VNIVERSITAT DE VALÈNCIA

Course Guide
46491 Biochemical basis of immunology: Principles and applications

COURSE DATA

DATA SUBJECT

Code: 46491
Name: Biochemical basis of immunology: Principles and applications
Cycle: Master's Degree
ECTS Credits: 3
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2254 - Master's Degree in Molecular Approaches in Health Sciences	Facultat de Medicina i Odontologia	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2254 - Master's Degree in Molecular Approaches in Health Sciences	Molecular technologies for research in health sciences	COMPULSORY

COORDINATION

O'CONNOR BLASCO JOSE ENRIQUE

GONZALEZ NAVARRO HERMINIA

SUMMARY

This subject will study the molecular mechanisms and cellular interactions that regulate the processes of proliferat differentiation, inhibition and apoptosis of immune cells, under normal and pathological conditions.The subject is a based on cellular and molecular analysis in Immunology.Through laboratory sessions and practical seminars, the st advanced applications of Immunology in Biomedicine.The subject also has a laboratory part equivalent to 4 hours, i immunocytometric techniques will be addressed. Through laboratory sessions, the student will understand its appli practical resolution of real situations in the context of research in Health Sciences.The subject has the participation basic and applied aspects of Immunology.
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PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

COMPETENCES / LEARNING OUTCOMES

2254 - Master's Degree in Molecular Approaches in Health Sciences

Aprender a identificar, manejar y presentar adecuadamente en informes y exposiciones públicas, conocimientos existentes sobre la Metodología y Técnicas Inmunológicas de Investigación, usando como vehículo la lengua inglesa.

Conocer, comprender y aplicar en la práctica la Metodología y Técnicas Inmunológicas de Investigación en situaciones relacionadas con la investigación básica y clínica.

Conocer en profundidad y comprender la organización a nivel molecular de células, sistemas y procesos de relevancia en las Ciencias de la Salud.

Conocer en profundidad y comprender las bases moleculares de la enfermedad.

Conocer en profundidad y comprender las metodologías de investigación básica aplicables a las Ciencias de la Salud.

Conocer y comprender los conceptos básicos y las aplicaciones en investigación básica y clínica de la Metodología y Técnicas Inmunológicas de Investigación.

Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.

Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

Students should demonstrate self-directed learning skills for continued academic growth.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

Tener capacidad de analizar y sintetizar un problema.

Tener capacidad de comunicación oral y escrita en una segunda lengua científica.

Tener capacidad de desarrollar un trabajo interdisciplinar.

Tener capacidad de trabajar en equipo

DESCRIPTION OF CONTENTS

1. 1 Introduction to Immunology and the Immune System

2. 2 Challenges to the Immune System: Pathogens and Antigens

3. 3 The tools of the Immune System: Evolution, development and differentiation

4. 4 The immune recognition of what is self and what is potentially dangerous

5. 5 Immune Sensors: Cell Receptors and Free Molecules

6. 6 Intercellular communication and cell traffic in the Immune System

7. 7 Effector Mechanisms of the Immune Response

8. 8 Regulatory Mechanisms of the Immune Response

9. 9 The immune response in action (I): Immunology of infection

10. 10 The immune response in action (II): Cancer immunology

11. 11 The immune response in action (III): Immunology of transplantation

12. 12 The Immune Response in Action (IV): Therapeutic Modifications

13. 13 Immunopathology (I): Introduction to Immunopathology

14. 14 Immunopathology (II): Autoimmunity and autoimmune diseases

15. 15 Immunopathology (III): Hypersensitivity reactions

16. 16 Seminar 1: Experimental and diagnostic molecular techniques in Immunology

17. 17 Seminar 2: Experimental and diagnostic cell techniques in Immunology

18. 18 Laboratory Practices (I): Immunophenotype of immune cells

19. 19 Laboratory Practices (II): Functional study of the innate immune system

20. 20 Computer Labs: Introduction to Immunocytometry Diagnosis

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	15,00
Seminar	5,00

Laboratory	5,00
Group work	5,00
Total hours	**30,00**

NON PRESENCIAL ACTIVITIES

Activity	**Hours**
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	0,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	**0,00**

TEACHING METHODOLOGY

The subject is planned to be developed in the form of face-to-face and non-face-to-face work.

The face-to-face teaching of this subject will be carried out through the following methodological approaches: classroom sessions, laboratory sessions, practical seminars and attendance at tutorials.
At least 25% of the subject will be taught in English. In the theory classes, a global vision of the topic to be dealt wit presented, focusing especially on the key concepts. In the same session, the most appropriate resources will be inc

In laboratory practices and practical seminars, the student will solve technical and experimental examples that will main applications of Immunology in Biomedicine.
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EVALUATION

- To master the terminology of the subject

- To understand the effects of technological processes on the chemical properties of food components.

- To apply the knowledge acquired in the handling and storage of food.

- To evaluate possible causes of sensory and/or nutritional changes of the components and/or food.

- To apply the knowledge to design and/or improve food

- To know, critically assess, manage and apply the most relevant basic and specialized bibliographic sources, as well as some on-line sources of dissemination of subjects related to food chemistry.

- To acquire the ability to synthesize and organize the information obtained from various sources properly.

- To be able to express adequately, both orally and in writing, the knowledge gained and put it in context

with previously acquired knowledge.

- To know how to apply scientific rigor in laboratory assays and in problem-solving.

- To adopt the skill to prepare reports of studies related to the subject

REFERENCES

- K. Abbas, A. H. Lichtman y S. Pillai. Inmunologia celular y molecular, Editorial Elsevier. C.A. Janeway, P. Travers, M- Walport y J.D. Capra. Inmunobiología. El sistema inmunitario en condiciones de salud y enfermedad, Editorial Masson. T. J. Kindt, R.A. Goldsby y B. A. Osborne. Inmunología de Kuby, Editorial McGraw-Hill. D. Male, J. Brostoff, D. B. Roth e I. Roitt. Inmunología, Editorial Elsevier-Masson.

- Immunology. Wikibooks. http://en.wikibooks.org/wiki/Immunology Frank, SA (2007) Immunology and Evolution of Infectious Disease. Princeton University. Press. https://stevefrank.org/antiVar/antiVarCut.pdf Immunology. Wikibooks. http://en.wikibooks.org/wiki/Immunology Essential Clinical Immunology, Edited by Zabriskie, JB. Cambridge University Press http://sacema.org/uploads/Essential-Clinical-Immunology.pd