

**Immunology of Infectious Diseases**

Code: 101931  
ECTS Credits: 6

Degree	Type	Year	Semester
2501230 Biomedical Sciences	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: Mercè Martí Ripoll  
Email: Merce.Marti@uab.cat

**Use of Languages**

Principal working language: english (eng)  
Some groups entirely in English: Yes  
Some groups entirely in Catalan: No  
Some groups entirely in Spanish: No

**Teachers**

Julian Miguel Blanco Arbues  
Javier Martinez Picado  
Christian Brander Silva  
Pere Joan Cardona Iglesias  
Aura Muntasell Castellví  
Carme Roura Mir  
Jesús Aranda Rodríguez

**External teachers**

Alfred Cortés  
Carlota Dobaño  
Esteban Veiga Chacón  
Hernando del Portillo

**Prerequisites**

To access to study "Immunology of Infectious Diseases", the student must have attained the learning skills of Immunology in the course corresponding to their degree.

**Objectives and Contextualisation**

**SECTION I**

Review of the main aspects of innate and adaptive immune response

MALT: Mucosa-Associated Lymphoid Tissue

MALT: Morphological and anatomical description. Lymphocyte recirculation

Immune response in the MALT: mechanisms of innate and adaptive immunity.

## SECTION II

Immune response to bacteria

Analysis of antibacterial mechanisms mediated by innate and adaptive immunity.

Immune effector mechanisms operating against intra or extracellular bacteria.

Evasion mechanisms that bacteria use to avoid the immune system.

Pathology and treatment of diseases caused by bacterial infections

Learning to recognize and describe diseases caused by bacterial infections that are clinically important.

Identification of emerging bacterial diseases.

Vaccines.

Seminars by specialists

## SECTION III

Immune response to parasites

Learning the basics of parasitic infections.

Immune mechanisms used to deal with different types of parasitic infections.

Different strategies and different mechanisms used by parasites to evade the host's immune response.

Pathology and treatment of diseases caused by parasites

Learning to recognize and describe diseases caused by parasitic infections that are clinically important.

Vaccines.

Seminars by specialists

## SECTION IV

Immune response to viruses

Basic concepts of antiviral immunity.

Specific mechanisms of innate and adaptive immunity involved in defense against viral infections.

Different strategies used by viruses to evade the antiviral immune response.

Pathology and treatment of diseases caused by infections

Learning to recognize and describe diseases caused by infections that are clinically important.

Identification of emerging viral diseases.

Vaccines.

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## Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Display knowledge of the bases and elements applicable to the development and validation of diagnostic and therapeutic techniques.
- Display knowledge of the basic life processes on several levels of organisation: molecular, cellular, tissues, organs, individual and populations.
- Display knowledge of the concepts and language of biomedical sciences in order to follow biomedical literature correctly.
- Display theoretical and practical knowledge of the major molecular and cellular bases of human and animal pathologies.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Read and critically analyse original and review papers on biomedical issues and assess and choose the appropriate methodological descriptions for biomedical laboratory research work.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

## Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Analyse the relationship between the nature of the immune response and the molecular and physical characteristics of the antigens that induce it.
3. Display practical skills in performing a diagnostic analysis in immunopathology.
4. Explain the mechanisms of activation and regulation of the cellular and humoral immune response and their link to immunopathology.
5. Explain the relationships between a possible pathogen and its host.

6. Identify the principal elements intervening in the immune response to infections and tumours, and in the situation of allogeneic transplant.
7. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
8. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
9. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
10. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
11. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
12. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
13. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
14. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
15. Understand scientific texts and write review papers on immunology and biology.
16. Understand the scientific literature and the databases specialising in problems of immunology and immunopathology, and interpret the results of a scientific project.
17. Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

## Content

Contents of the subject\*:

### Section I

Review innate and adaptive immunity: inflammasoma, TLR signaling, cell lineages Th cells (Th1, Th2, Th17, regulatory T cells)...

MALT anatomy of mucosal lymphocyte recirculation, a description of cellular elements (intraepithelial lymphocytes) and humoral (IgA) and immune response associated with MALT.

### Section II.

Immune response to bacteria.

Pathology of diseases caused by bacterial infections.

*Seminars include a monographic session on Mycobacterium tuberculosis.*

### Section III.

Immune response to the parasite.

Pathology of diseases caused by parasites.

*Seminars include a monographic session on Plasmodium falciparum.*

### Section IV.

Immune response to the virus.

Pathology of diseases caused by viral infections.

Seminars include a monographic session on HIV.

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

## Methodology

Teaching methodology of the subject \*:

### LECTURES:

The topics of the Teaching Units will be taught in 30 sessions. Some of the sessions will be taught by guest professors and specialists in the field of clinical research into diseases caused by pathogens. The content of the theory program will be taught mainly by teachers in the form of master classes with audiovisual support. The presentations used in class by the teacher will be previously available in the Virtual Campus of the subject.

### SELF-LEARNING:

Autonomous learning will be based on achieving the specific learning competencies that will accompany the beginning of each Block into which the subject program is divided. It is advisable that students regularly consult the books recommended in the Bibliography section of this teaching guide to consolidate and clarify, if necessary, the contents explained in class. In this sense, it is also advisable for students to use the links indicated on the Virtual Campus, which contain videos and animations related to the processes explained in class.

### COOPERATIVE LEARNING:

Problem-based learning (ABP) or CASE sessions will be scheduled. To solve the cases, the cooperative learning methodology will be applied: groups of 3 or 4 students will be made. Case information will be posted on the Virtual Campus (CV).

1) Prepare an oral presentation: choose the fundamental parts of the work and present it to the rest of the class.

2) Linked with the oral presentation, a graphic abstract will be made accompanied by a complete explanatory legend describing the infographic.

The details of the work will be given during the presentation of the subject.

\* Unless the restrictions imposed by the health authorities force the change in the non-contact mode. In this case, its format will be adapted to the possibilities offered by the UAB virtual tools.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classes	30	1.2	2, 4, 5, 6
Classroom practicals	12	0.48	2, 16, 15, 3, 4, 5, 6, 17
Type: Supervised			
Preparation of oral presentation	16.5	0.66	2, 16, 15, 3, 4, 5, 6, 17

Preparation of written report	15	0.6	2, 16, 15, 3, 4, 5, 6, 17
Type: Autonomous			
Interpretation of data from a scientific publication or from a clinical case	20	0.8	2, 16, 15, 3, 4, 5, 6, 17
Study hours	50	2	2, 16, 15, 3, 4, 5, 6

## Assessment

The evaluation of the course will be continued through individual tests that assess:

- Individual learning by students from exams
- Cooperative learning from the training activities scheduled as classroom practices, written and oral presentation skills.

The evaluation activities scheduled in the subject of Immunology are \*:

Exams: two partial exams. Each test will be worth 35% of the final grade. Exams will be multiple choice questions of a minim of 25 questions with five options and only one correct. A correction value of 1/5 will be subtracted per every incorrect answer. To pass this part of the course, the sum of the partial exams must be more than 50% weight of the total grade. Students must achieve a minimum 40% in partial 1 to compensate with partial 2.

Cases (ABP): The cases are for cooperative work in groups of 3-4 students. They will be practical problems. The aim is for students to develop their skills of self-learning search and selection of information and eventually develop the ability to synthesize and written communication. Also workgroup.

The evaluation of cases represent 30% of the final grade in the course as follows:

- 10% for the writtenwork.
- 20% oral presentation.

To pass this part of the course grades must be greater than 50% of their total value.

The final grade for the course will be composed of the score of the two partial exams and cases.

Along the semester, there will be questionnaires online or in class that will serve as continuous evaluation and can help the final scores.

If they fail to pass the course or want to improve grades, students can retake a full or partial final exam. By doing an exam to improve grades, the student renounces to the previous score obtained.

Failure to appear to any of the tests must be justifiedto get a second chance.

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. Thus, the student will be graded as Non-evaluable if the weighing of all conducted evaluation activities is less than 67% of the final score.

***\*Student's assessment will performed face-to-face, unless the requirements enforced by the health authorities demand shifting to the online modality. In this case, the format will be adapted (maintaining its weighting in the final grade) to the possibilities offered by the UAB's virtual tools.***

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Final Examination (only the student does not reach 50% of the total in the two partial exams)	70%	2	0.08	2, 3, 4, 5, 6
Oral presentation of collective work	10%	0.5	0.02	1, 14, 13, 2, 16, 15, 3, 4, 5, 6, 7, 12, 11, 10, 8, 9, 17
Partial Examination P1	35%	1.5	0.06	2, 3, 4, 5, 6
Partial Examination P2	35%	1.5	0.06	2, 16, 15, 3, 4, 5, 6
Written Report	20%	1	0.04	2, 16, 15, 3, 4, 5, 6, 17

## Bibliography

- Books in English:

Primer to the Immune Response, 2nd Edition, by Tak W. Mak, Mary Saunders and Bradley Jett. ELSEVIER

Review of Medical Microbiology and Immunology by W. Levinson. Mc Graw Hill, 11e, (2010).

Deja Review Microbiology & Immunology, by E. Chen, S. Kasturi, McGraw-Hill Ed. 2nd ed (2010).

Elsevier's Integrated Review Immunology and Microbiology: With STUDENT CONSULT Online Access, by Jeffrey K. Actor - Elsevier Science Health Science Division (2011)

BRS Microbiology and Immunology, by Arthur G. Johnson, Richard J. Ziegler, Louise Hawley - Lippincott Williams & Wilkins (2009).

Janeway's Immunobiology by K Murphy. Ltd/Garland Science, NY & London, 8th ed (2011)

Kuby Immunology (with web support) by T.J. Kindt, R.A. Goldsby, B.A. Osborne. W.H. Freeman Co., 6th ed (2006)

Cellular and Molecular Immunology by Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai, Saunders, 7th ed (2011).

Immunology, by David K. Male, Jonathan Brostoff, Ivan Maurice Roitt, David B. Roth Mosby Elsevier Ed., 7th ed (2006)

Roitt's Essential Immunology, by [Peter Delves](#), [Seamus Martin](#), [Dennis Burton](#), [Ivan Roitt](#), Wiley-Blackwell Ed., 12th ed (2011)

Principles of Mucosal Immunology (Society for Mucosal Immunology), by Phillip D. Smith, Thomas T. McDonald, Richard S. Blumberg Ed. Garland Science 1st ed. (2013).

Mim's Pathogenesis of Infectious disease. A.A; Nash, R.G. Dalziel & J. R. Fitzgerald. Academic Press Ed. 6th Edition. (2015)

Principles of Molecular Virology. A.J Cann. Academic Press Ed. 6th Edition. (2016)

- Books in Catalan or in Spanish:

Microbiología e inmunología médicas de W. Levinson. Mc Graw Hill interamericana, 8ª ed, (2006).

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, 7ª ed, (2012).

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

Inmunología de Kuby by T.J. Kindt, R.A. Goldsby, B.A. Osborne. Mc Graw Hill 6ª ed., (2007).

Inmunología de P. Parham. Ed. Panamericana, 2ª ed. (2006).

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

- Complementary Bibliography

Advances in Immunology

[http://www.elsevier.com/wps/find/bookdescription.cws\\_home/716912/description#description](http://www.elsevier.com/wps/find/bookdescription.cws_home/716912/description#description)

<http://www.sciencedirect.com/science/bookseries/00652776>

Annual Review of Immunology

<http://arjournals.annualreviews.org/loi/immunol>

Current Opinion in Immunology

[http://www.elsevier.com/wps/find/journaldescription.cws\\_home/601305/description#description](http://www.elsevier.com/wps/find/journaldescription.cws_home/601305/description#description)

<http://www.sciencedirect.com/science/journal/09527915>

Immunological Reviews

<http://www3.interscience.wiley.com/journal/118503650/home>

Nature Reviews in Immunology

<http://www.nature.com/nri/index.html>

Seminars in Immunology

[http://www.elsevier.com/wps/find/journaldescription.cws\\_home/622945/description#description](http://www.elsevier.com/wps/find/journaldescription.cws_home/622945/description#description)

Trends in Immunology

<http://www.cell.com/trends/immunology/>

Microbiology and Immunology

<http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291348-0421>

Journal of Microbiology, Immunology and Infection

<http://www.e-jmii.com/>

Comparative Immunology, Microbiology and Infectious Diseases

[http://www.elsevier.com/wps/find/journaldescription.cws\\_home/496/description#description](http://www.elsevier.com/wps/find/journaldescription.cws_home/496/description#description)