MINISTRY OF HEALTH OF UKRAINE
ODESSA NATIONAL MEDICAL UNIVERSITY
Clinical immunology, genetics and medical biology department

APPROVED
Vice-rector on scientific-academic education
professor _____ I. P. Shmakova
" 01 " 09 2021

CURRICULUM ON CYCLE
"CLINICAL ASPECTS OF IMMUNOPROPHYLAXIS"

Level of higher education: of the second (master's)

Field of knowledge 22 «Healthcare»

In specialty 222 «Medicine»

Educational and professional program: Medicine

Odesa 2021 – 2022

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The program is based on the educational-professional program "Medicine", training of specialists of the second (master's) level of higher education in the specialty 222 "Medicine" in the field of knowledge 22 "Health", approved by the Academic Council of ONMedU, from 04.06.2020, protocol №11 .
Developers: Doctor of Medicine, Professor S.F. Goncharuk

Program was discussed on the methodical meeting of the clinical immunology, genetics and medical biology department
Protocol №1 at 27.08.2021
Head of the department, Doctor of medicine, professor S. F. Goncharuk

The program was approved at the meeting of the subject cycle commission on medical and biological disciplines of ONMedU
Protocol №1 at 27.08.2021
Chairman of the subject cycle methodical commission on medical and biological disciplines,
Doctor of medicine, professor O.L. Appelhans

The program was approved at the meeting of the Central Coordination and Methodological Council of ONMedU
Protocol №1 at 30.08.2021

1. Description of the discipline:

Name of indicators	Characteristics of the discipline	
	Full-time education	
The total number of: Credits - 2.5 Hours - 75 Content sections - 5	Selective	
	Year of study	5
	Semester	IX - X
	Lectures	5 hours
	Practical classes	35 hours
	SSW	35 hours
	Including individual tasks	0
	Type of control	Differential test

2. Aims and tasks of the discipline

The purpose: of studying the discipline of clinical aspects of immunoprophylaxis is to form in future doctors an idea about the structure of the immune system, the mechanisms of functioning of the immune response; immune-dependent pathology, the functioning of the immune system in different age groups; the concept of individual and population immunity; the need for immunoprophylactic measures; about the classification of vaccines; about the current Ukraine routine immunisation schedule.

Main tasks:

- to get acquainted with modern scientific achievements on the ways of forming a specific immune response to antigens
- to master the mechanisms of formation of primary and secondary immune response to infectious and non-infectious pathogens
- assess the patient's immune status according to the basic immunolaboratory methods and principles of interpretation of immunograms;
- to get acquaint with the concept of individual, group, collective, population immunity
- to get acquaint with modern methods of creation of vaccines and their classification
- to get acquaint with the approaches to carrying out vaccinations in the conditions of medical and preventive establishments regulated by the Ministry of Health of Ukraine
- to form an idea of the importance of the formation of individual and population immunity in the system of medical care.

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

IC - Integral competence is the ability to solve complex problems and problems in the field of health care in the specialty "Medicine" in a professional activity or in the learning process, which involves research and / or innovation and is characterized by uncertainty of conditions and requirements.

- **General competencies:**

GC1 Ability to abstract thinking, analysis and synthesis
GC2 Knowledge and understanding of the subject area and understanding of the profession
GC3 Ability to communicate in the state language
GC5 Ability to adapt and make an informed decision in a new situation
GC6 Ability to work in a team
GC7 Ability to evaluate and ensure the quality of work performed

- **Special (professional, subject) competencies**

SC1 Communication skills and clinical examination of the patient
SC2 Ability to determine the list of necessary clinical and laboratory and instrumental studies and evaluate their results
SC3 Ability to establish an initial and clinical diagnosis of the disease
SC4 Ability to determine the principles of treatment of diseases, the required mode of work and rest and the nature of nutrition
SC5 Ability to diagnose emergencies
SC6 Ability to determine tactics and provide emergency medical care

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

To know:

Structure and clinical physiology of the immune system

Modern views on the formation of the immune response

Basic methods of immunodiagnostics clinical manifestations of immunodeficiency conditions features of formation of anti-infective immunity

Classification of modern vaccines principles of immunoprophylaxis terms of preventive vaccinations, according to the current Ukraine routine immunisation schedule.

Be able to:

Explain to patients and relatives of patients the need for immunoprophylactic measures

To carry out differential diagnosis of hereditary and acquired immune disorders in various pathologies on the basis of immunological anamnesis, analysis of genealogical tree, data of clinical and laboratory examination of patients

Evaluate the data of general blood tests, immunological and allergological studies, taking into account the leading mechanism of immunological disorders in the genesis of different types of immunological and allergic pathology

Identify contraindications for immunization

Timely detect signs of post vaccination reactions and post vaccination complications

To form a vaccination plan for the patient according to the current Ukraine routine immunisation schedule

3. Contents of the curriculum

General principles of functioning of the immune system

TOPIC 1. Structure and principles of functioning of the immune system. Determination and forms of immunity. Central and peripheral organs of the immune system. Factors of the congenital immunity: cellular (monocytic - macrophage system, killer and granulocytic cell), humoral (complement system, cytokines and others). Antigens and their characteristic. Specific immunity, its peculiarities, the stages of formation and cooperation of the immunocompetent cells, which participate in formation of the immune response. Populations (T & B-lymphocytes) and subpopulations (T - helpers of 1 and 2 types, T- regulators, T -CDL) of lymphocytes, stages of their maturing and differentiation, their functions. Immunoglobulins, structure, function. Thymus - dependent and thymus - independent mechanism of synthesis of the antibodies. Structure and properties of the circulating immune complexes. Main complex of histocompatibility: structure, property, function.

TOPIC 2. Patterns and features of the formation of the immune response.
Mechanisms of formation of innate and adaptive immune response. Specific immunity, its features, stages of formation and cooperation of immunocompetent cells involved in the formation of the immune response. Regulation of immunity.

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

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

TOPIC 3. Immunologic methods of investigation. Basic rules of evaluation of the immune status.

A complex approach to evaluation of the human immune status. Peculiarities of the immunologic anamnesis. Clinical methods of evaluation of the immune status. Instrumental methods of evaluation of the immune status. Determination of the main symptoms and syndromes of the immune disorders.

Laboratory methods of evaluation of the immune status: humoral congenital factors of protection; evaluation of the cellular immunity; complex evaluation of local immunity.

Immunogram, interpretation of its results. Possibilities and limitations of the immunological methods in clinical practice. Peculiarities of making the immunological diagnosis.

Immunodeficiency diseases and immune-dependent pathology

TOPIC 4. Diseases of the immune system. Immunodeficiency diseases.

Congenital immunodeficiency diseases: definition, classification, mechanism of development. Clinical signs, immunodiagnosis, doctor's tactics, approaches to treatment: combined, T and B – dependent immunodeficiencies, caused by disorder of the phagocytic link of immunity and deficiency of protein complement.

Acquired immunodeficiency diseases: definition, causes, the mechanisms of development, classification, diagnostics. The role of the acquired immunodeficiency diseases in the pathogenesis of different diseases. Early detection of the secondary immunological deficiency. Basic approaches to the treatment and prophylaxis taking into account clinical manifestations and peculiarities of the course.

TOPIC 5. Principles of immunodiagnostics, immunotherapy, immunorehabilitation and immunoprophylaxis.

Classification of immunotropic drugs, mechanism of action, side effects. Principles of clinical use of immunotropic drugs, indications and contraindications to the appointment, dose selection, immunological control of therapeutic efficacy: immunosuppressive drugs; immunostimulating drugs; blockers of mediators of immune reactions; anti-inflammatory drugs; replacement therapy; cytokine therapy, antireceptor drugs, etc. Basic principles of immunoprophylaxis of bacterial and viral infections. The main types of immunorehabilitation, its strategy, tactics and basic principles. Approaches to the use of immunotropic therapy depending on age.

The main aspects of immunoprophylaxis

TOPIC 6. Classification of vaccines. Contraindications for vaccination, post-vaccination reactions and post-vaccination complications.

Latest in vaccine development. Classification of vaccines. Causes of postvaccination reactions and postvaccination complications. The concept of postvaccination reaction. Classification of postvaccination reactions. The concept of post-vaccination complications. Classification of post-vaccination complications.

TOPIC 7. Calendar of preventive vaccinations in Ukraine

The current Ukraine routine immunisation schedule content.

Terms of preventive vaccinations and justification.

The main orders of the Ministry of Health of Ukraine regarding preventive vaccinations.

4. Structure of the discipline

Topic	Lectures	Practical classes	SSW	Individual work
General principles of functioning of the immune system				
Topic 1. Structure and principles of functioning of the immune system. Topic 2. Patterns and features of the formatio of the immune response. Topic 3. Immunologic methods of investigation. Basic rules of evaluation of the immune status.	3	10 5	- 15	-
Immunodeficiency diseases and immunodependent pathology				
Topic 4. Diseases of the immune system. Immunodeficiency diseases. Topic 5. Principles of immunodiagnostics, immunotherapy, immunorehabilitation and immunoprophylaxis.	2	5 5		-
The main aspects of immunoprophylaxis				
Topic 6. Classification of vaccines. Contraindications for vaccination, post-vaccination reactions and post-vaccination complications. Topic 7. Calendar of preventive vaccinations in Ukraine		3 5	10 10	-
Final control		2		
Total:	5	35	35	-

5. THEMATIC PLAN OF LECTURES

№	Topic	Hours
1.	Principles of functioning of the immune system	3
2.	Diseases of the immune system. Immunodeficiency diseases.	2
Total		5

6. THEMATIC PLAN OF PRACTICAL CLASSES

№	Topic	Hours
1.	Structure and principles of functioning of the immune system	10

2.	Immunologic methods of investigation.	5
3.	Diseases of the immune system. Immunodeficiency diseases	5
4.	Basic rules of evaluation of the immune status	3
5.	Contraindications for vaccination, post-vaccination reactions and post-vaccination complications.	5
6.	The current Ukraine routine immunisation Schedule	5
	Final control	2
Total		35

7. THEMATIC PLAN OF SELF-STUDY WORK

№	Preparation to the practical classes and final module control	Hours
1.	**Patterns and features of the formation of the immune response.** Mechanisms of formation of innate and adaptive immune response. Specific immunity, its features, stages of formation and cooperation of immunocompetent cells involved in the formation of the immune response. Regulation of immunity. Age features of bone marrow, thymus and peripheral lymphoid organs. Immunopathology in the elderly.	15
2.	**Classification of vaccines.** The main directions of vaccines. Classification of vaccines.	10
3.	**Calendar of preventive vaccinations in Ukraine.** The main orders of the Ministry of Health of Ukraine regarding preventive vaccinations.	10
Total		35

8. Individual student work - Not provided.

9. Teaching methods

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

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

10. Methods of control and criteria for evaluating learning outcomes

Ongoing control: oral examination, testing, assessment of practical skills, solving situational clinical problems, assessment of activity in the classroom.

Final control: differential test

The structure of the current assessment in the practical lesson:

1. Assessment of theoretical knowledge on the topic of the lesson:
- methods: survey, solution of situational clinical problem;
- maximum grade - 5, minimum grade - 3, unsatisfactory grade - 2.

2. Evaluation of work with the patient on the topic of the lesson:
- methods: assessment of:
a) communication skills with the patient or his parents,
b) the correctness of the appointment and evaluation of laboratory and instrumental studies,

c) compliance with the algorithm for differential diagnosis
d) justification of clinical diagnosis,
e) treatment plan
- maximum grade - 5, minimum grade - 3, unsatisfactory grade - 2

Criteria for current assessment in the practical class:

«5»	is given to the student who systematically worked during a semester, showed during examination various and deep knowledge of a program material, is able to successfully carry out tasks which are provided by the program, has mastered the maintenance of the basic and additional literature, has understood interrelation of separate sections of discipline, showed creative abilities in understanding and using educational material, showed the ability to independently update and replenish knowledge; confidently demonstrates practical skills during the examination of a patient and interpretation of clinical, laboratory and instrumental studies, expresses his opinion on the topic, demonstrates clinical thinking
«4»	is given to a student who has shown full knowledge of the curriculum, successfully completes the tasks provided by the program, mastered the basic literature recommended by the program, showed a sufficient level of knowledge in the discipline and is able to independently update and update during further study and professional activity; demonstrates clinical thinking
«3»	is given to the student who has shown knowledge of the basic educational program material in the volume necessary for the further training and the subsequent work on a profession, copes with performance of the tasks provided by the program, has made separate mistakes in answers on examination and at performance of examination tasks, but has the necessary knowledge to overcome mistakes under the guidance of a researcher, insecurely participates in the discussion and solution of situational clinical problems, demonstrates practical skills during the examination of a patient and interpretation of clinical, laboratory and instrumental studies with significant errors.
«2»	is given to the student who did not show sufficient knowledge of the basic educational program material, made fundamental mistakes in performance of the tasks provided by the program, cannot use the knowledge at the further training without the help of the Teacher, failed to master skills of independent work, does not participate in the discussion and solution of the situational clinical problem, does not demonstrate practical skills during the examination of a patient and the interpretation of clinical, laboratory and instrumental studies.

Final assessment

Only those students who do not have academic debt and have an average score for current academic activity of at least 3.00 are allowed to take the final assessment. Differentiated student credit is assessed on a 4-point (traditional) scale, conducted by interviewing and performing written tasks (situational task, treatment algorithm, evaluation of immunograms or leukograms, MCQs). The score for the differentiated test is the arithmetic mean for answering 2 theoretical / practical questions (one question from each of the sections: general immunology; clinical immunology and allergology) and performing 2 written tasks.

11. Distribution of points received by applicants for higher education

The grade for the discipline consists of 50.0% of the grade for the current performance and 50.0% of the grade for the exam. The average score for the discipline is translated into a national grade and converted into scores on a multi-point scale. Conversion of the traditional grade for the discipline in the 200-point is carried out by the information and computer center of the university program "Contingent".

Table for conversion of traditional assessment into multi-point:

National grade for the discipline	The sum of points for the discipline
«5»	**185 – 200**
«4»	**151 – 184**
«3»	**120 – 154**

Credits of discipline are independently converted into both the ECTS scale and the four-point scale. ECTS scale scores are not converted to a four-point scale and vice versa. Further calculating are carried out by the information computer center of the university.

Conversion of traditional assessment in the discipline and the amount of points on the ECTS scale

ECTS scale	Statistical indicator
A	Best 10% of students
B	Next 25% of students
C	Next 30% of students
D	Next 25% of students
E	The last 10% of students

The ECTS scale is given by the ONMedU educational subdivision or the dean's office after ranking the grades in the discipline among students studying in one course and in one specialty. According to the decision of the Academic Council, the ranking of students - citizens of foreign countries is recommended to be carried out in one array.

12. The list of theoretical questions to the differential test

1. The main biological tasks and functions of the body's immune system.
2. Classification of immune system organs. Apoptosis (concept and role in the functioning of the organism).
3. Differences between specific and nonspecific immune response.
4. The main factors of nonspecific immune response.
5. The main factors of specific (adaptive) immune response.
6. Antigen presentation: a role in the formation of the immune response. Antigen-presenting cells.
7. Phagocytosis: a role in the implementation of nonspecific and specific immune response. Phagocytosis of cells.
8. Humoral factors of nonspecific immune protection of an organism.
9. Killer cells: basic types, their functions and features.
10. Granulocytes: functions and role in the immune response. Diagnostic significance in various pathological conditions.
11. Agranulocytes: functions and role in the immune response. Diagnostic significance in various pathological conditions.

12. Complement system. Biological consequences of complement system activation. Ways of activation.
13. B-lymphocytes: markers and functions. Diagnostic significance in various pathological conditions.
14. T-lymphocytes: types and main markers. Diagnostic significance in various pathological conditions.
15. T-helpers of II types and I: differences in mechanisms of action.
16. Immunoglobulins: structure, function, classes. Diagnostic significance in various pathological conditions of Ig M and IgG
17. Immunoglobulins: structure, function, classes. Diagnostic significance in various pathological conditions Ig E and Ig A
18. Cellular and humoral immune response of adaptive immunity: features and differences.
19. Cytokines: basic classes and their functions.
20. The main complex of human histocompatibility. Classes of antigens and their role in the formation of the immune response.
21. The main complex of human histocompatibility. Concept. Location. Mechanisms of imitation.
22. Factors of antibacterial immune protection of an organism. Cellular and humoral immune response.
23. Antiviral immune response.
24. Mechanisms of protection of an organism against multicellular parasites.
25. Classification of immunodeficiency states. Diagnostic criteria.
26. Classification of immunodeficiency states. Primary immunodeficiency states with disorders in the humoral (B-cell) and T-cell links: basic syndromes, features of the clinical course, diagnosis, principles of therapy.
27. Classification of immunodeficiency states. Primary immunodeficiency states with deficiency of phagocyte functions, insufficiency of the complement system and combined primary immunodeficiency states: basic syndromes, features of the clinical course, diagnosis, principles of therapy.
28. Secondary immunodeficiency states: causes, classification, features of the clinical course, diagnosis, principles of therapy.
29. Classification of immunotropic drugs.
30. Indications and contraindications to the appointment of immunotropic drugs.
31. Basic immunosuppressive drugs.
32. Basic immunostimulating drugs.
33. The main directions of cytokine therapy.
34. The concept of immunorehabilitation.
35. Classification of vaccines.
36. The concept of post-vaccination reaction. Classification.
37. The concept of post-vaccination complications. Classification.
38. Terms of preventive vaccinations in Ukraine against tuberculosis.
39. Terms of preventive vaccinations in Ukraine against tetanus, diphtheria, polio.
40. Terms of preventive vaccinations in Ukraine for hepatitis B.
41. Terms of preventive vaccinations in Ukraine against measles, mumps, rubella.
42. Orders of the Ministry of Health of Ukraine regulating preventive vaccinations.

13. Methodical support:

- Curriculum of the discipline
- The syllabus of the discipline
- Textbook: Bajora YI, Goncharuk SF Clinical immunology and allergology. Textbook: ed. 4th, add. // Odessa: Press - Courier, 2018. - 264 p.
- Multimedia presentations
- Situational clinical tasks

- Methodical development of practical classes
- Electronic bank of test tasks by divisions of the discipline.

14. Recommended literature

Main:

1. Drannik GN Clinical immunology and allergology / Manual for students, interns, immunologists, allergists, doctors of medical specialties of all specialties. - 4 ed., Ext. // Kiev: - LLC "POLYGRAPH PLUS" .- 2011. - 482 p.

2. Immunoprophylaxis of infectious diseases: textbook - 2nd ed. / LI Chernyshova, FI Lapiy, AP Volokha, etc.// Kyiv: "Medicine" - 2019.- 320 p.

3. Bazhora Yu.I., Goncharuk S.F., Kasyanenko A.V., Vachnenko A.V. Clinical immunology and allergology (the textbook) / Затверджено МОН України як підручник для студентів вищих навчальних закладів // Vinnytsia: Nova Knyha, 2019. – 272 p.: il.

Additional:

1. Oxford Handbook of Clinical Immunology and Allergy /G. Spickett. – 2nd ed. // Oxford University Press, USA, 2006. – 584 p.

2. Clinical Immunology: Disease, Principles, Mechanisms /J. Bellanti. – 1st ed. // Informa Health Care, 2010. – 500 p.

3. Clinical Immunology: Principles and Practice /Robert R. Rich, Thomas A. Fleisher, William T. Shearer, Harry W. Schroeder, Anthony J. Frew, Cornelia M. Weyand. – 3rd ed. // Mosby, 2008. – 1616 p.

4. Immunology for Medical Students /R. Nairn, M. Helbert – 2nd ed. // Mosby, 2006. – 320 p.

5. EAACI European Academy of Allergy and Clinical Immunology White Paper on Research, Innovation and Quality Care. Published by the European Academy of Allergy and Clinical Immunology 2018

6. Global Atlas of ALLERGY. Published by the European Academy of Allergy and Clinical Immunology 2014.

7. GLOBAL ATLAS OF SKIN ALLERGY. Published by the European Academy of Allergy and Clinical Immunology 2019.

8. Basic immunology : functions and disorders of the immune system / Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai ; Illustrations by David L. Baker, Alexandra Baker. -- Fifth edition. 318 p. ; cm. Includes bibliographical references and index.

9. ISBN 978-0-323-39082-8 I. Lichtman, Andrew H., author. II. Pillai, Shiv, author. III. Title. [DNLM: 1. Immunity. 2. Hypersensitivity. 3. Immune System--physiology. 4. Immunologic Deficiency Syndromes. QW 504] QR181 616.07’9--dc23.

10. 5th Edition of Clinical Immunology: Principles and Practice / Robert R. Rich. Elsevier – 2019. C. – 1323.

15. Electronic information resources

http://moz.gov.ua
https://elifesciences.org/subjects/immunology-inflammation
https://www.eaaci.org/
https://www.facebook.com/EAACI
http://aalu.org.ua/
https://allergy.immunologyconferences.com/events-list/asthma
https://www.immunopaedia.org.za/
https://www.worldallergy.org/meetings