UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Cell and Molecular Biology I

1819-1-H4102D002-H4102D006M

Aims

The course will provide the essential theoretical knowledge of biology, also focusing on the possible future application in the medical field. The subjects of the course will provide the necessary knowledge to understand the vital processes, both on the cellular and molecular level.

Contents

Structure and function of the most important cellular macromolecules; DNA duplication and repair mechanisms; transcription and RNA processing; translation and protein sorting; transcriptional and post-transcriptional regulation; signal transduction pathways; molecular and cellular mechanisms which control the cell cycle, cellular growth and differentiation as well as cell-to-cell interactions.

Detailed program

GENERAL BIOLOGY – Classification of living organisms – Structure od prokaryotic and eukaryotic cells – Viruses, classification, lytic and lisogen cycle. MOLECULAR BIOLOGY. Chemical composition and molecular organization of the cell – water, carbohydrates, lipids, proteins and nucleic acids. Identification of the chemical compound carrying the genetic information – Molecular basis of inheritance – DNA replication. Telomerases – Mechanisms of DNA repair. Correlation with human diseases, aging and cancer. - RNA, structure and function – Transcription and RNA maturation – The genetic code, and its biological implication (redundancy, frameshift) – Translation – Protein sorting

CELL BIOLOGY – Structure and function of the cytoskeleton – Cell adhesion mechanisms – Endocytosis and Exocytosis – Cell-to-cell communication in complex organisms – Signal transduction and the role of protein kinases

– Cell cycle and its regulatory mechanisms. _ Mytosis and Meiosis – Apoptosis – Cell differentiation processes: embrional and adult stem cells.

Prerequisites

Basic sciences (chemistry, physics)

Teaching form

lectures

Textbook and teaching resource

Alberts and Johnson. Molecular biology of the cell. Sixth edition. Garland Science, 2014; H. Lodish, A. Berk, S.L. Zipursky, P. Matsudaira, D. Baltimore, J. Darnell. Molecular cell biology, Freeman, 2016

Semester

first semester

Assessment method

Written exam with multiple choices quiz (30% of the final mark)

Oral examination on the subjects taught during the lectures

Discussion on further subjects (part of the program) not exhaustively discussed in class

Office hours

by appointment