

Course Unit	Laboratorial Immunology	Field of study	Biomedical Laboratory Sciences
Bachelor in	Biomedical Laboratory Sciences	School	School of Health
Academic Year	2022/2023	Year of study	2
Type	Semestral	Semester	2
Workload (hours)	135	Contact hours	T - , TP 22,5 PL 30 TC - , S - , E - , OT 7,5 O -
Level	1-2	ECTS credits	5.0
Code	9995-550-2204-00-22		

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Andrea Luisa Fernandes Afonso, Antonio Jose Madeira Nogueira, Jose Maria Joao de Quina

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Master basic concepts of the physiology of the immune system and main mechanisms of immunopathology.
2. Participation in routine laboratory work in a immunology laboratory and perform immunology laboratory work plans.
3. Participate and interpret laboratory experiments in immunology area.
4. Analyze and interpret critical immunology scientific work.

### Prerequisites

Before the course unit the learner is expected to be able to:  
None

### Course contents

1. Introduction to the immune system
2. Innate immunity
3. Cells and organs of the immune system
4. Recognition of antigens
5. Maturation, activation and differentiation of B and T lymphocytes
6. Effector mechanisms of immune response
7. Hypersensitivity reactions
8. Tolerance and autoimmunity
9. Immunity to tumors
10. Immune response to infectious diseases
11. Vaccines
12. Immunodeficiencies
13. Transplantation immunology

### Course contents (extended version)

1. Introduction to the immune system
2. Innate Immunity
3. Cells and organs of the immune system
  - Cells involved in innate immune response
  - Cells involved in adaptive immune response
  - Primary lymphoid organs and secondary lymphoid organs
  - Migration of immune cells and lymphocyte recirculation
4. Recognition of antigens
  - Antigens and antibodies
  - Major histocompatibility complex and antigen presentation
  - T-cell receptor (TCR) and accessory molecules
  - Rearrangement and expression of antigen receptor genes: immunoglobulins and TCR
5. Lymphocytes maturation, activation and differentiation
  - T-cell maturation, activation and differentiation
  - B-cell maturation, activation and differentiation
6. Immune effector mechanisms
  - Cytokines
  - T helper cells
  - Cell-mediated cytotoxic responses
  - The complement system
  - Activation and migration of leukocytes and inflammatory response
7. Hypersensitivity reactions
8. Tolerance and autoimmunity
9. Immunity to tumors
10. Immune response to infectious diseases
11. Active-passive immunization
12. Congenital and Acquired immunodeficiencies
13. Transplantation immunology
14. Practical classes - Laboratory diagnosis by immunological techniques:
  - Precipitation reactions
  - Agglutination reactions
  - Radioimmunoassay
  - Enzyme Linked Immunosorbent Assay (ELISA)
  - Immunochromatography
  - Flow cytometry
  - Other techniques: Immunofluorescence, Chemiluminescence and Western Blotting

### Recommended reading

1. Abbas, A.K., Lichtman, A. H., Pillai, S. (2021). Cellular and Molecular Immunology (10th ed), Elsevier.
2. Arosa, F. A. , Cardoso, E. M. & Pacheco F. C. (2012). Fundamentos de Imunologia (2ª ed. ). Lisboa: Lidel, edições técnicas, Lda.
3. Murphy, K. (2014). Imunobiologia de Janeway (8th ed.). Porto Alegre: Artmed.
4. Goldsby, R. A. , Kindt, T. J. , & Osborne, B. A. Kuby Immunology (6th ed.). New York: Freeman & Company
5. Compêndio de artigos da Pubmed: Frontiers in immunology – Grand Challenges: <http://www.ncbi.nlm.nih.gov/pmc/issues/209606/>

### Teaching and learning methods

Expositive, active and participative classes

### Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
  - Intermediate Written Test - 60%

**Assessment methods**

- Final Written Exam - 40%
- 2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)
  - Final Written Exam - 60%
  - Final Written Exam - 40%

**Language of instruction**

Portuguese

**Electronic validation**

Andrea Luisa Fernandes Afonso, Antonio Jose Madeira Nogueira	Josiana Adelaide Vaz	Juliana Almeida de Souza	Adília Maria Pires da Silva Fernandes
19-06-2023	20-06-2023	28-06-2023	28-06-2023