

BIO-450

Molecular endocrinology: health and environment

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Cursus	Sem.	Type
Life Sciences Engineering	MA2, MA4	Opt.
Minor in life sciences engineering	E	Opt.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	During the semester
Workload	120h
Weeks	14
Hours	4 weekly
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Summary

We will define homeostasis, principles of hormone regulation and the molecular mechanisms underlying hormone action and their pharmacologic exploitation. Human interactions with the environment, pertinent public health issues and their causes and preventative strategies will be analyzed.

Content

Study human physiology and the cellular and molecular basis underlying endocrine control mechanisms. After a basic primer in physiology and the endocrine system, we examine the mechanisms of steroid and peptide hormone action, canonical and rapid actions, the cross talk with other signaling pathways and ways to pharmacologically interfere with them. We will discuss the role of hormones in development and in human diseases such as diabetes, obesity and endocrine-related cancer. Perturbations through endocrine disruption and transgenerational disease predisposition will be examined.

Keywords

endocrine system, endocrine disruptors, genetic and environmental factors in human disease, nuclear hormone receptors, physiology, reproduction, sex differentiation, homeostasis, diabetes, obesity, hormone dependent cancers

Learning Outcomes

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

- Assess / Evaluate
- Contextualise
- Interpret
- Propose
- Plan
- Explore
- Investigate
- Explain

Transversal skills

- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Communicate effectively, being understood, including across different languages and cultures.
- Take responsibility for environmental impacts of her/ his actions and decisions.

- Take account of the social and human dimensions of the engineering profession.
- Demonstrate a capacity for creativity.
- Demonstrate the capacity for critical thinking
- Access and evaluate appropriate sources of information.

Teaching methods

Ex-cathedra lectures, practical session, creative group projects

Expected student activities

Group projects: movie for lay public, analysis and discussion of a public health problem, causes and solutions

Assessment methods

Written exam(s)
group projects
presentation

Resources

Bibliography

suggested reading and websites

Moodle Link

- <https://go.epfl.ch/BIO-450>