



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Molecular Biology

2021-1-H4601D066-H4601D011M

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#### Aims

MOLECULAR BIOLOGY knowledge of the main concepts of molecular biology, with particular regard to the processes of DNA replication and control of gene expression.

#### Contents

Structure and function of the most important cellular macromolecules; transcription and RNA processing; pathological implications. molecular biology techniques used in research and in molecular diagnostics.

#### Detailed program

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). - Immunogenetics. Generation of antibody diversity - Cancer genetics. Oncogenes and tumor suppressor genes (Rb1, WT1 and p53) – Molecular genetic tools (restriction enzymes, vectors, Southern blotting, PCR, sequencing, microarrays). Molecular cloning. Strategies for the diagnosis of genetic diseases (direct and indirect) – The human genome project: future implications – Gene therapy: general concepts and applications.

#### Prerequisites

Aims of the course Scienze Propedeutiche

#### Teaching form

Frontal lectures

## **Textbook and teaching resource**

Main Textbook

G. De Leo, E. Ginelli, S. Fasano. *Biologia e Genetica* EdiSES, 2013

More Resources

- H. Lodish, A. Berk, S.L. Zipursky, P. Matsudaira, D. Baltimore, J. Darnell. *Molecular cell biology*, Ed. FREEMAN, 6° ed. 2007.
- G. Karp. *Biologia cellulare e molecolare* 3° ed EDISES, 2007
- Strachan. *Human molecular genetics*, 4° Ed. GARLAND SCIENCE, 2010
- P.J. Russell. *Genetica*. 2° ed EDISES, 2007
- B. A. Pierce. *Genetica*. ZANICHELLI, 2005.

## **Semester**

2° semester

## **Assessment method**

One exam for all three sections of the course. Written test multiple choices (around 30) and 2-3 open shorts questions on all three modules. The examination is intended to test students' knowledge acquired in the different modules of the course.

## **Office hours**

On appointment

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