

**Diagnostic Techniques in Medical Immunology**

Code: 103641  
ECTS Credits: 3

Degree	Type	Year	Semester
2502442 Medicine	OT	3	0
2502442 Medicine	OT	4	0
2502442 Medicine	OT	5	0
2502442 Medicine	OT	6	0

**Contact**

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**Use of Languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

**Teachers**

Marta Vives Pi  
Oscar de la Calle Martin  
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Eva Maria Martinez Caceres  
Candido Juarez Rubio  
Maria Jose Amengual Guedan  
Laura Martinez Martinez  
Maria Esther Moga Naranjo

**External teachers**

Bibiana Quirant Sánchez  
Joan Climent Martí

**Prerequisites**

The student should be at least registered in the medical immunology course

**Objectives and Contextualisation**

Contextualization

The subject aims to introduce students who already know immunology to the techniques used in the laboratory of diagnostic immunology and the algorithms applied to support clinical diagnosis. It focuses on hypersensitivity, autoimmunity, immunochemistry, immunodeficiencies, histocompatibility and immunogenetics. A brief introduction to the principles of laboratory management will be also provided.

#### Justification

Since the middle of the last century, when LE cells were discovered, many immunological diagnostic tests have been added to the clinical practice. Diagnostic immunology is a term used to define this particular area of immunology and is different and more restricted than clinical immunology, which includes a more global approach to immunological diseases and includes clinical diagnosis and therapeutics.

The techniques used in the laboratories of diagnostic immunology constitute a compendium of the most reliable, robust, reproducible and quantitative methods of the spectrum available to the immunologist. They include specific development, which sometimes constitute very advanced biotechnical and engineering techniques to generate reproducible results in the shorter possible time from very small samples.

The number of diagnostic immunology tests performed in the healthcare system is important, since they are not only performed in specialized laboratories but also in many general clinical analysis laboratories.

There is an important industry that manufactures kits and equipment for immunology tests. Since immunology is a very active research area and there is ample room to improve present tests and to develop new ones for many diseases still orphan of immunological diagnosis and monitoring tests, this is a very promising area,

## Competences

### Medicine

- Communicate clearly, orally and in writing, with other professionals and the media.
- Critically assess and use clinical and biomedical information sources to obtain, organise, interpret and present information on science and health.
- Demonstrate understanding of the basic sciences and the principles underpinning them.
- Demonstrate understanding of the causal agents and the risk factors that determine states of health and the progression of illnesses.
- Demonstrate understanding of the functions and interrelationships of body systems at different levels of organisation, homeostatic and regulatory mechanisms, and how these can vary through interaction with the environment.
- Demonstrate understanding of the manifestations of the illness in the structure and function of the human body.
- Demonstrate understanding of the mechanisms of alterations to the structure and function of the systems of the organism in illness.
- Establish the diagnosis, prognosis and treatment, basing decisions on the best possible evidence and a multidisciplinary approach focusing on the patient's needs and involving all members of the healthcare team, as well as the family and social environment.
- Indicate the basic diagnosis techniques and procedures and analyse and interpret the results so as to better pinpoint the nature of the problems.
- Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
- Put forward suitable preventive measures for each clinical situation.
- Reason and make decisions in conflict situations of an ethical, religious, cultural, legal or professional nature, including those that stem from economic constraints, the marketing of health cures or scientific advances.
- Recognise ethical, legal and technical factors in patients' documentation, plagiarism, confidentiality and propriety.
- Recognise the role of complexity, uncertainty and probability in decision-making in medical practice.
- Recognise, understand and apply the doctor's role as a manager of public resources.
- Use information and communication technologies in professional practice.
- Write patient records and other medical documents that can be understood by third parties.

## Learning Outcomes

1. Apply analytic tests in accordance with their cost efficiency.
2. Apply the results of clinical and biological parameters indicative of the immune response to construct to diagnosis and treatment algorithms.
3. Choose an experimental technique that allows development of a working hypothesis and the diagnostic process.
4. Communicate clearly, orally and in writing, with other professionals and the media.
5. Correctly write reports on the results of different types of tests (analytic, genetic).
6. Describe legislation that regulates the use and confidentiality of analysis results.
7. Describe the clinical and biological parameters generated in immunomediated diseases.
8. Describe the indications of anatomopathological tests.
9. Describe the indications of biochemical tests used in the diagnosis of genetic diseases.
10. Describe the main biomedical bibliographic databases and filter the information provided.
11. Describe the principles of the scientific method and their application to experimental work.
12. Differentiate the functions of the immune system and how it interacts with other organ systems and reacts to germs by developing immune defence responses.
13. Identify the actions to prevent and protect against infectious diseases.
14. Identify the cost efficiency of analytic tests.
15. Identify the main mechanisms by which the immune system can cause or contribute to illness.
16. Identify the semiological value of laboratory tests used in the most common human pathologies.
17. Interpret measurable clinical and biological parameters that indicate a normal immune function and the changes resulting from interactions with the environment.
18. Know and interpret in the physiological and pathological context the main techniques for diagnosing the different diseases.
19. Know the main diseases mediated by the immune system and how they are reflected in the main parameters evaluating the state of the immune system.
20. Know the main forms of preventive immunotherapy, especially vaccines, and the mechanism by which they confer protection.
21. Know the therapeutic principles applicable to immunomediated diseases.
22. Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
23. Make deductions on the basis of experimental findings.
24. Use information and communication technologies in professional practice.

## Content

### Practical aspects of laboratory tests

1.- The immunology laboratory. Principles of operation and elements of the diagnostic process. Interpretation of diagnostic tests.

2.- Allergy diagnostic tests.

3.- Diagnostic tests of cellular and immunogenetic immunology (2 h). 4. - Diagnostic tests of immunochemistry.

5.- Diagnostic tests of systemic autoimmunity.

6.- Diagnostic tests of organ-specific autoimmunity (2 h). 7. - Diagnostic histocompatibility tests (2 h).

### Clinical case seminars

SCC1: clinical cases: autoimmunity. SCC2: clinical cases: immunochemistry. SCC3: clinical cases: allergy.

SSC4: clinical cases: primary immunodeficiencies.

SSC5: clinical cases: transplant.

## Methodology

Clinical Case Seminars (SCC). It also includes problem-based learning (PBL) activities. Group measure: 2-10 students. Scheduled sessions: 5 sessions of 1 hour. The students, in small groups, will discuss typical clinical assumptions, under the direction of a tutor.

Laboratory practices (PLAB): Participation in the tasks of the clinical immunology laboratory with an immunology laboratory technician as instructor.

Autonomous work: Comprehensive reading of texts and articles, study and realization of schemes, summary and conceptual assimilation of the contents. Preparation of presentations and deliveries.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
CLINICAL CASE SEMINARS (SCC)	5	0.2	2, 1, 4, 18, 19, 23, 7, 11, 8, 9, 12, 14, 15, 17, 22, 24
LABORATORY PRACTICALS (PLAB)	10	0.4	2, 1, 4, 18, 19, 23, 7, 11, 8, 9, 12, 14, 15, 17, 22, 24
Type: Supervised			
TUTORIALS	8	0.32	22
Type: Autonomous			
SELF-STUDY/READING ARTICLES /REPORTS OF INTEREST	47	1.88	2, 21, 19, 7, 10, 16, 17, 5

## Assessment

Possibility of reevaluation (Recovery test): resolution of clinical case (40%) and examination, 4 short questions (60%).

Students who do pass the tests will have to enrol again.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Attendance and active participation in class and in seminars	20%	0.5	0.02	2, 1, 4, 21, 18, 20, 19, 23, 7, 11, 6, 8, 9, 10, 12, 14, 16, 15, 13, 17, 22, 5, 3, 24
Oral Assessment :structured tests	40%	2	0.08	4, 20, 10, 22, 5, 24
Practical type evaluation : case studies	40%	2.5	0.1	2, 1, 21, 18, 20, 19, 23, 7, 6, 8, 9, 14, 16, 15, 13, 17, 5, 3

## Bibliography

Textos

Blaney, Kathy D., and Paula R. Howard. Basic and Applied Concepts of Immunohematology. Mosby, 1999.

Brostoff, Jonathan, Alexander Gray, David Male, and Ivan Roitt. Case Studies in Immunology. 2nd ed. Gower Medical Pub, 1996.

Chapel, Helen. Essentials of Clinical Immunology. Fifth Edition Saunders, 2006.

Detrick, Barbara. Manual of Clinical Laboratory Immunology. 6th ed. Ed. Barbara Detrick. American Society Microbiology, 2002.

Gorczyński, Reginald M., and Jacqueline Stanley. Problem-Based Immunology. Saunders, 2006. Mackay, Ian R. The Autoimmune Diseases, Fourth Edition. 4th ed. Ed. Ian R. Mackay. Academic Press, 2006.

Yehuda Shoenfeld (Editor), Pier Luigi Meroni (Editor), M. Eric Gershwin MD (Editor) Autoantibodies, Third Edition -2014.

Hans D. Ochs, C. I. Edward Smith, Jennifer M. Puck. Primary Immunodeficiency Diseases: A Molecular & Cellular Approach. Oxford University Press, USA, 2013

Clinical Immunology: Principles and Practice. 5th edition Robert R. Rich MD , Thomas A Fleisher MD, William T. Shearer MD PhD, Harry Schroeder, Anthony J. Frew MD FRCP, Cornelia M. Weyand MD PhD, 2018.