DEPARTMENT OF CLINICAL NEUROSCIENCE

K8F6089, Nervous System Injury and Repair, 2 credits (hec)

Skada och reparation av nervsystemet, 2 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by The Committee for Doctoral Education on 2025-09-05, and is valid from spring semester 2026.

Responsible department

Department of Clinical Neuroscience, Faculty of Medicine

Prerequisite courses, or equivalent

Basic Neuroscience course or corresponding knowledge. The basic neuroscience course should include neuroanatomy, CNS cell-types and their functions, and some CNS injury/disorders.

Purpose & Intended learning outcomes

Purpose

The purpose of the course is for participants to gain broad knowledge concerning the biological consequences after injuries (e.g. trauma, stroke, surgery) to various parts of the nervous system (CNS/PNS). The course aims to provide an overview of the pathobiology that follows injury, experimental models/methods, treatment strategies, as well as clinical features and biomarkers. Importantly, the course intends for the participants to appreciate various research efforts and opportunities for nervous system repair, as well as providing a translational outlook on these topics. Hence, the participant will learn the fundamental features and topics associated to nervous system injury and repair.

Intended learning outcomes

In the context of nervous system injuries, the student should be able to:

1. Outline the consequences to neural networks and pathobiology, as well as consider

variations across species.

2. Recommend experimental models and methods to study both injury and repair.
3. Justify repair/treatment strategies and diagnostic methods.
4. Identify potential hurdles in translation of various treatment strategies

Course content

The course will cover topics related to the consequences following injury to the nervous system, including the secondary injury, post-injury phases, and potential outcomes. This includes cellular and molecular events such as inflammation, reactive gliosis, CNS scarring (glial/fibrotic scarring), demyelination/remyelination, neuronal network reformation, and more. Moreover, we will cover how these events can be studied and what experimental models/methods are used. We will discuss and give examples of the possibilities for diagnostics and the reparative potential of different treatment strategies. Thus, we will cover and provide up-to-date information regarding both pre-clinical and clinical efforts and applications, including knowledge gaps. Students will participate in group sessions that will facilitate discussion regarding the above topics and there will be assignments focusing on specific aspects of nervous system injury and repair.

Forms of teaching and learning

The course starts with a shorter online part and will be followed by one full week of on-site course days (Karolinska in Solna). The online part can be accessed two weeks in advance and is dedicated to laying the groundwork prior the course week and is a repository for the teaching material. The on-site part of the course runs daytime for one week full-time with a mix of lectures by invited scientists. There will be group sessions and assignments. Towards the end of the week, the participants will prepare and give oral presentations. Active participation that allows interaction between the PhD-students will be promoted.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

In order to achieve the learning outcomes all participants are expected to be present the whole week. The group assignments, the oral presentations by the students, and the subsequent general discussion between all participants are compulsory. Students that are absent from these parts will have to individually submit a written presentation of the subject according to the instructions of the course organizer.

Forms of assessment

The examination is a structured oral presentation, as well as performing as an opponent during the presentation of another student. All students are individually assessed.

Course literature

Recommended scientific articles and hand-outs will be made available in advance of the starting date of the course.

Other information

Replacing K8F5595.