UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Molecular Immunology

2425-3-E0201Q056

Aims

The course aims to provide modern concepts on how the immune system interacts and responds to an environment containing different species of potentially dangerous microorganisms. The teaching delves into the problem of how the immune system exists and evolved to protect the individual from infections. The course will also analyze the role of the immune system in the context of cancer, autoimmune diseases and organ transplants.
The course aims to provide modern concepts on how the immune system interacts and responds to an environment containing different species of potentially dangerous microorganisms and how at the same time it protects us from tumors or causes inflammatory diseases.
The various problems will be treated through the discussion of original experiments and particular relevance will be given to the themes that have characterized new molecular immunology studies in recent years, including imaging approaches, ex vivo three-dimensional models and/or in vivo models

Contents

1. how to study the immune system:
   three-dimensional approaches and models, ex vivo and in vivo models, advanced imaging
2. study of the immune system in infections
3. study of the immune system in autoimmunity, allergies, organ transplants
4. study of the immune system in the mucous membranes
5. immune system in cancer

Detailed program

Description: anatomical and physiological barriers. The cells of innate immunity. The receptors of innate immunity.

Signal transduction by toll like receptors. Signal transduction by the inflammasome.
Immunometabolism.
Description: relationship between cellular metabolism and immunity. The immunometabolism of phagocytes. Lymphocyte immunometbolism. Immunometabolism and tumors.
The immune defense against infections.
Description: Innate and adaptive immunity to viral, bacterial and fungal infections
Interaction between commensal microorganisms and the immune system.
Description: mucosal and intestinal immunology. Pathophysiology of the interaction between commensal microorganisms and the organism.
Immunopathologies.
Description: sepsis and inflammatory bowel diseases.
Phagocytes and tumors.
Description: role of macrophages and neutrophils in blocking or promoting tumor growth and study of the molecular mechanisms of this relationship.

Prerequisites

basic knowledge of Immunology
General preparatory requirements: the student can take the third year exams after having passed all the exams of the first year of the course

Teaching form

Teaching is held in Italian.
20 classroom lessons, including analysis and discussion of scientific articles, created with the support of PowerPoint presentations.
At the end of each topic, students will interactively discuss the scientific articles relevant to the content of the thematic module.
A 2-hour practice activity as support for studying and preparing for the exam carried out in interactive mode
in presence
A lesson will be given in co-teaching with Prof. Guglielmetti to discuss the interactions between the mucosal immune system and the microbiota in the food sector.

Textbook and teaching resource

The material presented during the lessons (slides and scientific articles discussed in class) is available on the course's e-learning page.
Suggested textbooks:
“Immunobiology, the immune system in health and disease”, by Paul Travers, Mark Walport, Mark Shlomchik, Mark Schlomchik Charles Janeway (Authors); Taylor & Francis, Inc. (Publisher) (latest English edition or latest edition of the Italian translation, Publisher: Piccin)

Semester

second semester

Assessment method

oral examination.
method: the student will present an article from which basic skills on immunology (theory) will be deduced and from which conceptual questions will start on topics such as autoimmunity, mucosal immunology, cancer immunology

Office hours

Office hours: by appointment, by email to the teacher.

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING