Universitat Autònoma de Barcelona

2022/2023

Immunology of Infectious Diseases

Code: 101007
ECTS Credits: 6

Degree	Type	Year	Semester
2500502 Microbiology	OT	4	1

Contact

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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
Roger Colobran Oriol
Jesús Aranda Rodriguez

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 thatbacteria 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 infecccions.

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.

Seminars by specialists

Competences

- Characterise the causal agents of microbial diseases in humans, animals and plants in order to diagnose and control them, perform epidemiological studies and be aware of present-day problems with these diseases and strategies to combat them.
- Identify the molecular mechanisms of pathogenesis and relate them to the response to infection in order to design and develop strategies for diagnosing and combating diseases caused by microorganisms.
- Obtain, select and manage information.
- Use bibliography or internet tools, specific to microbiology or other related disciplines, both in English and in the first language.
- Work individually or in groups, in multidisciplinary teams and in an international context.

Learning Outcomes

1. Analyse the relationship between the type of immune response that is developing and the characteristics of the pathogen: the entry pathway and anatomical location, the mechanisms that trigger response and evasion.
2. Obtain, select and manage information.
3. Understand the relationships between a possible pathogen and its host
4. Use bibliography or internet tools, specific to microbiology or other related disciplines, both in English and in the first language.
5. Work individually or in groups, in multidisciplinary teams and in an international context.

Content

Contents of the subject:

Section I

Review innate and adaptive immunity: inflamasoma, 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.

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 to the oral presentation, there will be an infographic accompanied by a descriptive summary of it.

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

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom practicals	12	0.48	1, 3, 2, 5, 4

Master classes	30	1.2	1, 3
Type: Supervised			
Preparation of oral presentation	17.5	0.7	1, 3, 2, 5, 4
Preparation of written report	17.5	0.7	1, 3, 2, 5, 4
Type: Autonomous			
Data interpretation from an article or a problem	20	0.8	1, 3, 2, 5, 4
Learning consolidation: study	50	2	1, 3, 2, 5, 4

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:

i) 10% for the writtenwork.

ii) 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.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Oral presentation of team work	20%	0	0	1, 3, 2, 5, 4
Partial Examination 1	35%	1.5	0.06	1, 3, 2
Partial Examination 2	35%	1.5	0.06	1, 3, 2
Written Report	10%	0	0	2, 5, 4

Bibliography

Primer to the Immune Response, 2nd Edition, by Tak W. Mak, Mary Saunders and Bradley Jett. 2n Edition, ELSEVIER (2014). ISBN: 9780123852458

Review of Medical Microbiology and Immunology by W. Levinson, P. Chin-Hong, E.A. Joyce, J. Nussbaum, B. Schwartz. McGraw-Hill, 16th edition, (2020). ISBN-13: 978-1260116717.

Deja Review Microbiology and Immunology. E. Chen, S. Kasturi. McGraw-Hill Ed. 2nd ed (2010). ISBN-13: 978-0071627153.

Elsevier's Integrated Review Immunology and Microbiology: With STUDENT CONSULT Online Access, by Jeffrey K. Actor - Elsevier Science Health Science Division (2012). ISBN: 978-0323074476.

BRS Microbiology and Immunology, by Arthur G. Johnson, Richard J. Ziegler, Louise Hawley. Lippincott Williams & Wilkins 5th (2009). ISBN: 9780781789127.

Janeway's Immunobiology by K. Murphy, C. Weaver. Ltd/Garland Science, NY & London, 9th ed (2016). ISBN: 9780815345053.

Kuby Immunology (with web support) by J. Punt, S. Stranford, P Jones and J. Owen.W.H. Freeman and Co. Ltd, 8th ed (2018). ISBN13: 9781319114701

Cellular and Molecular Immunology by Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai, Saunders, 10th ed (2021). ISBN13: 978-0323757485.

Roitt's Essential Immunology, by Peter Delves, Seamus Martin, Dennis Burton, Ivan Roitt, Wiley-Blackwell Ed., 13th ed (2017). ISBN 9781118415771.

Principles of Mucosal Immunology (Society for Mucosal Immunology), by Phillip D. Smith, Thomas T. McDonald, Richard S. Blumberg Ed. Garland Science 2nd ed. (2020). ISBN 9780815345558.

Mim's Pathogenesis of Infectious disease. A.A; Nash, R.G. Dalziel & J. R. Fitzgerald. Academic Press Ed. 6th Edition. (2015). EBook ISBN: 978012397781; Paperback ISBN: 9780123971883

Principles of Molecular Virology.A.J Cann. Academic Press Ed. 6th Edition. (2016). EBook ISBN: 9780128019559; Paperback ISBN: 9780128019467.

Unifying Michobial Mechanisms. M. F. Cole. Garland Science 1st ed. (2019). eBook ISBN: 9780429262777.

- Complementary Bibliography

Advances in Immunology

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.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

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

Software

Microsoft Office is sufficient to carry out this subject.