

Developmental origins of disease: Effects of early-life chemical exposure on the reproductive, metabolic, and neuronal systems

Target audience: PhD students, others that are interested. Acceptance of researchers, postdoctoral fellows and master students finalizing their thesis work is subject to availability.

Time: First time June 13-17, 2022. Then every second year.

Place: IOB at EBC

Course codes: To be announced.

Number of credits: 2.0

Evaluation: passed or failed

Prerequisites: PhD and licentiate students in biology, medicine, veterinary medicine, food science, nutrition, nursing, or related subjects, or in a specialist training program (e.g. resident) or equivalent within the same subjects are accepted.

Objective:

The aim of the course is to provide holistic understanding and broad knowledge of developmental toxicity in vertebrates, focusing on reproduction, neuronal functions, and metabolism. The overall goal is to help build a base for collaboration among different research areas.

After completion of the course, the PhD-student should be able to:

Knowledge and understanding

- Explain the Barker hypothesis and the principle of developmental programming
- Explain why early life stages are particularly susceptible to chemical impact
- Describe molecular pathways important for development of the reproductive organs, brain, and metabolic functions
- Describe mode of actions of some well-studied toxicants that impact the development of reproductive, neuronal, and metabolic systems

Skills and capacities

- To be able to actively participate in planning an oral presentation, addressing the effects of specific chemicals on developmental toxicity of multiple physiological systems in vertebrates using *in vitro* and *in vivo* models

Evaluative capacity and approach

- Ability to choose appropriate research methodologies and species for specific chemicals within developmental toxicity of the reproductive, neuronal, and metabolic systems
- Critically evaluate and analyze other PhD-students presentations.

Examination:

In the beginning of the course, the participants will be divided into groups. They will be encouraged to collect information about different types of environmental pollutants considering developmental effects on the reproductive, neuronal and metabolic systems, and underlying mechanisms. Towards the end of the week each group will be given one type of developmental toxicant to focus on. They will meet to discuss and prepare a presentation of how their type of chemical can induce developmental effects on the embryo/fetus and the reproductive, neuronal and metabolic systems. The presentation should evaluate risks for developmental toxicity in the three health domains and consider variation in sensitivity among different animal taxa. Roughly 5-10 hours are scheduled for this work. After lunch on the last day, each group will present their ideas around their pollutants and lead a discussion involving other course participants. Successful completion of the course also requires active participation and 80 % attendance.

Content:

The course will include lectures, student presentations and group discussions. The subjects covered will be: development of the embryo/fetus and the reproductive, neuronal and metabolic systems and disruption of these processes by various anthropogenic pollutants. There will also be lectures dealing with developmental disrupters and the basis for regulation of this kind of chemicals.

The course gives 2.0 ECTS. In addition to attending the 5-day full time course, the participants should in advance prepare a presentation of their own project and present it during the week. They will also use five lecture hours during the week to discuss and prepare for the examination, which is given after lunch the last day.

Location

In 2022, Evolutionary Biology Centre, Uppsala University (detailed schedule will be announced).

Course leaders

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Course administration

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Costs: There is no course fee. The participants will cover their own travel and living costs.