UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Cellular and Gene Therapy

2324-2-F0901D048-F0901D081M

Aims

1. Stem cells biology; Hemopoietic stem cell transplantation as the best success of stem cell therapy; stem cells and tissue regeneration (cardiovascular, orthopaedic, etc.)

2. Cell therapy in cancer and immunocompromised hosts; immunoregulatory cells: from discovery to application in the clinic.

3. Monoclonal antibody: from Koehler & Milstein up to now: a masterpiece in biotech therapy.

4. Introduction to gene therapy; the viral and non-viral vectors; successes and problems in gene therapy.

5. The concept of GMP production: how a cellular or a gene products (es. CAR-T cells) become a drug.

Contents

The aims of the Course is to provide an overview of the current and most relevant applications of biotech in the development of new treatment strategies. The two tracks of the course include the targeting treatment and the development of cellular and gene therapy.
The first part will cover the process of identification of new potential targets for treatment by using high-throughout technologies , the screening of active molecules and the preclinical and clinical development. Diseases in the field of cancer will be taken as cases in point.
The second part will present the pre clinical and clinical development of a product for cellular and gene therapy in the field of cancer (CAR-T cells), treatment of infections in immuno-compromised hosts, and tissue regeneration. Emphasis will be given to the knowledge of the process of production under “GMP” conditions.

Detailed program

New perspectives in the use of stem cells.

Cellular therapies in the antitumoral therapies.

Cellular therapies and immunoregulation.

Anti-infectious cellular therapies in the patient with immunodeficiency.

Non viral vectors for the gene therapy.

The transposons, new methods of gene manipulations.

Viral vectors for the gene theraphy.

Introduction to stem cells.

IPS and embrional stem cells: alternatives or complimentary?

Gene and cell therapy for MPS-I: from pre-clinical modelling to patient.

Stem cells and heart: : what is next?

The gene therapy in the non oncological pathologies.

Mesenchimal stem cells in the osteo-articular tissue repair.

Monoclonal antibodies in therapies: from Koehler & Milstein to the clinic: a useful way,

Prerequisites

Basic knowledge on pathology and immunology. Advanced knowledge in biochemistry, molecular biology and genetics.

Teaching form

Lessons in presence, subject to any ministerial changes related to a possible COVID pandemic situation.

Textbook and teaching resource

Updated reviews on all topics will be suggested at each lesson.
On the course page will be uploaded some relevant publications, and the slides (in PDF fromat) of the lessons.

Semester

First semester.

Assessment method

Written exam: one question with open answer.
Final oral exam (in English) with the presentation of a scientific article.

Office hours

Contact the teacher by email.

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING