DEPARTMENT OF MEDICINE, HUDDINGE

H7F5739, Antigen Presentation and T-Cell Activation, 1.5 credits (hec)

Antigenpresentation och T-cellsaktivering , 1,5 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by the The Committee for Doctoral Education on 2024-09-16, and is valid from spring semester 2025.

Responsible department

Department of Medicine, Huddinge, Faculty of Medicine

Prerequisite courses, or equivalent

Students should have previously attended a Basic immunology course (or equivalent), or otherwise have attained the same level of previous knowledge.

Purpose & Intended learning outcomes

Purpose

The purpose of the course is for the students to get an overview of antigen presentation and T cell activation in different settings (e.g. infection, cancer).

During the course, students with previous basic immunology knowledge will be able to further deepen their understanding of various and important aspects of lymphocytes biology.

Intended learning outcomes

- To be able to describe and compare different types of antigen capture and processing, antigen presentation pathways, e.g. MHC class I & II, MR1 and CD1 system, peptide/lipid/glycolipid presentation, as well as the main T cell subsets and invariant lymphocytes (i.e MAIT, gd T cells).
- To be able to identify gaps of knowledge about T lymphocyte activation, differentiation, and antigen-presentation.
- To be able to formulate a research question (including experimental plan) related to lymphocyte activation in steady state, disease, or cell therapy.

Course content

The following topics will be addressed:
Thorough walk-through of the antigen presentation pathways, both MHC class I and II, upstream and downstream of TCR activation.
The course will cover antigen presentation and T cell activation into different clinical contexts (such as infection, autoimmunity) and with an emphasis in the context of cancer.

The CD1 system, presentation of lipids, glycolipids, MR1 presentation, MAIT cell activation , the effector and regulatory functions of gd T cells and subsets as well their role will will be discussed.
Manipulation of T cell activation for instance by checkpoint inhibitors, T cell exhaustion, the impact of tumor micro-environment, and practical applications such as immunotherapy, will also be covered.

Forms of teaching and learning

The course will be based on lectures, as well as time for questions and discussions.
In addition, work (in small groups) will enable the students to gain deeper knowledge in a specific area of interest.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

All lectures and group sessions are considered mandatory.

Missed events should be compensated for with a written report on the subject in accordance with the indications of the course organizers.

Forms of assessment

The assessment will be done in the form of a group presentation.

Course literature

Recommended course literature:

- T cell antigen receptor recognition of antigen-presenting molecules. Annu Rev Immunol. 2015;33:169-200. Rossjohn et al.

- The burgeoning family of unconventional T cells. Nat Immunol. 2015; 16(11):1114-23. Godfrey DI et al.

- Early T cell activation: integrating biochemical, structural, and biophysical cues. Annu Rev Immunol. 2015;33:539-61.Malissen B.

- Obstacles Posed by the Tumor Microenvironment to T cell Activity: A Case for Synergistic Therapies. Cancer Cell. 2017;31(3):311-325. Anderson KG et al.

- Peeking Into the Black Box of T Cell Receptor Signaling. Annu Rev Immunol. 2024 Jun;42(1):1-20. Weiss A.