



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Molecular Genetics

2223-3-I0302D035-I0302D046M

---

#### Aims

Provide knowledge related to the use of the main cytogenetic and molecular biology methods, with particular reference to PCR, with application examples in a biomedical laboratory (eg haemato-oncology).  
Discuss and exemplify the role of the biomedical laboratory technician in the context of a clinical protocol.  
Provide applicative skills of the preferential analytical method according to clinical question.

#### Contents

Cytogenetics and particular genetic diseases

FISH, aCGH, imprinting diseases, triplet expansion diseases as examples of various techniques applicable in a genetics laboratory

Molecular Biology:

PCR and its many applications, with examples related to a hemato-oncology laboratory

#### Detailed program

Cytogenetics and particular genetic diseases

FISH technique: when to apply it, what allows you to see and what are its limitations.

aCGH molecular karyotype: how to apply it in prenatal diagnosis or in syndromic children, limits.

Techniques for analyzing imprinting diseases, brief summary of imprinting diseases and what they are caused by.

Use of microsatellites and their variability in the genetic field and personal identification.

How can I analyze the expansion of triplets (or microsatellites in general) ?

Molecular Biology:

PCR and its many applications (examples relating to a hemato-oncology laboratory):

- Structure of nucleic acids
- Principles of polymerase chain reaction
- multiple types of PCR for different applications
- applications of PCR in medicine: from diagnostics to molecular monitoring
- mutation analysis
- gene expression analysis
- Quantitative PCR, principles and applications
- Molecular monitoring of minimal residual disease in hemato-oncology
- digital PCR

## **Prerequisites**

Students should know the basic principles of Mendelian genetics, nucleic acid structure and molecular biology

## **Teaching form**

Lectures with theoretical explanations and applications in the context of the biomedical laboratory.  
Visit to a molecular biology laboratory.

## **Textbook and teaching resource**

material made available by the teacher

## **Semester**

first semester

## **Assessment method**

written exam with 10 multiple choice questions and 2 open questions

## **Office hours**

on request via email

# Sustainable Development Goals

GOOD HEALTH AND WELL-BEING

---