

66023 - Advanced immunology

Syllabus Information

Academic Year: 2022/23

Subject: 66023 - Advanced immunology

Faculty / School: 100 - Facultad de Ciencias

Degree: 537 - Master's in Molecular and Cellular Biology

ECTS: 6.0

Year: 1

Semester: First semester

Subject Type: Optional

Module:

1. General information

1.1. Aims of the course

The main aim of the subject is to expand the immunological knowledge of students, mainly about the mechanisms by which the immune system prevents pathologies, especially infectious, or pathologies related to failures in the immune system. Moreover the students will get practical content to the subject, in the Immunology Service of a Hospital, so that the students get up-to-date with the techniques that are commonly used in this discipline and contact with the clinical reality. With the theoretical and practical lessons the students will acquire the basic knowledge and skills of advanced immunology. The students will put into practice the knowledge acquired with their personal work and the presentation of a seminar, showing additional skills related to search for information, critical analysis and communication skills.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the results of learning of the subject provides training and competence to contribute to some extent to its achievement: Objective 3: Health and well-being; Objective 4: Quality education.

1.2. Context and importance of this course in the degree

This subject is one of the optional subjects that the University Master in Molecular and Cellular Biology offers.

1.3. Recommendations to take this course

Basic training in Immunology is recommended.

2. Learning goals

2.1. Competences

After this course, the student will be more competent to:

- Work in the Immunology service of a Hospital or in Any entity related to Immunology at the diagnostic or analytical level.
- Search and analyze specific information related to Immunology issues.
- Make presentations and exhibitions of topics related to Immunology at a higher level.

2.2. Learning goals

The student must demonstrate the following results :

Predict and describe in detail the most important immune mechanisms in the eradication of infections by viruses, extra and intracellular bacteria, fungi, protozoa or multicellular parasites.

Assess the effectiveness of different types of existing vaccines or others that may occur in the future, depending on their knowledge of the immune responses.

Interpret the results and possibilities of current and future cancer immunotherapy treatments in function of your knowledge of the immune response against cancer.

Interpret the symptoms of diseases due to failures in the immune system, explain them according to each pathology and to propose an adequate and updated treatment in each case.

Solve specific problems related to the diagnostic procedures that are carried out in a regular way in a Hospital Immunology Services.

Present and exhibit works related to the subject done individually.

2.3. Importance of learning goals

Motivation and relevance of the objectives and competences of this subject.

Immunology is a biological science that is in full expansion, both at the level of analytical applications through immunochemical methods, as at the conceptual level, with applications of the advances achieved in such sectors relevant issues such as the prevention of infectious diseases through vaccines, the prevention of rejection in transplants, cancer immunotherapy, the treatment of autoimmune diseases or immunodeficiencies.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that they have achieved the expected learning outcomes through the following assessment activities:

1. Attendance and active participation: 20% of the grade.
2. Problem solving and cases: 30% of the grade.
3. Presentation of a seminar: 50% of the grade.

Valuation criteria and levels of demand:

The presentation of this seminar is compulsory to pass the subject. It will be scored from 0 to 10 and will contribute 50% to the final grade: 30% will correspond to the teacher's evaluation and 20% to the evaluation carried out by the students through a rubric.

There will be an exam for those students who do not follow the course.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process that is designed for this course is based on the following: This course is scheduled to start with theoretical contents to finish with an eminently practical and applied orientation. It is intended for students to be able to apply the theoretical and practical knowledge they have acquired in the course.

4.2. Learning tasks

The program offered to the students to achieve the expected results includes the following activities:

1. **Theoretical classes.** 20 sessions of 2 hours each.
2. **Problems lessons.** 10 hours that are inserted between the theoretical classes to consolidate knowledge and present practical cases.
3. **Clinical seminars.** 8 hours. Visit, exhibition and knowledge of the main techniques used in the Immunology Service of a Hospital. Discussion of clinical cases.
4. **Seminars.** 12 contact hours. This activity consists of students collecting information on a specific topic. The analysis of the information should lead to the preparation of a seminar, which will be exposed, debated and evaluated in class.

The teaching and assessment activities will be carried out personally unless, due to the health situation, the provisions issued by the competent authorities and by the University of Zaragoza arrange to carry them out electronically.

4.3. Syllabus

The course will address the following topics:

1. Lectures

SECTION I. UPDATE

Topic 1. Update on integration and regulation of the immune response.

SECTION II. MOLECULAR AND CELLULAR MECHANISMS OF DISEASE PREVENTION BY THE IMMUNE SYSTEM

Topic 2. Immunity against bacteria.

Topic 3. Immunity against viruses.

Topic 4. Vaccines.

Topic 5. Immunity against parasites.

Topic 6. Immunity against cancer. 1. Tumor Immunology.

Topic 7. Immunity against cancer. 2. Cancer immunotherapy.

SECTION III. DISEASES RELATED WITH THE IMMUNE SYSTEM

Topic 8. Organ transplantation and immune rejection.

Topic 9. Autoimmune diseases.

Topic 10. Primary Immunodeficiencies.

Topic 11. AIDS.

Topic 12. Hypersensitivity reactions. Allergies.

Topic 13. Animal models.

2. Clinical sessions

- Routine immunological exploration
- HLA typing for transplants
- AIDS diagnostic
- Primary immunodeficiencies diagnostic

4.4. Course planning and calendar

Further information concerning the timetable, classroom, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the Faculty of Science website.

Practice sessions' calendar, as well as seminars lead by students shall be notified in class and posted in the virtual platform ADD.

4.5. Bibliography and recommended resources

- Murphy, Kenneth. Janeway's immunobiology / Kenneth Murphy, Paul Travers, Mark Walport; with contributions by, Michael Ehrenstein ... [et al.]. - 7th ed. New York : Garland Science, cop. 2008
- Abbas, Abul K.. Inmunología celular y molecular / Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai ; [revisión, Juan Manuel Igea Aznar] . - 6ª ed., [reimp.] Barcelona [etc.] : Elsevier, D.L. 2009