

Immunology

Code: 101981
ECTS Credits: 6

Degree	Type	Year	Semester
2500890 Genetics	OT	4	0

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Àngel Raúl Castaño García
Email: Raul.Castano@uab.cat

Use of Languages

Principal working language: spanish (spa)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: Yes

Teachers

Iñaki Alvarez Perez

Prerequisites

The students should have obtained the competences of the previous degree courses.

Objectives and Contextualisation

At the end of the course, students will have to:

- To know the components of the immune system: molecules, cells and lymphoid organs.
- To understand the innate and adaptive immune response, humoral and cellular; the phases of the immune response and the regulation and homeostasis of the immune system.
- To know the communication between components of the immune system through blood and lymphatic traffic, and the anatomical location of the immune response.
- To apply the knowledge of the immune response in infections for viruses, bacteria, protozoa, helminths and fungi.
- To know the cellular and molecular immunological techniques applicable to the different biological systems.
- To know how to apply the reactions of the immune system and its specificity to the study of biomolecules, diagnosis, vaccines and immunotherapy.
- To know the basics of immunopathology.

The 6 ECTS of the subject of Immunology will be divided into two thematic blocks with specific learning competences.

Block I. Basic immunology (3 ECTS)

- To know the components of the immune system: molecules, cells and lymphoid organs.
- To know the concepts of innate immunity and specific immunity.
- To identify the elements that intervene in both responses.
- To enumerate and explain the structural and functional characteristics of each molecular and cellular component of innate and adaptive immunity.

Block II. Organization of the Immune Response and its application (3 ECTS)

- To integrate the elements of the immune system in the three phases of the immune response: 1) activation phase; 2) effector phase; and 3) phase regulation and homeostasis of the immune response.
- To know the communication between components of the immune system through blood and lymphatic traffic; And the anatomical location of the immune response.
- To know the mechanisms that participate in the immune response against infections for viruses, bacteria, protozoa, helminths and fungi.
- To know the cellular and molecular immunological techniques applicable to the different biological systems.
- To know how to apply the reactions of the immune system and its specificity to the study of biomolecules, diagnosis, vaccines and immunotherapy.
- To know the basics of dysfunctions of the immune system that originate immunopathologies.

Competences

- Describe and identify the structural and functional characteristics of nucleic acids and proteins including their different organisational levels.
- Describe the genetic bases of the development and control of genic expression.
- Develop self-directed learning.
- Reason critically.
- Use and manage bibliographic information or computer or Internet resources in the field of study, in ones own languages and in English.

Learning Outcomes

1. Describe the mechanisms for regulating genic expression in viruses, bacteria and eukaryotes.
2. Develop self-directed learning.
3. Reason critically.
4. Relate the structure of nucleic acids with their biological functions.
5. Use and manage bibliographic information or computer or Internet resources in the field of study, in ones own languages and in English.

Content

Contents of the subject

Block I. Basic immunology (3 ECTS).

Block II. Organization of the Immune Response and its application (3 ECTS).

Introduction

TOPIC 1: Introduction: general view of the immune system. Basic concepts.

TOPIC 2: Introduction: general view of the immune system. Components and actions of the immune response.

TOPIC 3: Anatomy: organs and tissues immune

Innate immunity

TOPIC 4: Inborn immunity: immediate and induced

TOPIC 5: Inborn immune response cells: macrophages, granulocytes, APC and NK

TOPIC 6: The System of the Complement

Acquired immunity - Antigen-specific cells and receptors and antigen recognition

TOPIC 7: Structure of immunoglobulins and antigen receptor of B cells (BCR)

TOPIC 8: Organization and reordering of immunoglobulin genes

TOPIC 9: Antigen-antibody interaction

TOPIC 10: Lymphocytes B: Selection in bone marrow and subpopulations of lymphocytes B

TOPIC 11: Major Histocompatibility Complex: structure of function and gene organization

TOPIC 12: MHC: antigenic processing and presentation

TOPIC 13: Cell T antigen receptor (TCR): structure and genetics

TOPIC 14: Lymphocytes T: thymic selection and subpopulations of T lymphocytes

Block II. Organization of the Immune Response and its application (3 ECTS)

Organization of the immune response

TOPIC 15: Cytokines and chemokines (AAP)

TOPIC 16: Chemokines and Molecules of adhesion

TOPIC 17: Lymphocyte traffic and recirculation of lymphocytes: homing.

TOPIC 18: Activation of the immune response: coreceptors and co-stimulation

TOPIC 19: Cellular immune response

TOPIC 20: Humoral Immune Response

TOPIC 21: Regulation of the immune response: tolerance

Applications of Immunology

TOPIC 22: Immune response in front of pathogens: generalities

TOPIC 23: Immunopathology associated with the immune response

TOPIC 24: Immunotherapy: tumors, vaccines and transplants

TOPIC 25: Cellular and molecular techniques

*Unless the requirements enforced by the health authorities demand a prioritization or reduction of these contents.

Methodology

The group for lectures and classroom practices will be the total number of students enrolled.

Classroom practices will be taught in 12 hours in which cases and articles will be discussed. During the course there will also be 3-4 seminars that will be taught by experts in each subject.

Expositive Classes (lectures):

The 25 themes of the program will be held in 33 sessions.

Classroom practices:

12 works will be scheduled for groups of students, who will prepare them cooperatively. Some of them will be tracking topics that have emerged from news of the daily press or of the scientific press related to Immunology. Others will correspond to themes of applied immunology of block II such as response against pathogens, immunopathology or immunotherapy. The information about each work and the application guidelines will be stored on the Virtual Campus (CV). Each group will prepare the oral presentation of their work based on a power point presentation (or similar). There is no written presentation of the work. Each session of classroom practices (1h) will present 1 work (40 min of exposure + 10 min of questions). The teacher and the rest of the students will ask questions about aspects of the topic presented. The final presentation (in PDF format) have to be stored in CV before the day of the presentation.

The total number of seminars per student will depend on the number of students enrolled, in such a way that each student will have to carry out at least a seminar or classroom practice.

The seminars will be subject to the exam with at least a question per topic.

*The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom practices	12	0.48	2, 3, 5
Regular classes	33	1.32	1, 2, 3, 4
Type: Supervised			
Oral presentation of a topic, article or clinical case	8	0.32	2, 3, 5
Type: Autonomous			
Preparation of seminars	32	1.28	2, 3, 5
Study	58	2.32	2, 3, 5

Assessment

Partial exams: two partial exams, at the end of Blocks I and II. Each test will be worth 40% of the final grade. They will be exams of test type with questions with 4-5 options to choose one. In the correction, ¼ or 1/5 of the value of each question will be subtracted by incorrect answer. The duration of each test will be a minimum of 2 hours. The subject can be approved by partial as long as the average between the two tests and the seminars is 5, taking into account that it can be done only when the student has a minimum grade of 4 in both partials. Partial exams are recoverable matter.

Seminars: Seminars and classroom practices help to develop the students self-learning, synthesis and written and oral communication skills. The evaluation will represent 20% of the final grade of the subject and the content, the written presentation of the seminar, the oral presentation, the answer to questions and the participation in the discussion will be valued.

Recovery exam: A recovery exam will be scheduled for students who have not reached the minimum necessary (that is, do not have a minimum of 4 in both of the two partial or do not reach 5 in the total of the course) or who want to raise the note. The evaluation of this final exam will be by partials and will count 40% each one of them. In order to pass the subject, a minimum grade of 4 in the total exam is required, provided that the final result of the three evaluable activities is ≥ 5 .

To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course or module. Thus, the student will be graded as "No Valuable" if the weighthin of all conducted evaluation activities is less than 67% of the final score

*Student's assessment may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Partial Exam 1	40%	3	0.12	2, 3, 5
Partial Exam 2	40%	3	0.12	1, 3, 4
Presentation of a group work	20%	1	0.04	2, 3, 5

Bibliography

Books in english

Kuby Immunology by J Owen, J Punt, S Stranford, P. Jones. .7th Edition revised, (2013)

Janeway's Immunobiology by K Murphy and C Weaver. Ltd/Garland Science, NY & London, 9th ed (2016)

Cellular and Molecular Immunology by Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai, Saunders, 9th ed (2017).

Roitt's Essential Immunology by [Peter Delves](#), [Seamus Martin](#), [Dennis Burton](#), [Ivan Roitt](#), Wiley-Blackwell Ed., 13th ed (2017)

Books in Spanish or catalan:

Inmunología deKuby J Owen, J Punt and S Stranford, 7ª edición (2014)

Inmunobiología de Janeway: K Murphy, P. Travers, M. Walport, Mc Graw Hill, 7ª ed, (2008).

Inmunología Celular y Molecular de A.Abbas, W. Lichtman, S Pillai. W. B. Saunders Co., Philadelphia, 8ª ed, (2015).

Introducción a la Inmunología Humana de L. Faimboim, J. Geffner. Ed Medica Panamericana, 7ª ed (2011).

Inmunología, Biología y Patología del Sistema Inmunitario de JR Regueiro, C López Larrea, S González Rodríguez, E Martínez Naves. Ed Médica Panamericana, 4ª ed, 2011.

Diccionari d'immunologia de TERMCAT, Centre de Terminologia, Ed Masson, Barcelona, 2005

In addition, we have acces to the platfomr on digital books (<https://mirades.uab.cat/ebs/>). In the following link, you will find an infographics to facilitate findind of electronic books (<https://ddd.uab.cat/record/22492>).

Among the digital resources we higlight the course books:

[Kuby inmunología \[Recurs electrònic\]](#) / Judith A. Owen, Jenni Punt, Sharon A. Stranford ; con la colaboración de Patricia P. Jones ; traducción: Bernardo Rivera Muñoz [Owen, Judith A.](#)

[Inmunología celular y molecular \[Recurs electrònic\]](#) / Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai ; ilustraciones de David L. Baker, Alexandra Baker [Abbas, Abul K.](#)

[Roitt inmunología \[Recurs electrònic\] : fundamentos](#) / Peter J. Delves ... [et al.]

[Introducción a la inmunología humana \[Recurs electrònic\]](#) / Leonardo Fainboim, Jorge Geffner [Fainboim, Leonardo](#)