

# Introduction to Diabetes Research

## Background

This course is instituted as a direct consequence of the formation of the Uppsala Diabetes Center (UDC). This interdisciplinary center gathers scientist from different research fields and faculties with a common interest in diabetes and diabetes-related complications. The main aim of the course is to bring PhD student with a broad interest in diabetes together to enable exchange of ideas and to function as a foundation on which to build scientific collaborations, but also to give the PhD students a concise introduction to current diabetes research and research methodology. The course will thus function as an introduction to diabetes research and is primarily aimed at first-year PhD students. The course is suitable for PhD students enrolled via UDC, but also for other PhD students within an interest in diabetes. Uppsala University is a world-leading institution for both preclinical and clinical diabetes research, with many PhD students starting diabetes-related research projects each year. We therefore believe that there is a need for an introductory course in diabetes research, and for that reason we request funding from "kommittén för utbildning på forskarnivå" and UDC for the proposed course "Introduction to diabetes research".

## Description

This course aims to give an introduction to important topics related to diabetes. The course curriculum includes lectures on different aspects of diabetes, including common causes of diabetes, physiological and metabolic changes associated with diabetes, strategies to prevent and treat diabetes and the societal impact of the disease. These theoretical parts are also mixed with group work where participants will discuss some of these topics, put them in context and orally present conclusions. The course is suitable for doctoral students affiliated with Uppsala Diabetes Center (UDC) or the research tracks "Metabolism", "Inflammation" and "Cardiovascular", but also open to other applicants.

## Credits

2 hp (40 course hours + preparation of posters for presentation + presentation of case work)

## Learning outcomes

After completion of the course, the participants are expected to:

- Account for the diabetes situation globally and to discuss differences and similarities in preventive methods in different contexts.

- Explain the basic biology, pathology and treatment of different types of diabetes.
- Describe and critically discuss the social, economic and environmental challenges we face regarding diabetes.

## Content

The course curriculum is organized around the four focus areas of the Uppsala Diabetes Center.

### Islet physiology and regeneration

- History of diabetes and its classification and pathogenesis
- Structure and function of the pancreatic islets of Langerhans
- Islet regeneration and replacement strategies

### Metabolism and complications

- Metabolic changes in type-2 diabetes
- Obesity and treatment of obesity
- Cardiovascular and renal complications in diabetes
- Current and novel treatments for type-1 and type-2 diabetes

### Immunology, infections and host-microbe interactions

- The immune system and diabetes
- Gut microbiota and diabetes
- Diabetes in animals

### The individual, society and diabetes

- The global diabetes situation
- The patient perspective
- Swedish National Diabetes Register (NDR) and other national health and quality registers
- Differences and similarities in preventive methods in different contexts
- Social, economic, environmental and societal challenges of diabetes

## Planned dates

September 12-16+21, 2022 and **September 11-15, 2023**

## Preliminary schedule

	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
08:30-09:00	<b>Course start, introduction to UDC, presentations</b> Olof Idevall, Meena Daivadanam				<b>Visit to the diabetes clinic</b>
9:00-09:45	<b>What is diabetes? Historical aspects</b>	<b>Metabolic changes in type-2 diabetes</b> Ulf Risérus	<b>Current and novel treatments for type-1 and type-2 diabetes (Interactive lecture)</b> Beatrice Kennedy	<b>Swedish National Diabetes Register (NDR) and other national health and quality registers</b> Katarina Eeg-Olofsson	
09:45-10:30	<b>What is diabetes? Classification and pathogenesis</b>	<b>Obesity and treatment of obesity</b> Jan Eriksson	<b>Islet regeneration and replacement strategies</b>	<b>Differences and similarities in preventive methods in different contexts</b> Meena Daivadanam	<b>Diabetes in animals</b> Emma Strage
10:30-11:00	<b>C</b>	<b>O</b>	<b>F</b>	<b>F</b>	<b>E</b>
11:00-11:45	<b>The global diabetes situation</b> Shafqat Ahmad	<b>Cardiovascular and renal complications in diabetes</b>	<b>Islet regeneration and replacement strategies</b> Joey Lau Börjesson	<b>Differences and similarities in preventive methods in different contexts</b> Meena Daivadanam	<b>Diabetes in animals</b> Sanna Truelsen Lindåse
11:45-12:00	<b>Group discussion</b>	<b>Group discussion</b>	<b>Group discussion</b>	<b>Group discussion</b>	<b>Group discussion</b>
12:00-13:00	<b>L</b>	<b>U</b>	<b>N</b>	<b>C</b>	<b>H</b>
13:00-13:45	<b>Structure and function of the pancreatic islets</b> Anders Tengholm	<b>The immune system and diabetes</b> Gustaf Christofersson	<b>The patient perspective</b> (Diabetesföreningen)	<b>Social, economic, environmental and societal challenges of diabetes</b> Taeda Tomic	<b>Presentation of case work</b>
13:45-14:30	<b>Structure and function of the pancreatic islets</b> Anders Tengholm	<b>Gut microbiota and diabetes</b>	<b>Poster presentations</b> Olof Idevall, Meena Daivadanam	<b>Poster presentations</b> Olof Idevall, Meena Daivadanam	<b>Presentation of case work</b>
14:30-15:00	<b>C</b>	<b>O</b>	<b>F</b>	<b>F</b>	<b>E</b>
15:00-16:00	<b>Introduction to case work and mini-symposium</b> Olof Idevall, Meena Daivadanam	<b>Poster presentations</b> Olof Idevall, Meena Daivadanam	<b>Case work/group discussions</b>	<b>Case work/group discussions</b>	<b>Course summary and evaluation</b> Olof Idevall, Meena Daivadanam
16:15-17:00	<b>Case work/group discussions</b>	<b>Case work/group discussions</b>	<b>Case work/group discussions</b>	<b>Case work/group discussions</b>	
18:30-20:30				<b>Dinner with speakers</b>	

## **Teaching**

Compulsory lectures, case work, presentations and group work.

## **Examination**

Attendance at compulsory lectures and active participation in seminars, case- and group work are required to pass the course. Up to two missed compulsory activities can be compensated for by written reports. More extensive absence will have to be complemented by attendance at a later course.

## **Selection procedure**

In case the number of applications exceeds the maximum number of course participants (set to 22), priority will be given in the following order: UDC-affiliated doctoral students, other doctoral students from Uppsala University, doctoral students from other Universities.

## **Literature**

Relevant literature in the form of original and review articles will be provided before the start of the course.

## **Course leaders/Examinators**

Olof Idevall, Department of Medical Cell Biology ([olof.idevall@mcb.uu.se](mailto:olof.idevall@mcb.uu.se)) and Meena Daivadanam, Department of Women's and Children's Health ([meena.daivadanam@kbh.uu.se](mailto:meena.daivadanam@kbh.uu.se))

## **Teachers**

Olof Idevall, Sebastian Barg, Kailash Singh, Ulf Risérus, Jan Eriksson, Maria Eriksson Svensson, Joel Kullberg, Marcel den Hoed, Emma Strage (SLU), Sanna Truelsen Lindåse (SLU), Joey Lau Börjesson, Gustaf Christofersson, Shafqat Ahmad, Katarina Eeg-Olofsson, Meena Daivadanam, Taeda Tomic, Beatrice Kennedy.