HUMANITAS MEDICAL

CLINICAL MICROBIOLOGY II (Prof. Valeria CENTO, Prof. Seppo MERI, Prof. Mauro TEIXEIRA; 3 CFU)

Learning objectives

At the end of these lectures and activities, students should be able to

- Describe fungi and associated diseases; describe pathogenic mechanisms and the resulting pathology at the cellular, tissue, and organism levels; and the clinical manifestations.
- Describe RNA and DNA viruses and associated diseases; describe pathogenic mechanisms and the resulting pathology at the cellular, tissue, and organism levels; and the clinical manifestations.
- Describe parasites (protozoan, helminths, arthropod vectors) and associated diseases; describe pathogenic mechanisms and the resulting pathology at the cellular, tissue, and organism levels; and the clinical manifestations.
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T cell development
Generation of T cell receptor diversity
Assembly of the mature TCR
Thymic selection (an introduction)
T cell signalling (T cell activation).

5. T cell development and functions - Lecture 2

T cell functions
Immune synapses
Costimulation - checkpoint blockade
Cytotoxic function.

6. B cell development and functions - Lecture 1

BCR diversification
B cell development

7. B cell development and functions - Lecture 2

- Th-B cell interactions; germinal centers

- Medawar
- Treg
- Consequences of maternal-fetal tolerance for the evolution of immune system control

MUCOSAL IMMUNE SYSTEM AND MICROBIOTA (Prof. Maria RESCIGNO, 2 CFU)

Learning Objectives

At the end of the lecture course, students should be able to:

- Understand the structure of the mucosal immune system (the sites where the response is initiated)
- Understand how immune responses are initiated or repressed at mucosal sites
- Understand how immune homeostasis is carried out at mucosal sites.
- Understand the bases of several disorders initiated at mucosal surfaces (allergies, asthma, metabolic disorder, etc.)
- Understand what is the microbiota, its activities on our well-being and how we tolerate

Lectures

1. Development and structure of Mucosal tissue

- Description of the mucosal associated lymphoid tissues
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- Broncho-alveolar associated lymphoid tissue (BALT),
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2. Cellular constituents of the mucosal immune system I: Epithelial cells and antigen uptake

- Epithelial cells,
- Bile acids and enterohepatic circulation,
- Antigen uptake
- Initiation of oral tolerance to food

3. Cellular constituents of the mucosal immune system II

- Intraepithelial lymphocytes, dendritic cells, macrophages, Mast cells and neutrophils
- Atypical CD8 T cells
- gd T cells
- iNK T cells
- Innate lymphoid cells
- ILC and chronic disorders

4. Lymphocyte trafficking and oral tolerance

- Lamina propria lymphocytes
- T regulatory cells (thymus derived and peripherally derived)
- T regulatory cells and IBD

- T cell-mediated (type IV) hypersensitivity
- Autoimmune diseases: The central and peripheral tolerance
- Mechanisms of autoimmunity
- General features of the most common autoimmune diseases (Systemic Lupus Erythematosus)

PPP portfolio: Rash, Jaundice, Chest Pain, Fever, Shortness of Breath or Dyspnea

3. Rejection of tissue transplants and immunodeficiency syndromes (Prof Jaillon)

- Rejection of tissue transplants: Generalities and definition, Type of rejection reactions
- Graft-versus-host disease
- Immunodeficiency syndromes: Primary immunodeficiencies
- Primary immunodeficiencies: Defect in innate immunity
- Primary immunodeficiencies: Defect in adaptive immunity
- Secondary immunodeficencies: Acquired immune deficiency syndrome (AIDS)

PPP portfolio: Rash, Chest Pain, Fever, Cough

4. Vaccines (Prof Alberto Mantovani)

5-6. Immune responses to tumors and principles of cancer immunotherapy (Prof Jaillon)

- Introduction
- The immunosurveillance hypothesis
- Defensive mechanisms against tumors
- Mechanisms of cancer immune evasion
- Cancer immunoediting
- Principles of cancer immunotherapy (antibodies, inhibitors of immune checkpoints, CAR-T cells)

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course and recap lessons will be done in order to increase the integration of the different modules. All lectures will be held synchronously, either in presence or using Teams.

Group work activities/activation of knowledge: the purpose of these activities is to activate and solidify knowledge acquired during lectures and independent study, in a collaborative learning setting. For these activities, students will be divided in groups that will remain the same through the semester. Participation is mandatory. Student that cannot be on Campus for reasons related to the pandemics will participate in teams.

Problem based learning (PBL) during each semester a PBL will be presented and discussed with students. Students are encouraged to actively participate to the lectures with questions and comments.

Attendance is mandatory, an absence rate of 25% will be tolerated. For higher absence rates university rules will be followed.

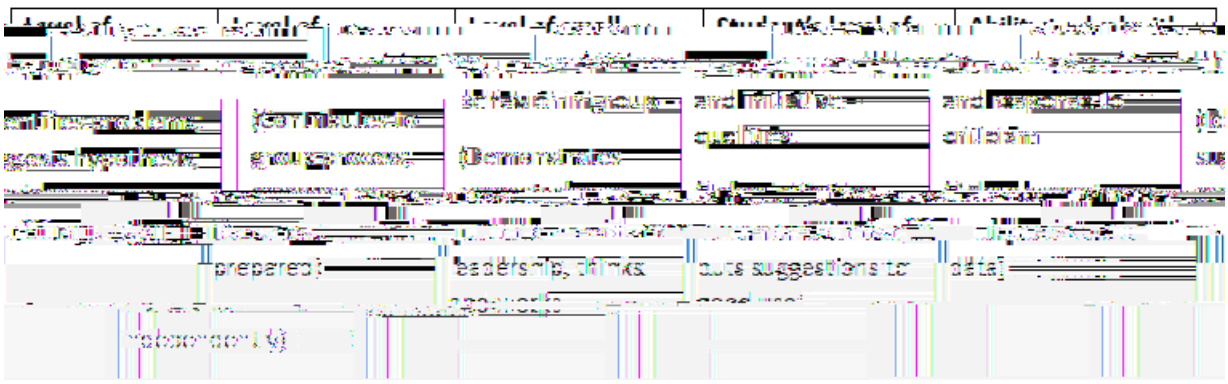
Assessment

one multiple choice exam at the end of the course and by evaluation of the PBL activity.
The faculty reserves the possibility to have an oral exam.

Content of the Exam (40 questions): 14q on Microbiology, 10q on Adaptive Immunity, 8q Mucosal Immune System and Microbiota, 8q on Immunopathology.

Exam evaluation: 40 questions, each question 0.75 points.
To pass the test you need to answer at least 24 questions correctly.
A minimum of 60% correct answers must be reached.

PBL evaluation: students will be evaluated by tutors and experts following the table below.
For every column of the table, the scale will be: 4= Excellent; 3=Good; 2=Satisfactory; 1= Poor.
Extra points will be added to the exam evaluation following these ranges
Evaluation range 10-13: 1 point; 14-17: 2 points; 18-20: 3 points.
Each point is a 0.75 to add to final grade.



Texts

- Robbins and Cotran, Pathologic Basis of Diseases, 10th edition, 2020; Elsevier

- Cellular and molecular immunology 10th edition, 2021; Elsevier
- Bauman RW, Microbiology with Diseases by Taxonomy, 6th edition, Pearson
- Updated scientific literature and clinical guideline (EBM, Evidence Based Medicine)