**Ministry of health of ukraine**

**Kharkiv national medical university**

**Department of Internal Medicine No. 2, Clinical Immunology and Allergology named after academician L.T. Malaya**

**Syllabus of discipline**

**«Molecular Allergology»**

**for masters in the field of preparation 22 "Health"**

**specialty 222 "Medicine"**

**qualification Master of Medicine**

**Kharkiv – 2020**

**Fifth year of study**

**Required Items:**

Number of credits – 3,0.

The total number of hours - 90.

Hours for full-time study: classroom - 20, independent student work - 70.

Year - 5, semesters - 9 and 10.

Practical classes - 20 hours.

Independent work - 70

Type of control: credit.

Location of practical classes: study rooms of the Department of Internal Medicine №2, Clinical Immunology and Allergology named after Acad. LT Small on the basis of the National Clinical Hospital "City Clinical Hospital №27" of KhCM (41 Pushkinskaya St.).

Classes: Monday, Tuesday, Wednesday, Thursday, Friday (800-1215 / 1225-1555 according to schedule).

**Course coordinators**

1. Pavlo Kravchun - Head of the Department of Internal Medicine №2, Clinical Immunology and Allergology named after Academician L.T. Malaya, Dr. med. Professor.

2. Volodymyr Babadzhan - Professor of the Department of Internal Medicine №2, Clinical Immunology and Allergology named after Academician L.T. Malaya, Dr. med. M.Sc., Professor, Email: vd.babadzhan[@knmu.edu.ua](mailto:vladdoc2@gmail.com)

**Course abstract**

The discipline "Molecular Allergology" includes an idea of ​​the structure of allergenic proteins responsible for sensitizing the body to certain allergens, their classification, the concept of one- and multicomponent quantitative methods for determining their concentration in serum, which will interpret test results, determine species-specific sensitivity and possible cross-reactivity, which will assess the risk of an allergic reaction to various allergens. Molecular diagnostics is an important tool for choosing the right treatment of the patient, according to the correctly calculated principles, schemes and protocols. Such information helps physicians to personificate treatment, including making recommendations for reducing the effects of the target allergen, selecting appropriate allergens, and specific immunotherapy techniques or the need for dietary adjustments. And as a result will significantly reduce the risk of disease (hay fever, allergic bronchitis, allergic bronchitis, allergic bronchitis allergies, anaphylaxis). The study of the discipline is needed by physicians, family physicians, pediatricians, otorhinolaryngologists, pulmonologists and others. The course "Molecular Allergology" is intended for Masters of Medicine of 5 years for study.

The purpose of teaching the course "Molecular Allergology" is to deepen knowledge of modern methods of allergodiagnostics, skills to identify causative allergens, develop measures to prevent contact with them, methods of allergen-specific immunotherapy, emergency help and other competencies in allergology required in the professional activities Masters of Medicine, which are established on the basis of educational and professional program.

The main tasks of studying the discipline "Molecular Allergology" are the acquisition of competencies by masters in accordance with the general and professional competences of educational and professional program "Medicine" of the second (master's) higher education level, specialty 222 Medicine qualification Master of Medicine: 1) the ability to interpret the results of allergen-component studies, to determine the relationship between clinical manifestations of allergies and research results; 2) the ability to detect clinical and immunological signs of immune disorders in patients with acute, recurrent and chronic allergy, to establish a clinical diagnosis; 3) the ability to classify the symptoms and syndromes of allergies; 4) the ability to make a plan of examination of the patient, to analyze the obtained data of one- and multi-component research methods that can identify the causative allergen; 5) the ability to determine the presence of cross-sensitization; 6) the ability to apply knowledge in practical situations, to prescribe allergen-specific immunotherapy, to provide emergency care; 7) understanding of the subject area and professional activity, the ability to adapt and act in a new situation, making an informed decision, the ability to work in a team, to act socially responsibly and consciously.

**The organization of training – curriculum the discipline “Molecular Allergology”**

|  |  |  |  |
| --- | --- | --- | --- |
| Titles of disciplines and topics | Number of hours | | |
| Form of education (full-time or evening-time) | | |
| All | Including | |
| Pr. | IWS |
| 1 | 2 | 4 | 7 |
| Section 1. Types of allergen components, properties, characteristics of sources, clinical manifestations of allergy. | | | |
| Topic №1. Allergen components. Classification. PR-10 proteins. The concept of homologous proteins. | 2 | 2 |  |
| Topic № 2. Characteristics of PR-10 proteins, profiles, LTP-proteins, polcalcin and proteins of the Ole e 1 family. | 7 |  | 7 |
| Topic № 3. Characteristics of profiles, lipid transporter proteins (LTP), polcalcin, proteins of the Ole e 1 family. | 2 | 2 |  |
| Topic № 4. Characteristics of growth proteins, pectate lyase and defense-like proteins. | 7 |  | 7 |
| Topic № 5. Growth protein (Beta-expansin), pectate lyase (Defate lyase), defensin-like proteins (Defensin-like protein) of pollen of cereals and grasses. | 2 | 2 |  |
| Topic № 6. Protein stocks. Tropomyosins, NPC2 family proteins, lipocalins, serum albumin, serum albumin, uteroglobin, parvalbumin, superoxide dismutase, cross-reactive carbohydrate determinants. | 7 |  | 7 |
| Topic № 7. Plant stock proteins, tropomyosins, proteins of the Neiman Peak family, type C2, lipocalins, serum albumin, uteroglobin, parvalbumin, superoxide dismutase, cross-reactive carbohydrate determinant. | 2 | 2 |  |
| Topic № 8. Methods of diagnosis of sensitization to allergens of plant origin (tree pollen, herbaceous plants, weeds). | 7 |  | 7 |
| Together in Section 1 | 36 | 8 | 28 |
| Section 2. Methods of one- and multi-component allergodiagnostics. | | | |
| Topic № 9. Leather tests (pre-tests and scarification tests). Enzyme-linked immunosorbent assay, immunoblotting and one-component methods for determining specific IgE to allergen components. Molecular diagnosis of allergens of plant origin (pollen of trees, herbaceous plants, weeds). | 2 | 2 |  |
| Topic № 10. Multicomponent methods for determination of specific IgE to allergen components (ISAC, ALEX). Molecular diagnosis of sensitization to food allergens of plant origin, allergens of domestic fur animals, livestock. | 7 |  | 7 |
| Topic № 11. Determination of sensitization to allergen components using multicomponent methods based on microarrays. Food allergens of plant origin, furry animals, livestock. | 2 | 2 |  |
| Topic № 12. Specific immunodiagnostics of patients with hay fever and allergic bronchial asthma. Diagnosis of sensitization to food of animal origin. Allergens of mold and house dust mites, insects. | 7 |  | 7 |
| Topic № 13. Allergens of food of animal origin, seafood, meat, molds and yeasts, house dust mites, insects and parasites, poisons of membranous insects. Allergens for PACh tests. | 2 | 2 |  |
| Topic № 14. Specific immunotherapy of patients with hay fever and allergic bronchial asthma. | 6 |  | 6 |
| Together in Section 2. | 26 | 6 | 20 |
| Section 3. Allergic diseases. | | | |
| Topic № 15. Specific immunotherapy of patients with hay fever and allergic bronchial asthma with allergen extracts, allergen components, allergoids. | 2 | 2 |  |
| Topic №16 Specific immunotherapy for seasonal and year-round sensitization. | 6 |  | 6 |
| Topic 17. Features of specific immunotherapy for seasonal and perennial allergic rhinitis, allergic bronchial asthma. | 2 | 2 |  |
| Topic 18. Methods of administration of allergens and allergen components. Dosage of allergens. | 6 |  | 6 |
| Topic 19. Methods of specific immunotherapy. Clinical manifestations of side effects, complications, methods of their prevention. | 2 | 2 |  |
| Topic 20. Preparation for the test. | 10 |  | 10 |
| Together in Section 3 | 28 | 6 | 22 |
| Credit |  |  |  |
| Total hours in discipline | 90 | 20 | 70 |

**Topics of practical classes the discipline “Molecular Allergology”**

|  |  |  |
| --- | --- | --- |
| №  i/o | Title of topic | Number of hours |
| 1 | Allergen components. Classification. PR-10 proteins. The concept of homologous proteins. | 2 |
| 2 | Characteristics of profiles, lipid transporter proteins (LTP), polcalcin, proteins of the Ole e 1 family. | 2 |
| 3 | Growth protein (Beta-expansin), pectate lyase (Defate lyase), defensin-like proteins (Defensin-like protein) of pollen of cereals and grasses. | 2 |
| 4 | Protein stocks. Tropomyosins, NPC2 family proteins, lipocalins, serum albumin, serum albumin, uteroglobin, parvalbumin, superoxide dismutase, cross-reactive carbohydrate determinant. | 2 |
| 5 | Leather tests (pre-tests and scarification tests). Enzyme-linked immunosorbent assay, immunoblotting and one-component methods for determining specific IgE to allergen components. Molecular diagnosis of allergens of plant origin (pollen of trees, herbaceous plants, weeds). | 2 |
| 6 | Determination of sensitization to allergen components using multicomponent methods based on microarrays. Food allergens of plant origin, furry animals, livestock. | 2 |
| 7 | Allergens of food of animal origin, seafood, meat, molds and yeasts, house dust mites, insects and parasites, poisons of membranous insects. Allergens for PACh tests. | 2 |
| 8 | Specific immunotherapy of patients with hay fever and allergic bronchial asthma with allergen extracts, allergen components, allergoids. | 2 |
| 9 | Features of specific immunotherapy for seasonal and perennial allergic rhinitis, allergic bronchial asthma. | 2 |
| 10 | Methods of specific immunotherapy. Clinical manifestations of side effects, complications, methods of their prevention. | 2 |
| 11 | Credit |  |
| Total hours of practical classes | | 20 |

**Independent work of students (IWS) the discipline “Molecular Allergology”**

|  |  |  |
| --- | --- | --- |
| №  i/o | Title of topic | Number of hours |
| 1 | Characteristics of PR-10 proteins, profiles, LTP-proteins, polcalcin and proteins of the Ole e 1 family. | 7 |
| 2 | Characteristics of growth proteins, pectate lyase and defense-like proteins. | 7 |
| 3 | Protein stocks. Tropomyosins, NPC2 family proteins, lipocalins, serum albumin, serum albumin, uteroglobin, parvalbumin, superoxide dismutase, cross-reactive carbohydrate determinants. | 7 |
| 4 | Methods of diagnosis of sensitization to allergens of plant origin (tree pollen, herbaceous plants, weeds). | 7 |
| 5 | Multicomponent methods for determination of specific IgE to allergen components (ISAC, ALEX). Molecular diagnosis of sensitization to food allergens of plant origin, allergens of domestic fur animals, livestock. | 7 |
| 6 | Specific immunodiagnostics of patients with hay fever and allergic bronchial asthma. Diagnosis of sensitization to food of animal origin. Allergens of mold and house dust mites, insects. | 7 |
| 7 | Specific immunotherapy of patients with hay fever and allergic bronchial asthma. | 6 |
| 8 | Specific immunotherapy for seasonal and year-round sensitization. | 6 |
| 9 | Methods of administration of allergens and allergen components. Dosage of allergens. | 6 |
| 10 | Preparation for the test. | 10 |
| Total hours of independent work of the student | | 70 |

**Methods of control the discipline “Molecular Allergology”**

**Current training activity.** Teachers will ensure that each Masters of Medicine receives the necessary competences in the areas covered by the practical classes. Mastering the topic (current control) is controlled by practical lessons according to specific goals. The following measures are used to assess the level of the Master of Medicine preparation: interpretation and evaluation of the results of specific immuno-diagnostics, laboratory tests (ELISAs for determining the levels of specific IgEs), single- and multycomponent immunoassays, specific immunotherapy, , solution of situational tasks, control of the acquisition of practical skills.

When assessing the mastering of each discipline subject (current training activity - CTA) and the final session (software), the Master of Medicine is awarded an assessment according to the traditional 4-point system: "excellent", "good", "satisfactory" and "unsatisfactory".

**Evaluation of the success of master's of Medicine studies in ECTS, the organization of the educational process - a credit.**

**The final lesson** is conducted in accordance with the program of the discipline during the semester according to the schedule. The grade in the discipline is given to the Masters of Medicine at the last (final) lesson. The grade in the discipline includes a grade for current learning activities of Masters of Medicine.

**Assessment of the current training activity of the Master of Medicine.** Recalculation of the average grade for current training activities in a multi-point scale is carried out in accordance with the "Instructions for assessing the educational activities of Masters…" (Table 1). The total amount of points for the current training activity is defined as the arithmetic mean of traditional grades for each lesson, rounded to 2 decimal places, which are converted into points using table 1 (ACS - average score) is from 120 to 200 points. The minimum number of points that a Master of Medicine must score for the current training activity during the study of the discipline is 120 points, the maximum number of points - 200 points.

Table 1

Recalculation of the average grade for current activities in a multi-point scale (for disciplines that end with a credit)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 4-point scale | 200-point scale |  | 4-point scale | 200-point scale |  | 4-point scale | 200-point scale |
| 5 | 200 | 4.22-4,23 | 169 | 3.45-3,46 | 138 |
| 4.97-4,99 | 199 | 4.19-4,21 | 168 | 3.42-3,44 | 137 |
| 4.95-4,96 | 198 | 4.17-4,18 | 167 | 3.4-3,41 | 136 |
| 4.92-4,94 | 197 | 4.14-4,16 | 166 | 3.37-3,39 | 135 |
| 4.9-4,91 | 196 | 4.12-4,13 | 165 | 3.35-3,36 | 134 |
| 4.87-4,89 | 195 | 4.09-4,11 | 164 | 3.32-3,34 | 133 |
| 4.85-4,86 | 194 | 4.07-4,08 | 163 | 3.3-3,31 | 132 |
| 4.82-4,84 | 193 | 4.04-4,06 | 162 | 3.27-3,29 | 131 |
| 4.8-4,81 | 192 | 4.02-4,03 | 161 | 3.25-3,26 | 130 |
| 4.77-4,79 | 191 | 3.99-4,01 | 160 | 3.22-3,24 | 129 |
| 4.75-4,76 | 190 | 3.97-3,98 | 159 | 3.2-3,21 | 128 |
| 4.72-4,74 | 189 | 3.94-3,96 | 158 | 3.17-3,19 | 127 |
| 4.7-4,71 | 188 | 3.92-3,93 | 157 | 3.15-3,16 | 126 |
| 4.67-4,69 | 187 | 3.89-3,91 | 156 | 3.12-3,14 | 125 |
| 4.65-4,66 | 186 | 3.87-3,88 | 155 | 3.1-3,11 | 124 |
| 4.62-4,64 | 185 | 3.84-3,86 | 154 | 3.07-3,09 | 123 |
| 4.6-4,61 | 184 | 3.82-3,83 | 153 | 3.05-3,06 | 122 |
| 4.57-4,59 | 183 | 3.79-3,81 | 152 | 3.02-3,04 | 121 |
| 4.54-4,56 | 182 | 3.77-3,78 | 151 | 3-3,01 | 120 |
| 4.52-4,53 | 181 | 3.74-3,76 | 150 | **Less 3** | **Not enough** |
| 4.5-4,51 | 180 | 3.72-3,73 | 149 |  |  |
| 4.47-4,49 | 179 | 3.7-3,71 | 148 |
| 4.45-4,46 | 178 | 3.67-3,69 | 147 |  |  |
| 4.42-4,44 | 177 | 3.65-3,66 | 146 |  |
| 4.4-4,41 | 176 | 3.62-3,64 | 145 |  |  |
| 4.37-4,39 | 175 | 3.6-3,61 | 144 |  |  |
| 4.35-4,36 | 174 | 3.57-3,59 | 143 |  |  |
| 4.32-4,34 | 173 | 3.55-3,56 | 142 |  |  |
| 4.3-4,31 | 172 | 3.52-3,54 | 141 |  |  |
| 4,27-4,29 | 171 | 3.5-3,51 | 140 |  |  |
| 4.24-4,26 | 170 | 3.47-3,49 | 139 |  |  |

Assessment of Masters' independent work. Independent work of Master, which is provided by the topic of the lesson along with the classroom work, is assessed during the ongoing control of the topic at the relevant lesson.

**Score for discipline**

The grade in the discipline is given only to students who have all practical classes and lectures.

**Elimination of academic debt (working off)** The course grade is given only to Masters of Medicine who have completed all practical classes and lectures. If a Masters has arrears of absenteeism (absent or unsatisfactory) and lectures (absent), he or she may complete an internship or lecture (write an abstract and answer questions on a lecture topic) during the current semester, as well as approved the schedule of the educational process for a period of two weeks during the winter or summer holidays before the beginning of the next semester, after the end of the corresponding semester, or the academic year with the permission of the dean.

**Recommended literature**

1. Oxford Handbook of Clinical Immunology and Allergy/ Third edition/Edded by Gavin P.S. – Oxford University Press, 2015 - 659 p.

2. USMLE STEP 1Lecture Notes, 2016/ Immunology and Microbiology/Tiffany L. Alley, Kim Moscatello- NY-Kaplan, Inc., 2016 – 519 p.

**Information resources**

1. Library of Congress Cataloging-in-Publication Data

2. [www.allergen.org](http://www.allergen.org)

3. [www.allergyeducation-ma.com](http://www.allergyeducation-ma.com)

**Course Policy**

In order to achieve the learning goals and successfully complete the course for Masters of Medicine, it is necessary: from the first day to join the work; attend lectures regularly; read the material beforehand before considering it in a practical session; not to be late or miss classes; to come to the department dressed in a medical gown, to have replaceable shoes, to have a phonendoscope, a notebook, a pen; complete all necessary tasks and work daily; be able to work with a partner or as part of a group; seek help and receive it when you need it.

Provided academic mobility, interchangeability of credit (volume of credit 20 hours). Masters of Medicine can discuss different tasks, but their implementation is strictly individual. Writing, using any kind of software, tips, using a mobile phone, tablet or other electronic gadgets during the class are not permitted. Masters of Medicine are not allowed to be late for practical classes. The absences of the practical classes are worked out hour by hour by the group teacher or the regular teacher. Reception of workings and consultations are held daily from 1500 - 1700, on Saturdays in accordance with the "Regulations on the order of working out by Masters of educational classes" from 07.12.2015 № 415.

Masters with special needs should meet with the teacher or warn him or her before the class starts, at the request of the Master, this may be done by the head of the group. If you have any questions, please contact your teacher.

Head of the Department of Internal Medicine №2,

clinical immunology and allergology

named after academician L.T. Malaya,

Doctor of medicine, Profssor P. Kravchun