



DEPARTMENT OF NEUROSCIENCE

C4F5677, The Interplay Between Neuro-Infections and Neurodegenerative Diseases, 3 credits (hec)

Samspelet mellan neuroinfektioner och neurodegenerativa sjukdomar, 3

högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by the The Committee for Doctoral Education on 2023-12-22, and was last revised on 2024-02-08. The revised course syllabus is valid from autumn semester 2024.

Responsible department

Department of neuroscience, Faculty of Medicine

Prerequisite courses, or equivalent

Background in Biomedicine/Biomedical Science/Molecular Medicine

Purpose & Intended learning outcomes

Purpose

Students should gain knowledge on the common neuroinflammatory processes and molecular mechanisms of neuronal damage that are common between neurodegenerative diseases and CNS infections.

This course has the main general purpose of connecting two topics, or disease types, which are generally known by the scientific community to be completely distant from each other, such as Infections of the Central Nervous System (CNS) and neurodegenerative diseases/dementia. Students with a research project focused on CNS infections, neurodegenerative diseases, or neuroinflammation, are particularly encouraged to apply.

Intended learning outcomes

1. Understanding the common molecular processes of neuronal damage between CNS infections and neurodegenerative diseases.
2. Understanding the common neuroinflammatory events between CNS infections and

neurodegenerative diseases.

3. Designing an analysis using national registry databases.

Course content

Overview of state-of-the-art knowledge concerning the molecular mechanisms of neuroinflammation and neuronal cell damage in CNS infections and neurodegenerative diseases.

Forms of teaching and learning

This course is intended to be 90% theoretical with 10% practical part. Experts (KI, non-KI, Swedish and/or international) will be invited, either in person or via Zoom during the course for giving lectures and being moderators/workshop leaders during the course. The theoretical parts will be:

1. Lectures given by experts.
2. Workshops given by experts on the use of national registry database. National Registry Databases are useful tools to assess how many people (in Sweden) with a certain type of neurodegenerative disease have been hospitalized with episodes of brain infections, and vice versa.

The practical part will be for half a day (one half day during the second week):

1. Microscopy analysis of fixed neurons from Parkinson's, Alzheimer's, ALS and brain infection models (fixed human cells, mouse tissue, human brain biopsies). The students can visualize the common features of neuronal damage in neurodegenerative disease and infection pathogenesis.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

Attendance to all the activities of the course, individual assignments and participation to the group assignments are mandatory. Absence from mandatory parts of the course will be compensated by other activities after discussion with the course leaders.

Forms of assessment

Students will submit an individual assignment in which the disease of interest in their own PhD (or postdoc) research project will be analyzed in connection to either one type of CNS infection or one type of neurodegenerative disease.

Course literature

All teaching material will be included on Canvas:

1. Presentations from the experts.
2. Additional references to deepen knowledge on specific topics (references suggested by the experts giving the lectures).
3. Instructions to navigate into national registry databases, with examples of how to define a specific search.

Canvas as "digital teacher". Canvas will also help the students during the quizzes by:

1. Providing the correct answer to the questions answered wrong.
2. Providing references to find on Canvas the content to study to find the correct answer (but not precisely where to find the answer, it will be "task" of the student to re-study the content to find and understand the correct answer).