BIO-480

Neuroscience: from molecular mechanisms to disease

Gräff Johannes, Lashuel Hilal, Schneider Bernard

Cursus	Sem.	Type
Computational Neurosciences minor	H	Opt.
Life Sciences Engineering	MA1, MA3	Opt.
Minor in life sciences engineering	H	Opt.
Neuro-X minor	H	Opt.
Neuro-X	MA1, MA3	Opt.
Neuroprosthetics minor	H	Opt.
Neuroscience		Opt.

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
Exam	Written
Workload	150h
Weeks	14
Hours	**5 weekly**
Lecture	3 weekly
Exercises	2 weekly
Number of positions	

Summary

The goal of the course is to guide students through the essential aspects of molecular neuroscience and neurodegenerative diseases. The student will gain the ability to dissect the molecular basis of disease in the nervous system in order to begin to understand and identify therapeutic strategies.

Content

- Anatomical and functional organization of the brain
- Unique biology of neurons
- Unique biology of glial cells
- Generation, survival and integration of nerve cells
- Synapse formation, regeneration and plasticity
- Neuropharmacology
- Alzheimer's disease
- Parkinson's disease
- Motor neuron diseases
- Prion diseases
- Polyglutamine expansion diseases
- Protein aggregation in neurodegenerative disease
- Animal models of disease and translational neuroscience
- Neuroepigenetics

Learning Outcomes

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

- Define key concepts in neurodegenerative diseases
- Assess / Evaluate novel therapeutic strategies for neurodegenerative diseases
- Compare the unique properties of neuronal and glial cells
- Hypothesize therapeutic strategies for treating brain diseases
- Describe he function of genes associated with neurodegenerative diseases
- Design experiments to evaluate genetic mutations associated with neurodegenerative diseases

Transversal skills

- Access and evaluate appropriate sources of information.
- Summarize an article or a technical report.

Assessment methods

Written exam. 3 hours duration. Will contain short essay-style questions.

Resources

Bibliography

Purves, Neuroscience. 2012. 5th Ed. Sinauer Associates
Kandel, Principles of Neural Science. 2012. 5th Ed. McGraw Hill
Ressources en bibliothèque

- Principles of Neural Science / Kandel
- Neuroscience / Purves

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- Kandel, Principles of Neural Science. 2012. 6th Ed. McGraw Hill
- Purves, Neuroscience. 2012. 5th Ed. Sinauer Associates

Moodle Link

- https://go.epfl.ch/BIO-480