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|---------------------------|--------------------------------|---------------|----------------|--|-----|
| 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 | Level | 1-2 |
| Type | Semestral | Semester | 2 | ECTS credits | 5.0 |
| Workload (hours) | | 135 | Contact hours | T - TP 22,5 PL 30 TC - S - E - OT 7,5 O - | |
| 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

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|---|----------------------|--------------------------|---------------------------------------|
| 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 |