

**Immunopathology**

Code: 101929  
ECTS Credits: 3

Degree	Type	Year	Semester
2501230 Biomedical Sciences	OB	3	1

**Contact**

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**Use of languages**

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

**Other comments on languages**

Un 50% de les classes s'impartiran en anglès

**Teachers**

Marta Vives Pi  
Oscar de la Calle Martin  
Juan Francisco Delgado de la Poza  
Eva Maria Martinez Caceres  
Candido Juarez Rubio  
Manuel Hernández González  
Maria Jose Amengual Guedan  
Aina Teniente Serra  
Laura Martinez Martinez  
Maria Esther Moga Naranjo  
Roger Colobrán Oriol  
Mónica Martínez Gallo

**External teachers**

Bibiana Quirant Sánchez  
Clara Franco Jarava  
Gemma Vila Pijoan  
Janire Perurena Prieto  
Joan Climent Martí  
Laura Viñas Giménez

## Prerequisites

It is absolutely necessary to have adequate knowledge of:

- Cell Biology
- Structure and Function of Biomolecules (Biochemistry I)
- Human anatomy
- Experimental methods in Biomedicine
- Metabolism of Biomolecules (Biochemistry II)
- Basic Immunology

## Objectives and Contextualisation

1) To learn the role of the immune system in the following pathological processes:

- a. Infections
- b. Allergies and hypersensitivity disorders.
- c. Autoimmune diseases
- d. Primary and secondary immunodeficiencies
- e. Neoplasms and paraneoplastic diseases. Anti-tumor response
- f. Transplantation, rejection and graft versus host disease

2) To be familiar, understand and interpret diagnostic tests and studies that have clinical value for immune-mediated diseases.

3) To understand the mechanisms of action of immunology-based therapies, i.e., vaccines, immunosuppressive drugs, immunoglobulins, monoclonal antibodies, cytokines and cellular immunotherapy.

## Content

**Immunopathology: a) the immune system as a cause of disease, main mechanisms; b) the immune system for the cure of diseases, main immunology-based therapies**

Organized by Teaching Units (TU)

### TU1. Immune response and disease

#### Lectures

- 1 - Immune response in infectious diseases I. General aspects of the immune response and response to viral infections.
- 2 - Immune response in infectious diseases II. Immune response to bacteria, protozoa, fungi and helminths. Emerging infections.
- 3 - Tolerance and autoimmunity. Concept of tolerance to self-antigens. General mechanisms of T cell and B-cell Tolerance. Sequestered antigens. Tolerance failures and disease.
- 4 - Autoimmunity. Concept. Epidemiology and classification. Main autoimmune diseases. Etiology. Mechanisms of tissue damage. Hypothesis of the multiple check-points.
- 5 - Allergy. Concepts of allergy and atopy. Basic mechanisms. Main allergic diseases. Diagnosis of allergic diseases.
- 6 - Immunodeficiencies. Types of immunodeficiencies. Deficiencies of cellular immunity. Deficiencies of humoral immunity. Deficiencies of natural immunity. Other immunodeficiencies.

S1 Immunopathology Seminar 1: animal models of autoimmune diseases.

S2 Immunopathology Seminar 2: proliferations of cells of the immune system and disease, presentation of a case of myeloma and of lymphoma.

## **TU2. Immune responses in special clinical situations**

### **Lectures**

7 - Transplantation. Types of transplantation. Immunological basis of organs, tissue and cell transplantation. Clinical manifestations of rejection. Non-specific immunosuppressive treatments. Main forms of clinical transplant. Immune tolerance to transplant.

8 - AIDS: the epidemic. The human immunodeficiency virus (HIV). Mechanisms of infection. Natural history of the infection. The immune response to HIV. Perspectives for a vaccine.

9 - Tumour Immunology. Cancer biology and the immune response. Tumour antigens. How tumours avoid the immune response, concepts of immune surveillance and of immuno-editing. Immunotherapy of cancer, immunological check-points.

S3 Immunopathology Seminar 3: The problem of histocompatibility and its approach in the HLA typing laboratory.

S4 Immunopathology Seminar 4: Approaches in the diagnosis of immunodeficiencies and discussion of paradigmatic cases.

### **TU3. The laboratory of diagnostic immunology**

S5 Immunopathology Seminar 5: The diagnostic process. The properties of the diagnostics tests, the test catalog. The quality system and regulations. Laboratory accreditations. The laboratory of diagnostic immunology: contributions to disease prevention and diagnosis and treatment monitoring.

P1 Practical - demonstration 1: Diagnosis of plasma cell diseases in the laboratory. Demonstration of the techniques and interpretation of results.

P2 Practical - demonstration 2: Flow cytometry applied to diagnosis. Interpretation of the plots and results.

P3 Practical - demonstration 3: Use of indirect immunofluorescence (IFL) for the diagnosis of autoimmune diseases. Interpretation of the most frequent IFL patterns and their correspondence with the antigens recognized by ELISA and immunoblot.

P4 Practical - demonstration 4: HLA typing, methodologies and the quest for the best kidney and hematopoietic stem cell donors.

## **TU4. Therapies based on immunology**

### **Lectures**

10 - Immunotherapy I. General concepts. Vaccines, serum therapy, intravenous immunoglobulins.

11 - Immunotherapy II. Cytokines and anti-cytokines. Cell therapies, from transfusion to advanced cell therapies.