



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### 3r Principles in Biomedical Studies

2021-2-H4101D351

---

#### 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 substitution; 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 in the legislation regarding the animal experimentation: the European directive 2010/63 and the Italian DL 26/14.*

*Statistical methods applied to the determination of the study dimension in lab experiments: theoretical and practical aspects (free software G-power).*

*Development of QSAR in silico models for the studies on the relationship between structure and molecular properties.*

*In vitro* methods for studying complex diseases, like tumours, basing on engineered cellular models, spheroids, organoids. Examples on the *in vitro* methods available for reducing the number of animal in *in vivo* experimentation applied to tumours genetic.

Vertebrate experimental models alternative to mammals: the use of zebrafish and *Xenopus laevis* in developmental biology and toxicology.

## **Prerequisites**

## **Teaching form**

Classroom

(Note: webconf in case of persistency of COVID-19 emergency)

## **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

---