



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### The principle of 3R in Biomedical studies

2425-122R-21

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#### Aims

\*The course is aimed at introducing the student to the 3R principles (Replacement, Reduction; Refinement) in the biomedical studies and to provide basic and applied knowledge on the experimental models and instruments to be applied in the experimental research.

*The course is organized thanks to the collaboration of teachers from UNIMIB participating to the Center 3R for the promotion of the 3R principles in the didactics and research.*

#### Contents

*The 3R principles and incorporation into EU and Italian legislation regarding biomedical experimentation; biomedical statistic applied to the reduction of experimental animals; advanced in silico and in vitro methods for reduction and sostitution; in vivo models alternative to the use of mammals. During the course basic methods and models will be presented, as well as details on applied researches*

#### Detailed program

- The 3R: principles, significance, and the legislation regarding animal experimentation.
- From stem cells to organoids: using in vitro stem cell based models to address the challenges of brain research
- In silico approaches for Structure-Based Drug Design

- Vertebrate experimental models alternative to mammals: the use of zebrafish and *Xenopus laevis* in developmental biology and toxicology.
- 3D bioprinted in vitro models
- Confidence interval and hypothesis testing in statistics: interpretation and examples
- In vitro modeling of complex diseases: 2D and 3D cell systems to dissect cancer biology and to improve translational research

-Optical microscopy imaging in vivo as a tool to reduce the use of lab animals

## **Prerequisites**

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## **Teaching form**

Lectures by Webconference

## **Textbook and teaching resource**

*Slides of the presentations and scientific articles will be provided by the teachers*

## **Semester**

Second semester

## **Assessment method**

Oral examination

## **Office hours**

To be fixed by mail

**Sustainable Development Goals**

GOOD HEALTH AND WELL-BEING

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