UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Clerckship in Physiology

2526-2-H4101D236

Aims

The student will learn how to keep endothelial cells, astrocytes and primary neurons in culture and test their functional capacity using the equipment in the laboratory, will learn the basis of calcium imaging and electrophysiological recordings.

At the end of the course the student knows the basic functional mechanisms of cellular homeostasis, is able to describe the essential bases of functioning, knows the physiological processes and functional mechanisms of excitable cells and the physiological bases and the main functional characteristics.

1. Knowledge and understanding: it is essential that medical students receive sufficient exposure to recent scientific and technological innovations in light of the fundamental need for the development of knowledge and the improvement of medical practice to be deeply linked to the training process of young doctors in STEM disciplines
2. Applied knowledge and understanding: the material is presented in a context that prepares students for the profession, therefore, when possible, clinical examples will be used to illustrate the principles of the instruments and techniques applied in preclinical studies.
3. Autonomy of judgment: knowing how to acquire and evaluate the prelinical results by means of the main current laboratory techniques
4. Communication skills: acquisition of the set of skills that allow one to interact effectively with others, both verbally and non-verbally.
5. Ability to learn: acquisition of basic knowledge of the functioning of interventional/diagnostic instruments in preclinical medical practice.

Contents

- Cell cultures: human cerebral microvascular endothelial cells (hCMEC/D3) and primary neurons

- Videoimaging techniques for intracellular calcium measurements on viable cells

- Endothelial Permeability Assay

- Transwell© preparation

Detailed program

- Endothelial cell cultures of the cerebral microcirculation, primary neuronal cultures

Preparation techniques for collagenated slides and dishes, sterile preparation techniques, cell culture medium and maintenance buffer preparations

- Videoimaging techniques for measurements of intracellular calcium on viable cells

use of the fluorescence microscope, fundamentals of the MetaFluor software for image analysis and graphic processing, analysis of the obtained results by means of the Origin software

- Endothelial permeability tests

use of fluorescent tracers, calculation of endothelial permeability index (PE)

- Set up of Transwell © systems

Cell growth at confluence, measure of transepithelial electrical resistance (TEER)

Prerequisites

Essential of Human Anatomy, Biology, Physic

Teaching form

10 hours - Laboratory attendance:
Introduction to electrophysiology (3 ore)
Brain Slices (2 ore)
Confocal Advanced Miscroscopy (2 ore)
Calcium Imaging (3 ore)

Textbook and teaching resource

Scientific papers carried out by the research group

Semester

secondo semestre

Assessment method

Attendance and oral exam assessing the achievement of the objectives and the level of knowledge of the experimental techniques and procedures covered by the course

Office hours

By appointment upon written communication to giulio.sancini@unimib.it

Sustainable Development Goals

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