UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Immunology I

2324-2-H4102D011-H4102D033M

Aims

The course will give the basic knowledge of immunology with special consideration to the importance of the immune system in medicine.
The aim of the course is to give the basic knowledge of the structural and molecular mechanisms of the immune system. The immune system is an integrated set of molecules and cells that work in a coordinated way to maintain the body's homeostasis and protect it from foreign agents, such as microorganisms and their products. The course will address the dynamics and complexity of humoral and cell-mediated immune responses. At the end of the course the student will be able to describe: the organization of the immune response towards the different types of insults and the peculiarities of the different components of the immune system.

Contents

• General characteristics of immune responses

• Innate Immunity-The First Line of Defence

• The induced responses of Innate Immunity

• Antigen Recognition

• Generation of Lymphocyte Receptors

• Antigen Presentation to T lymphocytes

• Development and Survival of Lymphocytes

• Humoral Immune Responses

• T cell-mediated immunity

• Dynamics of Innate and Adaptive Immunity

Detailed program

Introduction to the immune system. Natural and adaptive responses. Anatomical-Functional Organization of the Immune System.

Innate immunity. Anatomic barriers and initial chemical defenses. The complement system and innate immunity. Pattern recognition by cells of the innate immune system. Recognition of molecular structures by the cells of the innate immune system. Soluble effector molecules of innate immunity: the complement, Pentrassins, collectins and ficolins. The innate responses induced against infection. Inflammatory response: main proinflammatory cytokines, leukocyte recruitment, ingestion and killing of microorganisms by phagocytes, systemic and pathological effects of inflammation. Antiviral response. Mechanisms of regulation of the innate immune response.

Antigen Recognition. Antigen Recognition by B-cell and T-cell Receptors. The structure of a typical antibody molecule. The interaction of the antibody molecule with specific antigen. Antigen recognition by T cells.

Generation of Lymphocyte Antigen Receptors. Primary immunoglobulin gene rearrangement. T-cell receptor gene rearrangement. Structural variation in immunoglobulin constant regions. Evolution of the adaptive immune response.

Antigen Presentation to T lymphocytes. The generation of ?:? T-cell receptor ligands. The major histocompatibility complex and its function.

Development and Survival of Lymphocytes. Development of B lymphocytes. Development of T lymphocytes. Positive and negative selection of T cells.

Humoral Immune Responses. B-cell activation by antigen and helper T cells. The distributions and functions of immunoglobulin classes. The destruction of antibody-coated pathogens via Fc receptors.

T cell-mediated immunity. Sites for the initiation of adaptive immune responses. Priming of naive T cells by pathogen-activated dendritic cells. General properties of effector T cells and their cytokines. T-cell-mediated cytotoxicity.

Dynamics of Innate and Adaptive Immunity. Integration of innate and adaptive immunity in response to specific types of pathogens. Effector T cells augment the effector functions of
innate immune cells. Immunological memory.

Prerequisites

Knowledge of the introductory courses indicated in the regulation of the degree course

Teaching form

Frontal lectures and support videos. Interactive lessons based on computer simulations of pathological clinical questions.

Textbook and teaching resource

Kenneth Murphy, Casey Weaver- Janeway "Immunobiology" – 9th ed. Garland Science

Abul Abbas Andrew Lichtman Shiv Pillai - Cellular and Molecular Immunology 9th Edition- Elsevier

Semester

II Semester

Assessment method

The course exam consists of a written exam with multiple-choice and open questions. The questions will assess the degree of depth achieved by the student. In the specific case of Immunology, questions are asked on all the fundamental aspects of the individual parts of the Program above. The test will also include an open-ended question (essay) that will assess the ability to link the different topics covered. In itinere tests will be planned in each session.

The exam is considered passed only if at least 60% of the questions including the open-ended question are answered.

Office hours

Monday morning by appointment

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY