BIO-478

Pharmacology and pharmacokinetics

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Cursus	Sem.	Type
Biotechnology minor	E	Opt.
Life Sciences Engineering	MA2, MA4	Opt.

Language of teaching	English
Credits	2
Session	Summer
Semester	Spring
Exam	Written
Workload	60h
Weeks	14
Hours	**2 weekly**
Courses	2 weekly
Number of positions	

Summary

This course introduces the student to the fudamentals of pharmacology, pharmacokinetics and drug-receptor interactions. It discusses also pharmacogenetics and chronopharmacology, to exemplify the challenges of personalized medicine.

Content

- Introduction to Pharmacology and general topics of pharmacology
- 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.
- 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
- General topics of pharmacotherapy

Keywords

Pharmacokinetics
Pharmacodynamics
Absorption
Distribution
Drug metabolism
drug elimination
Drug
Pharmacogenetics
Chronopharmacology

Learning Outcomes

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

- Describe mechanisms of Drug Absorption, Distribution, Metabolism and Excretion (ADME)
- Describe principal models and parameters of pharmacokinetics
- Explain the role of genetic polymorphisms in variable drug response
- Describe the effect of circadian rhythms on drug action
- Describe the basic principles of pharmacodynamics

- Compute and represent graphically the concentration dependence of agonist and agonist effects and of ligand binding, and the kinetics of drug action
- Describe the principles of drug action on the main classes of drug targets and illustrate it with examples
- Describe the principles of gene therapy and protein therapeutics and illustrate it with examples

Teaching methods

Ex Cathedra and exercises

Assessment methods

written exam

Resources

Bibliography

Handouts will be 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 James Ritter et al., Elsevier/Churchill Livingstone, 9th edition, 2018
- "Principles of Pharmacology" by DE Golan et al., Lippincott Williams & Wilkins, 4th edition, 2016.
- "Rowland and Tozer's Clinical Pharmacokinetics and Pharmacodynamics: Concepts and Applications" by Hartmut Derendorf, Stephan Schmidt, 5th edition, 2019.

Ressources en bibliothèque

- Rang and Dale's pharmacology " by James Ritter et al., Elsevier/Churchill Livingstone, 9th ed.
- Principles of Pharmacology / DE Golan et al., Lippincott Williams & Wilkins
- Rowland and Tozer's Clinical Pharmacokinetics and Pharmacodynamics: Concepts and Applications / Hartmut Derendorf, Stephan Schmidt

Moodle Link

- https://go.epfl.ch/BIO-478