UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Stem Cells: Human Diseases and Regenerative Medicine

2526-1-F0602Q127

Aims

The aim of this course is to extend and elaborate current notions on the possible involvement of stem cells in human diseases and regenerative medicine. The course will be focused on hihglighting how stem cells biology might consitute a key element for the study of disease pathogenesis. We will discuss also the application of stem cells as in vitro disease models and in experimental approaches for the cure of various diseases.

1. Knowledge and understanding:
   Students will be able to individuate how alterations in stem cells functionality might be part or cause a pathology. They will also gain elements to understand limits and potentialities related to stem cell-based therapies.

2. Applied knowledge and understanding:
   The course will give to the students a scientific background that could be applied to understand projects aimed at individutaing a stem cells involvement in degenerative diseases, cancer and aging, as well as 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:
   Students will be able to use an appropriate scientific language to read and relate about the topics of the course.

5. Learning skills:
   This course will give to the students the ability to integrate the new literature within this rapidly evolving field.

Contents

Along with the course the students will study the possible role of stem cell impairments and diseases pathogenesis (for example cancer stem cells, neurodegenerative diseases). Students will also learn how induced pluripotent stem cells might be used as in vitro models to study disease mechanisms. Finally the potential use of stem cells in clinical trials will be also reviewed.

Detailed program

1. INTRODUCTION
   Brief introduction on stem cells biology, functional properties and role in tissue homeostasis.

2. AGING AND ALTERATIONS IN TISSUE HOMEOSTASIS
   Aging-related molecular and cell mechanisms that might impair stem cell regenerative capacity.

3. CANCER STEM CELLS
   Cancer stem cells and their role in tumor progression.

4. STEM CELLS AND CLINICAL TRIALS
   The use of stem cells as "advanced therapies": limits and potentialities.

5. STEM CELLS AND DISEASE MODELING
   Use of stem cells as in vitro models to understand human diseases and to individuate patient-specific features.

Prerequisites

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

Teaching form

The course is composed by 21 lectures (18 lessons dedicated to delivered didactic -Didattica Erogativa - and 3 lessons dedicated to interactive teaching - Didattica Interattiva).

The 18 lessons (2 hours each) of delivered didactic will be focused on the presentation of contents by the lecturer: 15 lessons will be conveyed by means of face-to-face lectures and 3 lessons will be conveyed as distance learning)

Within the 3 lessons (2 hours each) dedicated to interactive teaching the students (by groups of about 4 students) will prepare a short seminar (15-20 minutes) regarding a topic of the course. The first two lessons will be dedicated to literature selection. In the last lesson students will present their work to the class. The seminar will be included as part of the final evaluation (more details in the "assessment section").
These 3 lessons of intercative learning will be conveyed by face-to-face mode.

Textbook and teaching resource

The course will be based on current scientific literature (original articles, reviews). 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 interview at 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.

The seminars presented by the students within the interactive teaching will receive a score of: 0, 1 or 2 that will be added to the evaluation of the written exam (if the final score wil be over 30, the student will receive 30 cum laude). Criteria for the score assessment will be: clarity of the presentation, use of the correct scientific language and ability to synthesize the topics of the research articles).

Office hours

Email to biocell1@libero.it to schedule a meeting

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION