

# Syllabus

for course at advanced level

**Advanced Neurochemistry with Molecular Neurobiology**  
**Avancerad neurokemi med molekylär neurobiologi**

**15.0 Higher Education  
Credits**  
**15.0 ECTS credits**

<b>Course code:</b>	KN8001
<b>Valid from:</b>	Autumn 2007
<b>Date of approval:</b>	2006-09-27
<b>Department</b>	Department of Biochemistry and Biophysics
<b>Subject</b>	Chemistry
<b>Specialisation:</b>	A1F - Second cycle, has second-cycle course/s as entry requirements

## Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University.

## Prerequisites and special admittance requirements

The course Neurochemistry with Molecular Neurobiology (KN7001) 15 ECTS (or a corresponding course) has to be completed to be eligible to participate. Also required is knowledge equivalent to the Swedish upper secondary school course English B.

## Course structure

Examination code	Name	Higher Education Credits
N801	Advanced Neurochemistry with Molecular Neurobiology	15
TEOR	Theory	7.5
LABO	Laboratory exercises	1.5
PROJ	Project work	6

## Course content

- a. The course covers experimental methods for studying transmitter release and its regulation, conversion of second messengers and their interactions, cross-talk among receptors, protein phosphorylation as a response to receptor activity, the activity and regulation of ion channels, Methods for studying chemical neuroanatomy and ion channels are also presented. Molecular genetics aspects of the cells of the nervous system and the basics of neurotoxicology are introduced
- b. The course includes the following elements:
  - 1.Theory 7.5 higher education credits.
  - 2.Laboratory exercises 1.5 higher education credits.
  - 3.Project work 6 higher education credits.

## Learning outcomes

It is expected that the student after taking the course will be able to:

- Demonstrate enhanced insights into the cellular and molecular mechanisms underlying the function of the nervous system.
- Demonstrate understanding of the interplay between neuron and glia cells (microglia and astrocytes), focusing on neurobiological changes in neurodegenerative diseases, e.g. Alzheimer's disease and prion diseases.

- Demonstrate understanding of basic neuroimmunology concepts, focusing on cytokine signalling, autoimmune disorders of the nervous system, myasthenia gravis and multiple sclerosis.
- Demonstrate basic understanding of nerve cell differentiation, growth factors and their receptor mechanisms, and the molecular and cellular architecture of the blood–brain barrier.
- Give an account of the mechanisms underlying neurodegeneration and neuroregeneration in the central and peripheral nervous systems.

### **Education**

The education consists of lectures, group work, seminars, reports and laboratory exercises.

Participation in the practical laboratory work, seminar reporting and group education associated with this is compulsory.

After consultation with the relevant teacher, an examiner may rule that a student is not obliged to participate in certain compulsory education, if there are special grounds for this

### **Forms of examination**

a. Measurement of knowledge takes place through:

- Written and/or oral examination
- Written and/or oral reporting of project work.

b. Grading is carried out according to a 7-point scale related to learning objectives:

A = Excellent

B = Very Good

C = Good

D = Satisfactory,

E = Sufficient

Fx = Fail

F = Fail

c. Grading criteria for the course will be distributed at the start of the course.

d. A minimum grade of E is required to pass the course, together with: a "Sufficient" grade for laboratory exercise reports, and participation in other compulsory education.

e. Students who fail to achieve a pass grade in an ordinary examination have the right to take at least further four examinations, as long as the course is given. The term "examination" here is used to denote also other compulsory elements of the course. Students who have achieved a pass grade on an examination may not retake this examination in order to attempt to achieve a higher grade. Students who have failed to reach a pass grade on two occasions have the right to request that a different teacher be appointed to set the grade of the course. A request for such appointment must be sent to the departmental board.

### **Interim**

Students may request that the examination is carried out in accordance with this syllabus even after it has ceased to apply. This right is limited, however, to a maximum of three occasions during a two-year-period after the end of giving the course. A request for such examination must be sent to the departmental board.

### **Limitations**

The course may not be included in a degree together with KE4810 (Neurochemistry), KE4820 (Neurochemistry with Molecular Neurobiology) or equivalents.

### **Misc**

The course is a component of the Master's programme in Neurochemistry with Molecular Neurobiology and the Master's programme in Medicinal Chemistry, and it can also be taken as an individual course.

The course may be taught in English.

### **Required reading**

Course literature is decided by the departmental board and is described in an appendix to the syllabus.