UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Omeostasi Cellulare nei Tessuti Somatici e Cellule Staminali

2223-1-F0601Q070

Aims

The aim of this course is to extend and elaborate current notions on somatic stem cells functions, focusing in particular on tissue homeostasis and repairing/regenerative mechanisms. we will discuss also basic elements related to embryonic stem cells, cloning and induced pluripotent stem cells.
1. Knowledge and understanding:
Students will be able to understand how stem cells regenerate our tissues and replace differentiated cells lost by the normal tissue omeostasis and/or tissue damage.

*2. Applied knowledge and understanding:

In addition, the course will give to the students a scientific background that can be applied to understand projects aimed to the study the molecular basis of neurodegenerative diseases and aging, as well as to studies aimed at developing biotechnological applications of stem cells.

*3. Making judgments

Students will be able to critically review the scientific bibliography inherent research studies investigating stem cells. In addition, students will be able to develop autonomously an informed opinion on the scientific rationale of stem cells use in biotechnological endeavors and pre-clinical studies.

4. Communication skills:
   Al termine del corso gli studenti saranno in grado di dare una definizione di cellula staminale e descrivere le caratteristiche funzionali, morfologiche e antigeniche che differenziano le diverse tipologie di cellule staminali. Saranno inoltre in grado di riassumere i meccanismi che sostengono l'omeostasi tissutale dei vari tessuti che compongono il nostro organismo utilizzando un appropriato linguaggio scientifico
   Students will be able to use an appropriate scientific language to define stem cells types and describe their functions, morphology and antigenic properties. Students will be able to describe mechanisms sustaining tissue homeostasis by using appropriate scientific teems.
5. Learning skills:

This course will give to the students the information to achieve a more comprehensive knowledge of the physiology of our tissues.

Contents

Comprehensive knowledge of stem cell field: definition, categories, functional characteristics, definition. General mechanisms and models describing cell homeostasis in somatic tissues. Description of the different stem cells type, considering their developmental origin, their role in tissue homeostasis and potential therapeutic application.

Detailed program

• Cells Genealogies I: Introduction and definitions: differentiation, functional maturation and multipotency.

• Cells Genealogies II: Actual and potential Stem Cells and the concept of cell homeostasis

• Cells Compartments I : Stemness, stemnes-inherent functional parameters and stem cells self-renewal

• Cell population compartments II: Transit Amplifying progenitors and their role in tissue and cell homeostasis

• Cell hierarchy models I: Single cells model, spiral-model.

• Clonal succession model, deterministic model, stocastic model

• Stem cell niche

• Proliferation and mechanisms of symmetric and asymmetric cell division

• Somatic Stem Cell model (general informations)

• Neural Stem Cells

• Intestinal Stem Cells

• Hematopoietic Stem Cells

• Epidermal Stem Cells

• Self-renewing tissues without stem cells

• Embryonic Stem Cells

• Induced Pluripotent Stem Cells

• Cancer Stem Cells

Prerequisites

The knowledge of the basic mechanisms of cell biology, human physiology and histology is required.

Teaching form

Lectures

Textbook and teaching resource

Stem cells, di C.S. Potten, Academic Press. Classes are based on original or review articles in English language. Fundamental articles and the ppt slides presented will be available on the e-learning system.

Semester

second semester

Assessment method

Students will be evaluated by three written "open" questions at the end of the course . The questions will be aimed at evaluating both the knowledge of the topics discussed throughout classes and the ability to synthetize the most important elements of each topic. First question will be focused on general aspects of cells homeostasis and stem cells definition. Second and third questions will be focused on one of the stem cells types described. If required by the student or the teacher, a critical discussion of the written assessment will complete the evaluation.

Office hours

Email to biocell1@libero.it to schedule a meeting.

Sustainable Development Goals

QUALITY EDUCATION