



DEPARTMENT OF CLINICAL NEUROSCIENCE

K8F6035, Basic Immunology, 3 credits (hec)

Grundläggande Immunologi, 3 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by the The Committee for Doctoral Education on 2024-09-10, and is valid from spring semester 2025.

Responsible department

Department of Clinical Neuroscience, Faculty of Medicine

Contributing department/s

Department of Medicine, Solna

Prerequisite courses, or equivalent

While no prior knowledge in immunology is required, basic immunological concepts will be discussed in depth and detail. Basic understanding of cell and molecular biology is therefore necessary (as an example - you should roughly remember what 'translation', 'G1 phase', 'splicing', or 'endocytosis' all are off the top of your head (molecular details not necessary)).

Purpose & Intended learning outcomes

Purpose

The course aims to provide a broad introduction to immunology which is both suitable for students who are new to the field or current staff who wish to broaden their immunological knowledge. The course also provides an important networking opportunity within the immunology faculty at Karolinska Institutet.

At the end of the course the student is expected to be able to:

Knowledge and understanding

- describe basic principles of innate and adaptive immunity and how different components of the immune system cooperate
- describe how altered functions of the immune system components can lead to a variety of diseases

Competence and skills

- explain the importance of selected high-end research papers and a selection of experimental technologies for advancing the field of immunology
- create an experimental plan to address an outstanding question in the field of immunology

Judgement and approach

- reflect on how your newly gained knowledge of the immune system may influence your current work, or how it inspired you to address new questions

Course content

- Part 1: Fundamental Immunological Mechanisms

- Part 2: Applied Immunology

This is a full-time course which consists of two parts. In part 1 we discuss basic immunological concepts underlying innate and adaptive immune responses. In part 2 we revisit and discuss these concepts in the context of disease. More specifically, in part 1 we will discuss development and function of key cell types mediating immune responses, pathogen recognition by cells of the innate immune system, generation of antigen receptor repertoires, principles of self/non-self discrimination and immunological tolerance, and mechanisms of humoral and cellular immune responses. In part 2 this knowledge will be applied to more clinical contexts such as defense against infections, autoimmune diseases, allergic diseases, tumours, or transplantation.

Forms of teaching and learning

- Part 1 (Fundamental Immunological Mechanisms)

- Part 2 (Applied Immunology)

Part 1 (fundamental immunological mechanisms) will take four full days and one half-day. The second part will follow after a teaching-free period of several weeks and will take 3 full days. The purpose of dividing the course into two parts is that the participants should have time to thoroughly study the literature from part 1 (fundamental immunological mechanisms) before learning more applied immunology in part 2 (applied immunology). Considering the substantial literature requirement plus work on the assignments, we estimate that an extra 2.5 days of self-studying is needed during the teaching-free period.

Lectures: The majority of the course consists of lectures by KI faculty, specialized in the particular topic they lecture on.

International speaker + related preparatory assignment: Towards the end of each course part, we aim to have a seminar by a very renowned international speaker. The purpose of these seminars

is to 1) give the course participants the opportunity to get inspired by cutting-edge research at international top level, to 2) deepen the students' knowledge in two different areas of immunology, and to 3) provide examples of different experimental approaches and how their application may lead to answering outstanding questions in immunology. The speakers have been asked to start with a more general introduction of their field of research, and then present some of the past and ongoing work in their lab. To facilitate the students' understanding of these seminars, we will prepare for the seminars with an assignment, which will be discussed just prior to the international seminar. The seminars themselves are open for the whole KI/KS immunology community.

Assignments: In addition to the assignment related to the international speaker, the course will include individual and group assignments requiring additional work during teaching-free period, has small individual assignments and an extensive group assignment – the latter spanning the teaching-free period.

Daily round-up: We will conclude most days with a group discussion session during which the students have the possibility to ask questions regarding the topics of the day.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components:

Lecture attendance and submission of all course assignments is compulsory. A single missed day of the course can be tolerated, but the student will be asked to work on an additional individual assignment based on the topic(s) of this day.

Forms of assessment:

In order to pass the course, the students are required to:

- 1) attend at least 95% of all scheduled activities,
- 2) actively participate in lectures and group activities, and
- 3) submit all assignments at a sufficient quality level.

Course literature

Mandatory reading

Selected research papers based on previous research from KiSS speakers will be provided through Canvas. These will be selected by teachers and provided to students before beginning the group assignments.

Recommended reading

Basic Immunology: Functions and Disorders of the Immune System, 7th edition (by Abul

Abbas, Andrew Lichtman and Shiv Pillai). We recommend that students read book chapters which correspond to lectures given and topics covered during the Basic Immunology course.