was considered and approved by the profile Danylo Halytskyi Lviv National Medical University «» September 2021, protocol №.

Editor-in-Chief Ph.D. Associate Professor Fedoruk H.V. (Kyiv), department editors prof. Havrylyuk A.M., PhD. Assoc.professor Lishchuk-Yakymovych Kh.O. (Lviv)

Program of the discipline “Clinical Immunology and Allergology” for the 6th year students (masters), who study the specialty 222 “Medicine” is composed by the staff of the department of Clinical Immunology and Allergology of Danylo Halytsky Lviv National Medical University: head of the department, doctor of medicine prof. V.V. Chopyak, prof. A.M. Havrylyuk, PhD assoc. prof: Kh.O. Lishchuk-Yakymovych, S.O. Zubchenko, PhD assist. N.M. Horbal, O.S. Tolokh

Head of the department Doctor of medicine,prof., V.V. Chopyak

INTRODUCTION

The program of studying the discipline "Clinical Immunology and Allergology"
in accordance with the Standard of Higher Education of the second (master's) level field of knowledge *22 "Healthcare"*
specialty *222 "Medicine",*
educational *master's* program

Description of the discipline "Clinical Immunology and Allergology" - as an academic discipline:
a) is based on other basic disciplines (medical biology, medical and biological physics, bio-organic and biological chemistry, histology, cytology and embryology, human anatomy, pathological morphology, physiology and pathophysiology, microbiology, virology and immunology, as well as the basics of internal medicine, pediatrics, general surgery, infectious diseases, obstetrics and gynecology, pharmacology) and integrates with these disciplines;
b) helps students to explore the features of the clinical profile of vocational and practical disciplines.
c) provides the ability to apply knowledge of clinical immunology and allergology at further education and training activities in accordance with the principles of evidence-based medicine.

Basics of clinical immunology and allergology
(specialties "General Medicine")

Contents:
• Immunological status. Measurement principles and directions of immune correction.
• Immunodeficiency diseases and immunodependent pathology
• Allergic diseases

Program of Clinical Immunology and Allergology in the fifth year for the specialties: "General Medicine" involves learning the basics of clinical immunology and allergology at its main sections: general immunology, immunopathology: primary and secondary immunodeficiency, autoimmune diseases, transplant immunology, immunology of reproduction, oncoimmunology, allergology, to focus on a study of immunopathogenesis, clinics of immune and allergic diagnosis, treatment and prevention of immunodependent diseases.
The main objective is to familiarize students with various aspects of clinical immunology. The emphasis is on getting skills of providing immunological allergic history, physical examination and differential diagnosis of frequent clinical manifestations and diseases. Students are participating in the diagnostic and treatment processes of outpatients (mostly) and in-patients under the supervision of assistants, associate professors and professors, who also provide familiarization with the procedures that are frequent and usual in the practice of clinical immunologist and allergist. Physicians, clinical assistants and associate professors of the department are the most important participants of this program. Each student records and shows clinical data of the patients three times during the cycle.
The types of learning activities of students according to the curriculum are:
a) lectures b) practical classes, c) independent students work (ISW).
Thematic plan of lectures, practical classes, ISW provide the implementation of all the topics in the educational process that make up the content modules. Thematic lectures reveal problem areas, relevant sections of clinical immunology and allergology. Teaching tools like multimedia presentation

slides, training films, patients' case demonstrations are most used in the lecture course. Lectures and practical training components are relevant to the practical work. Practical classes are conducted at clinical sites of the department. Expected duration of practical training in the fifth year is 5 academic hours. The objectives of clinical practical classes in clinical immunology and allergology are following:

- make the student become the participant in the process of providing medical care to patients from the time of their examination, diagnosis, treatment till discharge from the hospital or in -patient admission;
- acquire professional and practical skills; teamwork skills, physicians and other members of health care provision;
- form a responsible student as a future specialist in accordance with the level of training, his/her improvement during training and profession. The students are provided with a detailed work plan of the department and the tools for its realization. This plan should include:

Methods of investigation that a student should know;

- Algorithms (protocols) of examinations, diagnosis, treatment and prevention according to the standards of evidence-based medicine;

Supervision of the patients includes:

• clarification of patients' complaints, history of the disease, medical history and examination of the systems of the body;
• physical examination of the patient and determination of the main symptoms of the disease ;
• analysis of immunological laboratory data and data of allergy examination of the patient;
• statement of a diagnosis of the patient;
• purpose of treatment;
• identification measures of primary and secondary immunization ;
• report about the results of team work of the students in the study group, the analysis of the correctness of the diagnosis under the supervision, differential diagnosis, the amount of the assigned inspection, treatment tactics, assess of prognosis and disability.

In practical classes students are encouraged to keep a diary in which they should make a summary of the patients examined during the practical classes, fix the statement of the diagnosis, the patient's plan of examination and treatment plan. ISW makes up 30 % in the curriculum. It includes:

• study of topics not included in the plan of classes;
• students work in the offices of the departments of clinical sites, including immunological laboratories, allergic diagnosis rooms, interpretation of laboratory data and allergy research methods in extracurricular time;
• mastering practical skills using phantoms and work with patients (according to the list);
• work in the computer lab to prepare for the Step 2.

Teachers and supporting staff of the department help students to fulfill their individual work. During the practical training and the final module control teachers monitor and evaluate the individual work. Topics submitted for independent study are evaluated only during the final testing.

Departments and Courses of Clinical Immunology and Allergology have the right to redistribute training hours within the structural modules within the program depending on the organizational and technical capabilities, areas of scientific research, environmental characteristics of the region, but must complete the whole subject of the claims in accordance with the ultimate goals of EQC and EVP for field of study and curriculum.

Approximate academic plan on the subject "Clinical

immunology and allergology"

for training of specialists of the second (master's) level of higher education field of knowledge 22 "Healthcare"

specialty "222 "Medicine"

VI year

Structure of educational subject	Total hours, including				Year of study	Type of control
	Total (hours/ credits)	Classroom		ISW		
		Lectures	Practical classes			
Total hours/ Credits ECTS	**30/1,0**	**-**	**18**	**12**	**6**	
Part 1: Basics of clinical immunology and allergology **Content thematic parts – 2**	**30 hours / 1 credit ECTS**		**18**	**12**	**6**	**Credit**

Note: 1 credit ECTS – 30 hours; classroom load – 70%, ISW – 30%;

2.4. **The structure of the discipline**
FUNDAMENTALS OF CLINICAL IMMUNOLOGY AND ALLERGOLOGY
Total hours: 30/1 credit
(practical classes -18, ISW -12)

The purpose and objectives of the discipline

1. The studying purpose of the discipline "Clinical Immunology and Allergology" is the formation of systemic medical knowledge, skills for diagnosis of immune and allergic diseases. It is anticipated that knowledge of the basic clinical signs of immune and allergic diseases will enable the general practitioner to diagnose such diseases in time and direct the patient to a clinical immunologist or allergist. Awareness of the manifestations of sexually/blood transmitted diseases (HIV infection, hepatitis B and C, papillomavirus and herpetic (HSV 1/2, EBV, CMV, HHV6 infections, etc.) is an important part of the professional training of a general practitioner, and knowledge of preventive measures against these diseases is the responsibility of the physician of any specialty.

2. The main tasks of the discipline "Clinical Immunology and Allergology" is the study of:

- the basics of clinical immunology (cells and organs of immune system, anatomical and microscopic structure of mucous membranes, physiology and pathology of the skin, the basis of clinical

pharmacology for the treatment of immunological and allergic diseases);

- main clinical and diagnostic signs of widespread immunological and allergic diseases, their prevention and treatment;

- features of the clinical course of some infections (including papillomavirus and herpetic (HSV 1/2, EBV, CMV, HHV6 infections, etc.), HIV-infections and COVID-19.

- Acquisition by the student of knowledge and professional skills of the differential diagnosis of the most common diseases based on immunopathological syndromes, dispensary monitoring of patients with primary and secondary immunodeficiencies in an outpatient setting and emergency care for the most common acute allergic conditions based on approved protocols.

- Formation of the ability to use knowledge, skills, abilities and understanding to solve typical problems in doctor daily activity in the field of health care, which scope is provided by certain lists of syndromes and symptoms of diseases, emergencies, physiological conditions.

The ultimate goals of the discipline

The ultimate goals of the discipline "Clinical Immunology and Allergology" are based on the educational goals defined in the educational-professional program (OPP). They are defined as follows:

1. To determine the etiological and pathogenetic factors of the most common

immune-dependent diseases in adults and children.

2. To classify and to analyze their typical clinical picture

3. To make a diagnostic plan and to analyze the laboratory findings and

instrumental examinations of immunocompromised individuals, as well as to demonstrate the ability of the treatment, rehabilitation and prevention of the most common immune-dependent diseases.

4. To diagnose and to provide emergency care in acute allergic conditions.

5. To demonstrate mastery of deontological principles of a medical specialist and the principles of professional subordination in the medicine.

Interdisciplinary integration:

the discipline "Clinical Immunology and Allergogloy"

a. is based on the knowledge, previously acquired by masters, in anatomy, histology, normal and pathological physiology, medical biology, microbiology and other morphological disciplines and it is integrated with these disciplines;

b. is an important component of further master study of clinical disciplines providing integration of teaching with the above disciplines and forming abilities to apply clinical immunology and allergogloy knowledge in further education and in professional activities;

c. lays the foundations of a healthy lifestyle and informs on way how to prevent infection ingress.

d. is associated with other medical specialties: with infectology (HIV, transmissive viral and parasitic diseases of the body), dermatology (Lyell's syndrome, Stevens- Johnson syndrome, urticaria, angioneurotic edema and other allergic reactions to drugs), toxicology (toxicodermia and other toxic reactions), hematology (skin manifestations of onco-hematological diseases), rheumatology (systemic collagenoses, vasculitis) , endocrinology (skin changes in diabetes mellitus,

autoimmune thyroiditis), oncology (immunodeficiency, tumors), with neurology (neuroinfections,), dental disciplines (herpetic stomatitis).

3. **Competence and learning outcomes**, to the formation of which the discipline contributes (the relationship with the normative content of the training of higher education graduates, formulated in terms of results of study in the Standard of Higher Education).

In accordance with the requirements of the Standard of Higher Education, discipline ensures students' acquisition of **competences**:

- integral:

The discipline provides ability to apply acquired general and special competencies for solving complex tasks of professional activity and practical problems in health care in a certain position, application of which is determined by a list of syndromes and symptoms of diseases, emergencies, physiological conditions and diseases, which require special tactics of patient management; laboratory and instrumental investigations, medical manipulations; issues of occupational, forensic and military expertise and/or implementation of innovations.

***-general (GC)*:**

1. The ability to abstract thinking and analysis;
2. The ability to learn and possess modern information and communication technologies.
3. Ability to apply knowledge in practical situations.
4. Knowledge and understanding of the subject area and understanding of the professional activities.
5. Ability to adapt and act in a new situation.
6. Ability to take a reasonable decisions
7. Ability to work in a team.
8. Interpersonal skills.
9. Ability to communicate in the state language both orally and in writing.
11. Skills in the use of information and communication technologies.
12. Ability to work in a team.
13. Skills for cooperation with colleagues and patients.
14.Ability to act on ethical grounds.
15.Safety skills.
16.Ability to assess and ensure the quality of the work performed.

- special (professional, substantive) (SC):

1. Patient interviewing skills, skills of examination of the patient.
2. Ability to determine the required list of laboratory and instrumental research and evaluation of their results.
3. Ability to establish a preliminary and clinical diagnosis of the disease.
4. Ability to determine the required mode of work and rest during treatment diseases.
5. Ability to determine the principles of nutrition in treatment diseases.
6. Ability to determine the principles and nature of treatment of diseases.
7. Ability to diagnose emergencies.
8. Ability to determine the tactics of emergency medical care.
9. Skills in providing emergency medical care.

10. Skills of medical manipulations.
11. Ability to conduct sanitary and preventive measures.
12. Ability to plan and carry out preventive and anti-epidemic measures against infectious diseases.
13. Ability to determine the persons subject to dispensary supervision tactics.
14. Ability to conduct an efficiency examination.
15. Ability to keep medical records.
16. Ability to assess the impact of the environment, socio-economic and biological determinants on the health of the individual, family, population.

Content part 1: Immunodiagnostics of patients with basic immunopathological syndromes

Specific goals:

Students must:

• To know the nature of changes in cellular and humoral factors of innate and acquired immunity in patients with major immunopathological syndromes

• To complete conclusions about the functioning of the immune system with help of laboratory tests. To explain immunogram due to clinical data, stage of immune response, immunological history.

• To analyze changes in the immune system, taking into account the patient's age, health status and season.

• To determine the peculiarities of the development of antiviral immunity, the peculiarities of the course of COVID-19 infection

• Explain the basics of immunological testing methods to determine the quantitative and qualitative indicators of immune response.

• To conduct physical examination of patients with immune disorders.

• To justify the use of basic diagnostic methods used in clinical immunology, determine the indications and contraindications for their iuse.

• To determine the etiological and pathogenetic factors of allergic, autoimmune, immunodeficiency, cancer-dependent, immunoconflict syndromes.

• To substantiate the use of basic immunotropic drugs to correct the state of the immune system in patients with allergic, autoimmune, immunodeficiency, cancer, immunoconflict syndrome, and to determine the indications and contraindications for their appointment.

• Demonstrate mastery of moral and deontological principles of a medical specialist and the principles of professional subordination.

Content part 3: Modern immunotherapy of patients with basic immunopathological syndromes

TOPIC 1. Basic immunopathological syndromes

Determination of immunopathological syndrome. Basic immunopathological syndromes: allergic, autoimmune, immunodeficient (primary and secondary), immunoconflict, cancer-dependent, immunoneuroendocrine. Changes in the results of immunological laboratory tests characteristic of these syndromes.

Fever syndrome of unclear genesis: clinical manifestations, differential diagnosis, laboratory immunological diagnosis, treatment. Lymphadenopathy syndrome: classification, diagnostic tactics, treatment. Conditions that "mimic" the syndrome of lymphadenopathy. Diseases and pathological processes accompanied by enlarged lymph nodes.

TOPIC 2. Immunodiagnostics and immunotherapy in oncology.

Antiblastoma and problastoma 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 the CD phenotype of tumor cells. Modern methods for determining tumor antigens: enzyme-linked immunosorbent assay, chemiluminescent, immunohistochemical. Changes in cellular and humoral parameters of the immune response, characteristic of the immunogram of a patient with cancer.

Modern approaches to immunotherapy of a patient with oncological diseases. The danger of the formation of secondary immunodeficiency syndrome in patients after immunosuppressive treatment (chemotherapy and radiation therapy).

TOPIC 3. Immunology of reproduction. Immune-dependent male and female infertility

Participation of immune mechanisms in the realization of reproductive function of men and women. Homeostasis system (immune, endocrine and nervous systems) and fertility.

Immune-dependent forms of infertility in marriage. Causes and immunological mechanisms of antisperm autoantibodies formation in men and women, immunodiagnostics. Immunological methods of treatment. Immune conflicts in the system "mother - fetus": diagnosis, treatment, prevention.

The use of immunotropic drugs in the treatment of immune-dependent forms of infertility in men and women.

History of the use of assisted reproductive technologies (ART) in Ukraine. Intrauterine insemination with prepared sperm of a partner as a method of ART. Other methods of ART: in vitro fertilization IVF, IVM, ICSI. Gamete donation.

The main causes of ART failures: embryonic (endocrine disorders); implantation (tubal-peritoneal factor). Associations of implantation factor with the immune system. Immune-dependent defects in implantation and early embryogenesis. Significance of changes in the phenotypes of natural killers; imbalance of pro- and anti-inflammatory cytokines.

Organ-specific and systemic autoimmune diseases in women with repeated failed ART attempts.

Content part 2: Modern immunotherapy of patients with basic immunopathological syndromes

Specific goals:

Students must:

• Conduct surveys and physical examinations of patients with immune-dependent and allergic diseases, determine indications for therapeutic use of vaccines.

• Determine immunopathogenetic factors in the development of immune-dependent diseases (disease caused by COVID-19 virus, etc ..)

• To substantiate the use of basic immunotechnological methods in the creation of a new generation of immunotropic drugs, to determine the indications and contraindications for their use in the treatment of patients with various immune-dependent diseases.

• Interpret donor-recipient pair phenotyping data (histocompatibility index determination) in preparation for organ and cell transplantation.

• Justify the use of immunosuppressive therapy in the post-transplant period.

• Identify clinical and laboratory signs of subacute, acute and chronic rejection crises.

• Carry out a differential diagnosis between rejection crisis and infectious complication in patients after organ transplantation.

• To determine laboratory signs of development of systemic and local immunosuppressive mechanisms in normal pregnancy.

• To determine the mechanisms of development of immune-dependent forms of infertility.

• Interpret the data of phenotyping of a male-female pair (determination of the histocompatibility index) in the diagnosis of immunocompromised form of infertility.

• Analyze the results of determining the indicators that characterize the factors of antiblastoma protection in a patient with suspected tumor.

• Interpret data on the determination of tumor-associated antigens for early diagnosis of tumors, in assessing the effectiveness of treatment and to determine the presence or absence of metastases;

• Justify the use of immunotropic therapy in patients with tumors;

• Be able to use clinical and immunological criteria in the diagnosis of autoimmune pathology; justify the use of immunosuppressive therapy in patients with autoimmune pathology;

• Demonstrate mastery of moral and deontological principles of a medical professional and the principles of professional subordination

TOPIC 4. **Therapeutic use of vaccines in allergology, oncology, reproductive medicine**

Allergospecific immunotherapy (ASIT) as a leading method of treatment of IgE-dependent allergic diseases. The immunological essence of the effectiveness of ASIT. Impressions for ASIT. Contraindications to ASIT. Age restrictions of ASIT.
Basic principles of preparation of antitumor vaccines. Vaccines based on lysates and extracts of tumor cells. Dendritic cell tumor vaccines. Modern conjugate and genetically engineered tumor vaccines. Prophylactic use of vaccines to prevent virus-associated cancer.
The essence of immune-mediated contraception for men and women. Vaccines that block gamete maturation (against LHRH / GnRH, FSH, LH). Sperm vaccines are antigens that promote the formation of antisperm antibodies. Vaccines that contain antibodies to YLP-12 and their individual Fab fragments. Vaccine against antigens of the transparent zone of the egg. Chorionic gonadotropin vaccine

TOPIC 5. Immunodiagnostics, immunotherapy and prevention of viral COVID-19 infection.
Etiology, immunopathogenesis, diagnosis and immunotherapy of COVID-19. Division of coronaviruses into groups according to the degree of genome similarity and antigenic properties. The main antigen of coronaviruses is the thorn protein, or S protein (SARS2-S, strain Wuhan-Hu-1). Immunological methods for its identification and determination of antibodies to it: polymerase chain reaction (PCR) for direct determination of virus RNA and enzyme-linked immunosorbent assay for the determination of antibodies. Dynamics of the immunogram of infected and patients with COVID-19: the nature of changes in the main populations and subpopulations of T-lymphocytes, their activation markers; concentrations of cytokines of lymphocytic and monocytic / macrophage origin. Is there a specific etiotropic therapy for coronavirus infection? Pathogenetic therapy in the treatment of patients with severe COVID-19 infection.
Rules of conduct for people in society to avoid infection with the COVID-19 virus.

TOPIC 6. Biological therapy in the treatment of organ - specific and systemic autoimmune diseases
The concept of autoimmune reactions, autoimmune syndrome, autoimmune disease. Mechanisms of immunological tolerance failure, the role of genetic factors. Immunopathogenetic mechanisms of damage to biostructures of the human body in autoimmune pathology. Modern methods of immunodiagnostics of organ-specific and systemic autoimmune diseases. Modern approaches to the use of new immunotropic drugs in the treatment of patients with autoimmune pathology. Definition of the term biological therapy. Treatment of autoimmune diseases with immunoglobulin drugs for intravenous administration. Monoclonal antibodies against proinflammatory cytokines and their receptors in the treatment of autoimmune diseases. The use of biosimilars, their advantages and disadvantages.

Content part 3: Modern immunotherapy of patients with basic immunopathological syndromes

TOPIC 7. Immunosuppressive therapy of posttransplant patients.

Pre-transplant monitoring. Mechanisms of allograft rejection: superacute, acute and chronic. New immunological methods of diagnosis and therapy in transplantology.
Posttransplant immunosuppression: pharmacological, physical. Expediency of simultaneous appointment of immunosuppressive drugs from different groups. Leading mechanisms of immunosuppressive action of glucocorticosteroids; calcium neurin inhibitors, mTOR kinase, DNA synthesis. Biological therapy for immunosuppression: polyclonal and monoclonal antibodies, protein preparations for infusion. Side effects and complications of post-transplant immunosuppression.
Post-transplant infectious complications: bacterial, viral, fungal, simpler. Criteria for their diagnosis and treatment.

TOPIC 8. Immune-dependent post-COVID complications.

COVID-19 is an immunotropic infection. Characteristic changes:
activation of lymphocyte surface receptors (PD-1, CTLA-4) and signaling pathways (NF-κB / TNF-α, IL-6 / JAK / STAT, ISGF-3) in severe COVID-19 infection. Correlation of the severity of the course of COVID-19 with the detection of HLA antigens of the 1st and 2nd classes (A * 0101, A * 0201, A * 0301, A * 1101, A * 2402, B * 4001, C * 0401, C * 0701, C * 0702, DRB1 * 0401). Formation of secondary immunodeficiency infectious and autoimmune syndromes in postcoid patients.
Association of cytokine release syndrome with virus-induced secondary hemophagocytic lymphohistiocytosis in COVID-19 infection. Pediatric multisystem inflammatory syndrome as a complication of COVID-19 infection. The need for differential diagnosis with Kawasaki disease.
TOPIC 5. Herpetic immunotropic infections: clinic, diagnosis, immunotherapy
Acquired immunodeficiency diseases: definition, causes, mechanisms of development, classification, diagnosis. The role of herpes viruses in the pathogenesis of various diseases. Early detection of secondary immunological insufficiency of viral origin in the body. The main immunotherapeutic agents for the treatment of chronic herpes infection.
Rapid fatigue syndrome, chronic fatigue syndrome. Mechanisms of formation of secondary immunodeficiency, autoimmune and cancer-dependent syndromes in patients with chronic infection with Epstein-Barr viruses, cytomegalovirus, herpes viruses of the 6th and 8th types.

TOPIC 9. Drug allergy
Differential diagnosis of diseases (allergic, non-allergic) caused by reactions to drugs. Asthmatic status. Anaphylactic shock. Pathomorphology, pathogenesis, clinic and emergency care. Anaphylactic reactions during skin testing and specific immunotherapy. Anaphylactic reactions to medications.
Pathogenesis and classification of acute urticaria and angioneurotic edema of drug origin, their diagnosis and treatment.
Cell - mediated allergic diseases of drug genesis (serum sickness, Arthus' phenomenon, allergic alveolitis, etc.): immunopathogenesis, clinic, immunodiagnostics, immunotherapy.

THEMATIC PLAN OF PRACTICAL CLASSES

FOR FOREIGN (ENGLISHSPEAKING) SPECIALISTS OF MASTER'S LEVEL OF THE 6TH YEAR OF MEDICAL FACULTY OF DISCIPLINE «CLINICAL IMMUNOLOGY AND ALLERGOLOGY» FOR AUTUMN SEMESTER 2021-2022

No	***Theme***	***Hours***
1	Basic immunopathological syndromes. Immunodiagnostics and immunotherapy in oncology. Immunology of reproduction. Immune-dependent male and female infertility	6
2	Therapeutic use of vaccines in allergology, oncology, reproductive medicine. Immunodiagnostics, immunotherapy and prevention of viral COVID-19 infection. Biological therapy in the treatment of organ - specific and systemic autoimmune diseases	6
3	Immunosuppressive therapy of posttransplant patients. Immune-dependent post-COVID complications. Drug allergy	6
Total		**18**

THEMATIC PLAN OF INDIVIDUAL SELF-WORK

FOR FOREIGN (ENGLISHSPEAKING) SPECIALISTS OF MASTER'S LEVEL OF THE 6TH YEAR OF MEDICAL FACULTY OF DISCIPLINE «CLINICAL IMMUNOLOGY AND ALLERGOLOGY» FOR AUTUMN SEMESTER 2021-2022

№ з/п	***Theme***	***Hours***
3.	Herpetic immunotropic infections: clinical parameters, diagnosis, immunotherapy	4
4.	Drug allergy: diagnosis and treatment	4
5.	Immunodiagnosis and immunotherapy in in patients with **oncopathology**	4
Total		**12**

LIST OF QUESTIONS FOR THE STUDENTS' PREPARATION FOR THE FINAL CONTROL

1. Subject and tasks of clinical immunology and allergology. History of the development of immunology.
2. Current understanding of the structure, functions and development of the immune system. Central and peripheral immune organs.
3. Peculiarities of immune system functioning in children of different age and elderly people

4. Cellular congenital protective factors, their interaction in the realization of the immune response.
5. Monocyte-macrophage system: functions, peculiarities, role in the development and realization of the immune response.
6. Killing effect as the component of immune-biological surveillance. Main types of killer-cells, their function and properties. Role of blood granulocytes in the formation of immune response.
7. Humoral factors of congenital immunity.
8. Complement system. Biological consequences of complement system activation.
9. Antigens: structure, functions. Haptens.
10. Stages of maturation and differentiation of T- and B-cells.
11. T-cells. Structure of T-cellular receptor. Sub-population of T-lymphocytes. Main markers and differentiation clusters.
12. T-helper cells of the 1^{st} and 2^{nd} types. The importance of functional balance between T-helper cells (Th1\Th2).
13. Regulatory T-cells, main functions.
14. Apoptosis as a special type of cell death. Its role in functional and pathological processes.
15. B-cells. Main markers and functions. Receptor structure recognizing antigen. Definition of T-dependent and non-T-dependent types of immune response.
16. Immunoglobulins: structure, functions, classes. Role of immune complexes in the development of pathology.
17. Cytokines – mediators of immune system. Interleukins, classification, classes and participation in immune processes.
18. Growth factors, tumour-necrosis factors, interferons and adhesion molecules. Characteristics. Participation in the development of immune system.\
19. Immunological system of mucous membranes. Lymphoid tissue associated with gastro-intestinal tract.
20. Current understanding of the structure and functions of major histocompatibility complex. Structure of HLA antigens. Susceptibility to diseases depending on the HLA-phenotype.
21. Main classification principles of immunodeficiencies. Congenital combined immune deficiencies and immunodeficiencies of B-, T-cell mediated immunities: mechanisms of development, peculiarities of clinical course, immunodiagnostics and treatment.
22. Congenital immunodeficiencies of phagocyte-mediated immune system and complement system: mechanisms of development, peculiarities of clinical course, immunodiagnostics and treatment.
23. Definition of acquired immunity. Causes, clinical signs, immunodiagnostics, immunotherapy.
24. Syndrome of long-term fever: etiology, clinical, instrumental, laboratory and immunological diagnostic criteria, differential diagnostics, main principles of immunotherapy and immune prevention.
25. Syndrome of lymphadenopathy: etiology, clinical, instrumental, laboratory and immunological diagnostic criteria, differential diagnostics, main principles of immunotherapy and immune prevention.
26. Immune pathogenesis, stages of development, classification of HIV-infection/AIDS.
27. Clinical and laboratory diagnostic criteria, principles of HIV-infection/AIDS treatment.
28. Main principles of HIV-infection/AIDS prevention in Ukraine. Medical personnel as risk-group persons for the development of HIV-infection/AIDS.
29. Stresses, neuro-humoral and immune regulation disturbances. Fatigue syndrome.
30. Classification of harmful environmental factors, periods of their influence on the state of immune system.
31. Transplant immunology. Immunological indications and contraindications for the organ and tissue transplantations. Selection of donor-recipient pairs. Preexisting antilymphocyte toxicantibodies, their prognostic value.
32. Peculiarities of pre- and post-transplant immunological monitoring. Types of crisis rejection, heir clinical and immunological characteristics and prognosis.
33. Immune status of pregnant. Lactation immunology. Immune fertilization.

34. Immune-dependent forms of infertility in married couples. Causes and mechanisms of antibody formation to the sex cells in men and women. Immune pathogenesis of infertility, its diagnostics. Immunological approaches to the infertility treatment.
35. Anti-tumour factors, factors of tumour immune-resistance, problast factors suppressing the immunity and problast factors stimulating tumour growth. Definition of tumour-associated antigens.
36. Immune changes in cancer patients. Immunodiagnostics in oncology. Modern approaches to the immunotherapy of patients with oncologic diseases.
37. Causes of the formation of allergic pathology. Stages of allergic reaction formation.
38. Allergy and atopy. Classification of allergens. Causes and mechanisms of the development of allergic conditions.
39. Methods of allergy diagnostics: laboratory methods, skin tests and provocative tests.
40. Principles of anti-allergic therapy and immunotropic treatment methods in allergology. Specific immunotherapy, mechanism of action, indications and contraindications, prognosis of effectiveness.
41. Hey fever, allergic rhinitis, allergic conjunctivitis: etiology, immune pathogenesis, clinics, allegro-diagnostics main principles of immunotherapy.
42. Drug allergy. Immune pathogenesis, clinics, allegro-diagnostics, treatment, allegro- prevention.
43. Terms – allergy and pseudo-allergy, differential diagnostics. Histamine-liberation developmental mechanisms of pseudo-allergic reactions. Treatment principles.
44. Development of pseudo-allergic reactions in disorders of complement system activation and arachidonic acid metabolism. Treatment principles.
45. Definition of the term of autoimmunity, autoimmune disease, syndrome. Mechanisms of tolerance disruption, genetic basis of the development of auto-immune diseases.
46. Classification, main immune-laboratory diagnostics principles of autoimmune diseases. Modern approaches to the usage of immunotropic drugs.
47. Laboratory immunodiagnostic criteria of autoimmune diseases.
48. Classification of immunotropic medications, mechanism of action and side-effects.
49. Principles of clinical usage of immunotropic drugs, indications and contraindications for the administration, dose selection, control of therapeutic efficacy.
50. Main types of immune rehabilitation, its strategy, tactics and main principles.
51. Quantitive and functional immunologic tests. Immunogram, main indexes.
52. Determination methods of quantitive and functional characteristics of T-cells: rosette tests, tests with the usage of monoclonal antibodies, blast transformation reaction of T-cells (BTRT) with mitogens, level of circulating immune complexes (CIC).
53. Determination methods of quantitive and functional characteristics of B-cells: rosette tests, tests with the usage of monoclonal antibodies, blast transformation reaction of T-cells (BTRT) with mitogens, level of circulating immune complexes (CIC).
54. Methods of identification of phagocytic activity of lymphocytes.
55. Methods of determination of main classes of serum immunoglobulins concentration.

APPROXIMATE LIST OF PRACTICAL SKILLS AND TASKS FOR THE FINAL CONTROL

1. To interview and perform physical examinations of patients with immunodeficiency diseases (to collect immunological anamnesis, to determine the inherited susceptibility to the development of immunodeficiencies, to assess the data of physical methods of examination, etc.).
2. To be able to fill the patient's immunological history and to determine the "risk group" according to the pathology on its basis.
3. To acquire the skills of determining the required range of immunological tests for the examination of patients with immune-dependent pathology.

4. To determine the presence of main clinical symptoms and symptoms of immune disorders.
5. To carry out differentiated diagnosis, to ground and formulate he diagnosis in main immunodeficiency syndromes on the basis the data of laboratory and instrumental examination.
6. To perform clinical and immunological differentiation diagnostics of congenital and acquired immune deficiencies.
7. To acquire the skills of data interpretation and main principles of interpreting the data of leukogram and immunogram considering the clinics, period of disease, immunological anamnesis, etc.
8. To acquire the skills of influence estimation of the action of negative factors of the external environment and immunological indexes.
9. To detect clinical signs of local immunity decompensation.
10. To detect the signs of immune system irritation by the data of leukogram.
11. To administrate immunotropic treatment, determine pathogenesis, carry out primary and secondary immune prevention in the immune-dependent diseases.
12. To know main principles of immunotropic treatment administration in the complex treatment of immune dependent diseases.
13. To be able to carry out preventive measures during vaccination. To know the principles of immune-prophylaxis.
14. To acquire the skills of determining the necessity of clinical and allergological examination.
15. To interview and perform physical examination of the patients with allegopathology (to be able to fill allergological anamnesis, to determine the presence of genetic susceptibility to the development of allergological pathology).
16. To make a plan of the examination of patients with allergological diseases.
17. To gain the skills of performing skin allergological tests (prick-tests).
18. To gain the skills of estimating the data of laboratory allergological tests.
19. To acquire the skills of determining allergens with similar antigen determinants for making recommendations for the allergological prevention.
20. To gain the skills of performing pickfluometry and estimate its results.
21. To carry out differential diagnosis, ground and formulate diagnosis of main allergic diseases on the basis of laboratory and instrumental data analysis.
22. To administer treatment, state prognosis, carry out primary and secondary prevention in allergic diseases.
23. To administer first aid in acute allergic and pseudo-allergic pathology.
24. To apply in practice the standards of diagnostics and treatment of allergic diseases.
25. To gain the skills of administering anti-allergic drugs, to know formulations of main anti-allergic drugs.
26. To acquire the skills of laboratory results estimation, determining immunological criteria of immune pathology.
27. To apply in practice the standards of immune diagnostics and administration of immunosuppressive therapy with the estimation of its effectiveness in autoimmune diseases.
28. To acquirethe skills of determining the necessity of performing clinical and immunological examination of a married couple in case of the immune-dependent infertility suspicion.
29. To know the principles of immune diagnostics and immune therapy of infertility caused by the immunodeficiency in woman.
30. To know the principles of immune diagnostics and immune therapy of infertility caused by anti-ovarian immune conflict.
31. To know the principles of immune diagnostics and immune therapy in infertility caused by increased couple histocompatibility.
32. To interpret the data of analyses in the selection of the donor and recipient for the performance of transplantation.

33. To gain the skills in diagnostics of super-acute, acute and chronic crisis of the transplant organs and tissues rejection.
34. To carry out differential diagnostics of the crisis of rejection and infectious complications in patient following transplantation.
i. To administer immunosuppressive therapy an estimate its effectiveness after the transplantation of organs and tissues.
35. To interpret the data of immunograms in cancer patient combined with antiblast protection factors.
36. To assess the results of tumour-associated antigens occurrence in the early diagnostics of tumours and early detection of recurrent processes.
37. To know the immunotherapy principles and tumour immune prophylaxis.
38. To administer the urgent aid in acute allergic or pseudo-allergic pathology.
39. To administer the immunotropic therapy in complex treatment of infectious diseases.
40. To assess the effectiveness of administered immunotherapy in dynamics.
41. To know the principles of immune-prophylaxis and apply them in clinics.
42. To perform substitution therapy by the immunoglobulin drugs.
43. To perform antiviral immunotherapy by the administration of the drugs for interferon and interferon products.
44. To administer and assess the effectiveness of specific immunotherapy in the treatment of hey fever and allergic rhinitis.

Methods and means of standardized formative assessment of the learning process

Methods of assessment/test performance

Formative assessment is carried out during every practical class according to specific objectives of each theme.

During every practical class from the section "Fundamental immunology" the student answers 10 test questions; during every practical class from the sections "Applied immunology" and "Immunotherapy" the student answers 10 test questions and 3-5 case tests (tests on the theme of practical class; standard questions, with the tasks necessary for understanding a current theme; tasks on the lecture course and individual student's work related with current class; demonstrates the knowledge and practical skills on the theme of practical class).

Criteria of the assessment of student's formative academic activity

The teacher estimates the knowledge of students according to the 4-point scale asking questions for oral control and estimation. Every theme of the same module should have the same value.

Excellent ("5") – the student gives correct answers to 90-100% of A format tests. Student answers correctly and thematically to the standardized questions of the current theme including questions on the lecture course and self-guided work; connects the theory and practice and demonstrates correctly the accomplishment and knowledge of practical skills; interprets the test results fluently, solves highly complicated situational tasks, is able to generalize the material, knows methods of patient examination in the sufficient degree required for the medical professional; completed planned individual work (designing the tables, schemes on the theme).

Good ("4") – a student gives correct answers to 70-89% of A format tests. Student answers correctly and thematically to the standardized questions of the current theme including questions on the lecture course and self-guided work; demonstrates correctly the accomplishment and knowledge of practical skills; correctly uses theoretical knowledge to solve practical tasks; can solve easy and medium-complicated

situational tasks; gained necessary practical skills and ways of their usage in the amount which is higher than necessary minimum.

"Satisfactory" ("Passing grade") ("3") – a student gives correct answers to 50-69% of A format tests. Student doesn't give full answers to the standardized questions of the current theme including questions on the lecture course and self-guided work, requires additional questions; is not able to give clear, logical response. Makes mistakes while presenting the theme and demonstrating practical skills; solves only the easiest situational tasks, knows only the necessary minimum of examination methods.

"Unsatisfactory" ("Poor") ("2") – a student gives correct answers to less than 50% of A format tests; doesn't know the material of the current theme, can't make a structured and logical report, doesn't give answers to additional questions, doesn't understand the theme; makes significant mistakes during the report and demonstration of practical skills.

The student's knowledge is estimated by the 4-point scale («5», «4», «3», «2») during every class according to the criteria of the assessment of student's formative academic activity. The received marks are converted into points.

The following conversion of traditional mark into points is implemented in the program:

Usual mark	**Conversion into points Part 1** **Clinical immunology and allergology** 10 classes + final control (FC)
«5»	15
«4»	12
«3»	9
«2»	0

Maximum number of points that can be obtained by a student for his/her formative academic activity for the module is 120 points. It is counted by multiplying the number of points that correspond to the mark "5" and the number of practical classes in the module.
Minimum number of points that can be obtained by a student for his/her formative academic activity for the admission to the FMC is counted by multiplying the number of points that correspond to the mark "3" and the number of practical classes in the module.
Assessment of self-guided work: material for the self-guided work that is included in the theme of practical class together with classroom studies is estimated during the formative control of the theme during the corresponding classroom lesson.
Final control: is performed after learning of all themes of the module during the last practical class. Students, who accomplished all types of work according to the syllabus, made up all classes and received the number of points which is not less than minimal during the module.
Methods and means of standardized final control: it consists of two stages. The first stage – written answer to the format A tests. The second stage – oral and written answers to the control questions (text questions) or case tasks.
The conversion of the points for the specialties "General medicine", "Paediatrics", "Medical and preventing care" : «5» - 15 points, «4» - 12 points, «3» - 9 points. Total points for the formative control: maximum number of points – 129, minimum – 72.
Maximum number of points for the final control is **80**. The module is passed if a student received 50 and more points; the module is failed if a student got **less than 50 points.**

ASSESSMENT OF ACADEMIC ACTIVITY

Assessment is one of the final stages of the academic activity and determination of academic performance. The mark for the discipline is determined as average of the marks for modules structured by the academic discipline.

The mark for the thematic parts is determined as the sum of marks of formative academic activity (in points) and the mark of final modular control (in points) put at the assessment of theoretic knowledge and practical skills according to the lists determined by the curriculum

The maximum number of points received by the student during the module is 200 points.

Self-guided work of students planned in the theme together with classroom studies is estimated during formative control of the theme at the respective class. The knowledge of themes planned only for the self-guided work is controlled during the final modular control as "passed".

Final control is performed after studying all themed of the module during the last control class of the module.

The students, who attended all classes planned in the curriculum of the subject and received more than minimum number of points for the module are admitted to the final modular control. The student who missed the classes on serious reasons can have corrections in his/her individual plan and is permitted to make up academic debts in the determined term.

List of recommended literature:

1. Male, D., Peebles, S., & Male, V. (2021). *Immunology* (9th edition.). Elsevier.
2. Levinson, W., Chin-Hong, P., Joyce, E. A., Nussbaum, J., & Schwartz, B. S. (2020). *Review of medical microbiology & immunology : a guide to clinical infectious diseases* (Sixteenth edition.). McGraw-Hill Education.
3. Spickett, G. (2019). *Oxford Handbook of Clinical Immunology and Allergy* (4th ed.). Oxford University Press, Incorporated.
4. Abbas, A. K., Lichtman, A. H., Pillai, S., & Abbas, A. K. (2018). *Cellular and molecular immunology* (Ninth edition.). Elsevier.

Information resources:

https://www.jacionline.org

https://www.immunofrontiers.com/the-5-best-immunology-textbooks-of-2021