

BIO-480

**Neurosciences I : molecular neuroscience and neurodegeneration**

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<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Computational Neurosciences minor	H	Opt.
Neuroscience		Opt.
Sciences du vivant	MA1, MA3	Opt.

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
Exam	Written
Workload	150h
Weeks	14
<b>Hours</b>	<b>5 weekly</b>
Courses	3 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**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**

- Unique biology of neurons
- Molecular neuropharmacology
- Unique biology of glial cells
- Generation, survival and integration of nerve cells
- Synapse formation, regeneration and plasticity
- Anatomical and functional organization of the brain
- 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.

**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
- Explain the processes of brain development
- 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**

Group exercises.

### **Assessment methods**

Written exam. 3 hours duration. Will contain short essay-style questions. Students will answer 6 questions (approx. 6 x 30 min each) chosen from a list of 12 questions.

### **Resources**

#### **Bibliography**

Purves, Augustine, et al. Neuroscience. 2012. 5th Ed. Sinauer Associates, Inc, Sunderland, MA

#### **Ressources en bibliothèque**

- [Neuroscience / Purves](#)