



## INSTITUTE OF NEUROSCIENCE AND PHYSIOLOGY

### **KRF820 Quantitative Receptor Pharmacology, 7.5 credits**

Kvantitativ receptorfarmakologi, 7,5 högskolepoäng

*Second Cycle*

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#### **Confirmation**

This course syllabus was confirmed by Committee for Study Programmes in Pharmacy on 2010-02-15 and was last revised on 2020-11-13 by Institute of Neuroscience and Physiology to be valid from 2020-11-13, spring semester of 2021.

*Field of education:* Pharmacy 100%

*Department:* Institute of Neuroscience and Physiology

#### **Position in the educational system**

The course is included in the 300 credits of the pharmacy programme at second cycle level and is an elective course. The course is given also as a freestanding course and as contract education.

The course can be part of the following programmes: 1) Programme in Pharmacy (F2APO), 2) Programme in Pharmacy (MAPTY) and 3) Programme in Pharmacy (MAPOY)

#### **Entry requirements**

For admission to the course is required,

apart from general entry requirements for higher education and the specific entry requirements to the pharmacy programme, also that all courses up to and including the sixth semester have been completed. The course can also be offered to students on the Bachelor of Science in Pharmacy Programme having completed courses IBM220 and IBM 230 with approved result. When the course is offered as a freestanding course, 180 credits in courses or programmes in medicine, biomedicine, pharmaceuticals, biotechnology, odontology or chemistry is required.

**Learning outcomes**

Upon completion of the course the student will be able to:

*Knowledge and understanding*

- Be able to/understand receptor mechanisms that influence the clinical effect of drugs
- Be able to/understand methodological aspects of pharmacodynamic models used during drug development
- Be able to/understand and apply pharmacodynamic principles of optimal design/planning of functional studies
- Be able to/understand advantages and disadvantages with different experimental models used to examine substance-receptor interactions
- Be able to/understand the information from ligand binding studies and functional in vitro and in vivo experiments

*Skills and abilities*

- Design and analyse quantitative dose/concentration-response curves
- Apply pharmacological methods in experimental/laboratory studies
- Master data modeling
- Master quantitative evaluation of ligand binding data and functional data from in vitro and in vivo experiments
- Interpret and understand the importance of data from different pharmacological models

*Judgement and approach*

- Discover and evaluate the receptor concept in drug treatment
- Characterize and compare pharmacodynamic receptor mechanisms in relation to ligand-receptor interaction
- Critically evaluate pharmacodynamic phases regarding drug effects

**Course content**

The course is based on, and deepens, earlier courses in above all pharmacology and disease theory, physiology, statistics and pharmacokinetics. The purpose of this course is to provide advanced knowledge in experimental and theoretical receptor pharmacology regarding pharmacodynamics and the action mechanism of

pharmacological substances, with a focus on the signal paths of the nervous systems.

The course covers pharmacological principles, quantitative methods and laboratory technologies. Within these fields, structural and functional receptor families, receptor specificity and selectivity, affinity and efficacy will be discussed. The receptor dynamics and the quantitative pharmacology include design and analysis of dose/concentration curves. Practical application of methods and technologies will be highlighted in certain neuropharmacological fields. The course also contains theoretical and practical components regarding non-linear regression and methods for optimization.

The course constitutes 7.5 credits, of which the exam constitutes 5 credits and participation in group assignment with oral presentation 2.5 credits.

### **Form of teaching**

Written examination and oral presentation of advanced assignments. Compulsory components with requirements of attendance are start of the course, group meetings as well as seminar and laboratory sessions. The number of examination sessions is limited to five. Possibility to supplement failed compulsory parts can be given, at the earliest, at the next course date and only in case of a vacancy.

The student has the right to change examiner after having failed twice on the same examination, if it is practically possible. The application shall be sent to the board of the department and has to be in writing. In case the course has ceased or gone through larger changes the student should be guaranteed access to at least three examination sessions (including the regular examination session) during a time of at least a year with starting point of the earlier planning of the course.

*Language of instruction:* English and Swedish

### **Assessment**

A student has the right to request a change of examiner if they have previously failed the same examination twice, if this is practically possible. The application shall be sent to the board of the department and has to be in writing.

### **Grades**

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U). To receive grade from the course, all compulsory components must have been completed such as laboratory sessions and presentations. For the theoretical part of the course, Pass with distinction, Pass and Fail are given, while Fail and Pass only are given

for laboratory sessions and other compulsory parts.

**Course evaluation**

A course evaluation meeting with students and course administration is held when the course is completed. At the end of the course an electronic course evaluation is performed, the result of which, after compilation, is presented to the students.

**Additional information**

The course is partly problem-based but the teaching take place also in the form of lectures, group work as well as seminars. The course contains laboratory session's and computer based components, individual components that include and analysis in computational environment. The teaching material is to a large extent in English. The course is given in Swedish or English.

**Selection process**

When more applicants than available admissions, the selection among the applicants is carried out on the basis of the following criteria:

- 1) Student at the pharmacy programme at the Sahlgrenska academy
- 2) Student at the Bachelor of Science in Pharmacy Programme at University of Gothenburg
- 3) PhD in pharmacology/pharmaceutics
- 4) Documented knowledge (course etc) in pharmacology/pharmaceutics/mathematics. Selection is based on: course length (also for courses included in study programme).
- 5) Degree of Bachelor (or equivalent) that contains courses in pharmacology/pharmaceutics/biotechnology
- 6) The number of publications in scientific journals in a relevant subject area

7) If applicants can not be separated as above-mentioned criteria, selection takes place through randomization