BIO-478

# Pharmacology and pharmacokinetics

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| Cursus | Sem. | Type |
|---|---|---|
| Bioengineering | MA2, MA4 | Opt. |
| Sciences du vivant | MA2, MA4 | Opt. |

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| Language of teaching | English |
| Credits | 5 |
| Session | Summer |
| Semester | Spring |
| Exam | Written |
| Workload | 150h |
| Weeks | 14 |
| **Hours** | **5 weekly** |
| Courses | 3 weekly |
| Exercises | 2 weekly |
| **Number of positions** | |


## Summary

This course introduces the student to the fudamentals in pharmacology, pharmacokinétics, drug-receptor interactions. Pharmacogenetics and chronopharmacology are presented in a practical contexte in order to examplify the current issues in the domain to develop personalized medicine


## Content

- Introduction to Pharmacology and general topics of pharmacology
- Pharmacodynamics: Drug-target interaction, quantitative description of ligand binding, relationship between ligand binding and functional effect, antagonism; exercises
- Classes of drug targets: functional and structural aspects, strategies of drug targeting; examples
- Pharmacokinetics: principal models and parameters, Drug Absorption, Distribution, Metabolism and Excretion (ADME)
- Chronopharmacology: effect of circadian rhythm on drug action
- Pharmacogenetics: candidate genes for variable drug response.
- Toxicology (e-learning): toxicity mechanisms, risk evaluation, descriptive toxicology
- Online auto-evaluation questionnaires
- Article-based and case-based learning (pharmacokinetics modeling)

## Learning Prerequisites

### Required courses

General human physiology

### Recommended courses

Cellular and molecular physiology
Biochemistry
Maths

### Important concepts to start the course

Bachelor in Life Sciences and Technology or equivalent, i.e. physiology, cell and molecular biology, maths

## Learning Outcomes

By the end of the course, the student must be able to:

- Explain the fundamental concepts in pharmacology and pharmacokinetics
- Detect the different variables that will interfere with drug administration and action
- Design the ideal drug profile of a drug for a given indication acting in a given part of the body (ADME)
- Propose a specific organizational scheme of the different stakeholders participating in the development of a drug (from bench to patient bedside)
- Justify the diferent variables that are important to take into account in order to integrate the concepts in chronopharmacology and pharmacogenetics for the administration of drugs

## Transversal skills

- Set objectives and design an action plan to reach those objectives.
- Demonstrate a capacity for creativity.
- Demonstrate the capacity for critical thinking

## Teaching methods

Ex Cathedra and E-learning

## Assessment methods

Written exam

## Resources

### Bibliography

Handouts and reference publications will be given during the course or placed on the moodle site of the course.
Most of the topics are covered in the following reference textbooks:

- "Rang and Dale's pharmacology " by H.P. Rang et al., Elsevier/Churchill Livingstone, 2011
- "Principles of Pharmacology" by DE Golan et al., Lippincott Williams & Wilkins, 2008.

### Ressources en bibliothèque

- Rang and Dale's pharmacology / Rang
- Principles of Pharmacology / Golan