Universidad Zaragoza

Academic Year of Degree: 2026/27

27135 - Biotechnology applied to Immunology and Microbiology

Teaching Plan Information

Academic year: 2026/27
Subject: 27135 - Biotechnology applied to Immunology and Microbiology
Faculty / School: 100 - Facultad de Ciencias
Tipo de enseñanza: In person
Ambit: Biochemistry and biotechnology
Degree: 446 - Degree in Biotechnology
ECTS: 6.0
Year: 4
Semester: Second semester
Subject type: Optional
Module:

1. General information

The general objective of this subject is that the student uses and applies both the molecular knowledge of microorganisms and immunology for the understanding of pathological processes or industrial interest learning the fundamentals and methodology in their applied aspects to the resolution of real problems.

2. Learning results

Use and planning of production strategies for vaccines, antimicrobials and diagnostic and detection tests based on immunochemical methods

Design, at a basic level, industrial production processes for the above mentioned products

Use of basic immunochemical techniques and knowledge of their biomedical applications

Knowledge of polyclonal and monoclonal antibody production

Knowledge of the main biotechnological applications of polyclonal and monoclonal antibodies Knowledge of the regulations for the production of the above mentioned products

3. Syllabus

Master Class Program

Block 1

1.1. Typing and molecular characterization of microorganisms of industrial and sanitary interest.

1.2. Rational design of antimicrobials.

1.3. Rational and up-to-date vaccine design

Block 2

2.1. Polyclonal and monoclonal antibody production

2.2. Application of polyclonal and monoclonal antibodies in diagnostic and screening tests

Block 3

3.1. Application of monoclonal antibodies in antitumor and autoimmune disease treatment

3.2. Application of monoclonal antibodies in organ transplantation and prevention of immune rejection

Program of laboratory practices

Molecular characterization of vaccines and analysis of the immunity conferred

Production, purification and assay of monoclonal antibodies from hybridomas

4. Academic activities

The course will be delivered through a combination of educational activities designed to promote both the acquisition of theoretical knowledge and the development of practical and cross-disciplinary skills. Lectures will focus on presenting and analyzing the core content of the subject, encouraging active student participation and critical thinking. Laboratory practicals will allow students to apply theoretical concepts in an experimental setting, promoting the learning of specific techniques, teamwork, and the interpretation of results. Additionally, seminars led by external speakers and by the students themselves will contribute to an understanding of current applications and the development of scientific communication skills and academic discussion.

5. Assessment system

- Written test with multiple-choice questions, resolution of real cases, and short essay questions (50% of the final grade).

To pass the subject it will be necessary to pass this test (5 out of 10)

- Practice report (25% of the grade)

- Presentation of a seminar (25% of the grade)

In addition to the continuous assessment system indicated in the previous points, the student will have the possibility of being evaluated in a global test, which will judge the achievement of the learning results indicated above.

5.1. Academic fraud prevention

The use of unauthorised electronic materials or devices during the assessment may result in immediate exclusion from the examination and a fail mark (a numerical mark of '0' for the assessment).

Furthermore, the lecturer in charge may complete the grade report and submit it to the General Inspectorate of Services, so that it may, where appropriate, consider initiating disciplinary proceedings against the student for academic fraud.

In the case of a continuous assessment exam [continuous assessment cannot continue, unless otherwise specified in the academic guide.]

In the case of a regular or extraordinary exam session, the initiation of disciplinary proceedings will result in the grade 'pending resolution' until the proceedings are concluded.

6. Sustainable Development Goals

3 - Good Health and Well-being
9 - Industry, Innovation and Infrastructure

7. Bibliography

Antibodies: a laboratory manual / edited by Edward A. Greenfield . 2nd ed. Cold Spring Harbor : Cold Spring Harbor Laboratory, cop. 2014

Kindt, Thomas J.. Inmunología de Kuby / Thomas J. Kindt, Richard A. Goldsby , Barbara A. Osborne ; traducción, Roberto Palacios Martínez . 7ª ed. México D. F. ; Madrid [etc.] : McGraw-Hill Interamericana, cop. 2007

Orenstein, W. A.; Plotkin, S. A. Plotkin's Vaccines. 8th ed. [s. l.]: Elsevier, 2024. ISBN 9780323790581