



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Applied Immunology

2122-1-F0601Q071

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#### Aims

The aim of the course is to provide knowledge of the functioning of the immune system in different pathological contexts and at specific moments in the life of an individual.

Specifically, particular attention will be paid to the dysfunctions of the immune system that lead to chronic pathological contexts, such as auto-inflammatory diseases, tumors, autoimmune diseases and some diseases associated with infection, such as COVID19, in which the immune system is dysfunctional.

The course will provide the very latest knowledge relating to neuroimmunology and immune system dysfunctions in neuropathological contexts.

We will also discuss how dysfunctional immunological responses can be manipulated through the development of targeted therapies.

The basis for understanding the changes that accompany the immune system during the aging of individuals will be provided and recent theories in this field such as 'tissue tolerance' will be explained. Moreover, the immunological changes that occur during pregnancy, a particular stage of life, will also be discussed

Speaking of immunometabolism, it will also be understood how some cellular processes support immune functions and how their alteration can lead to pathologies.

The general objective is the acquisition of in-depth knowledge of the immune system in various pathological and

non-pathological contexts.

## **Contents**

### **Synthetic contents**

- Inflammation and mechanisms for extinguishing the inflammatory process
- pathological contexts deriving from failure to extinguish inflammation and the onset of chronic inflammation: COVID19, chronic inflammatory diseases; intestinal and cutaneous.
- Allergies and hypersensitivity
- Concept of autoimmunity and autoimmune diseases
- Tumor immunology and tumor immunotherapy
- neuroimmunology and neuroinflammation during AD, parkinson, MS
- immunity during pregnancy
- aging of the immune system and tissue tolerance
- immunometabolism

## **Detailed program**

### **Lectures program**

**Lecture 1: Introduction to the course. Inflammation and mechanisms for extinguishing inflammation**

**Lecture 2: Dysfunctions of the extinguishing mechanism: chronic inflammation**

**Lecture 3: SARS-Cov-2 infection and COVID-19 pathology, hints of other chronic viral infections**

**Lecture 4: chronic bacterial inflammation; sepsis**

**Lecture: chronic skin inflammations**

**Lecture 6: chronic inflammation of the intestine**

**Lecture 7: Tumor Immunology**

**Lecture 8: new molecular technologies applied to the study of the tumor microenvironment**

**Lecture 9: Tumor immunotherapy**

**Lecture 10: Hypersensitivity reactions and allergies**

**Lecture 11: Allergic asthma, allergic rhinitis and food allergies**

**Lecture 12: Autoimmunity**

**Lecture 13: Lupus and Rheumatoid Arthritis**

**Lecture 14: Neuroimmunology and neuroinflammation**

**Lecture 15: neuroinflammations in AD, Parkinson's and multiple sclerosis**

**Lecture 16: Immunity and Tolerance During Pregnancy**

**Lecture 17: Aging of the immune system**

**Lecture 18: Concept of 'Tissue Tolerance'**

**Lecture 19: Immunometabolism**

**Lecture 20: Discussion of scientific articles**

**Lecture 21: Discussion of scientific articles**

## **Prerequisites**

The knowledge of the basic mechanisms of functioning of the immune system is required.

## **Teaching form**

Monographies and original paper discussion.

## **Textbook and teaching resource**

PPT slides, original papers and review. Textbook: ImmunoBiology, The immune system in health and disease- Janeway, Traves.

## **Semester**

Second semester

## **Assessment method**

Students will be assessed with an oral exam or with the presentation of a scientific article (chosen by the student from a selection provided by the teacher) relating to one of the topics covered.

the presentations of articles by students will be considered *in itinere* tests

## **Office hours**

Reception hours ON APPOINTMENT to be requested by email:

VENERDI 9:30-11:30

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