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 Prerequisites

Required courses
Bachelor level in Life Sciences.

Important concepts to start the course
Understanding of molecular and cellular biology.

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
• Define the clinical, genetic and neuropathological characteristics of distinct neurodegenerative diseases
• Hypothesize therapeutic strategies for treating brain diseases
• Describe the 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.

Teaching methods
Formal lectures and exercises.

Expected student activities
Participate actively in exercises.

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

Resources
Bibliography

Ressources en bibliothèque
• Principles of Neural Science / Kandel
• Neuroscience / Purves