Novel Challenges in Toxicology

The course is divided into three major topics addressing a balanced combination of lectures on theoretical and practical case-based discussions presented during a dedicated course with limited attendance. The training programme has specific slots allocated to seminars and workshops, including informal discussions with lecturers (tutorial teaching). At the end of the course, the students will have an assessment exercise.

Module 1:

- Toxicology concepts and challenges
- Overview of key concepts, applications, and challenges of toxicology. (1h)
- Mechanisms of target and non-target organ toxicology. (1h)
- Cytochrome P450 enzymes in xenobiotic metabolism and their role in chemical genotoxicity. (1h)
- Redox toxicology. (1h)
- Food and environmental toxicology: from xenobiotics exposure to cancer. (1h)

Module 2:

- Emerging technologies in toxicology
- 3D liver models for drug metabolism and toxicology studies. (1h)
- Development of Zebrafish Models for studying DILI. (1h)
- Generation of functional liver cells from human induced pluripotent stem cells for toxicological applications. (1h)
- Eye-on-chip in vitro platforms for drug development. (1h)
- Omics-technologies applied to exosomes and body fluids for biomarkers identification in toxicology. (th)
- Systems toxicology: Cellular stress responses and prediction of adverse drug responses (1h)

Module 3:

- Impact of Toxicology in the new era
- Occupational exposure and human biomonitoring. (1h)
- New insights on the bioavailability of xenobiotics. (1h)
- Regulatory toxicology. (1h)
- Toxicological issues in advanced therapies. (1h)

- Impact of toxicology in modern society: challenges and opportunities. (1h)

Module 4:

- Student oral presentations of research project assignment.
- Projects presentation and discussion session. (8h)