Syllabus: Comparative reproductive biotechnologies

Syllabus approved: 2019-10-01

Number of credits: 2.0 ETCS

Subject: Biology

Part of research school: Graduate School for veterinary medicine and animal sciences

Education cycle: Third

Marking scale: Passed / Failed

Entry requirements:

Prerequisites: Persons admitted to, or have completed, a postgraduate program in animal science, reproduction, biology, medicine, veterinary medicine, food science, nutrition, or related subjects, or to a specialist training program (e.g. resident) or equivalent within the same subjects. A basic understanding of reproductive biology is needed.

Objective:

The aim of the course is to expand the participants' knowledge and understanding of reproductive biotechnologies in vertebrate animals and humans. Comparative aspects of reproductive biotechnologies in humans and animals will be covered.

Learning outcomes:

After completing the course the student shall be able to:

1) Explain how to manipulate basic reproductive endocrinology

2) Describe the different reproductive biotechnologies (*e.g.*)

- Artificial insemination
- Embryo production *in vitro* and *in vivo* and embryo transfer
- Preservation, cryopreservation and vitrification
- Cloning and gene targeting
- Intracytoplasmic sperm injection and other gamete manipulations

3) Explain the principles of cryobiology

4) Discuss potential epigenetic effects of reproductive biotechnologies

5) Discuss species differences and similarities in reproductive biotechnologies

6) Discuss aspects of security and biosecurity in relation to reproductive biotechnologies

7) Discuss aspects of reproductive biotechnologies in relation to the student´s own work

8) Discuss ethical aspects of the use of reproductive biotechnologies

Content: The contents will include the following topics (including comparative aspects):

Overview on gamete production and collection, male and female

Update on how to prepare females for assisted reproductive technologies (ART)

Gamete quality and factors affecting gamete quality

Sperm selection methods to improve sperm quality

Embryo production *in vivo* and *in vitro*

Transgenesis, cisgenesis, gene targeting and potential epigenetic effects

Reproductive strategies in wild populations and conservation breeding

Ethics and animal welfare

Pedagogical form: The course will include lectures, group discussions and practical sessions. A preliminary schedule is attached.

Literature: Handouts and scientific articles

Examination: Successful completion requires 80 % attendance, completion of pre-course assignments, presentation of own reproductive biotechnology project for the participants during the course, active participation in group discussions, during lectures and practical sessions.

Additional information:

The course will be given in collaboration with the Centre for Reproductive Biology in Uppsala, the Cell for Life Platform and the Developmental Biology Platform SLU.

There will be a pre-course assignment consisting of reading the scientific articles and preparing an oral presentation for the other students at the start of the course summarizing how reproductive biotechnologies relates to their own project. A written summary of how their own work relates to reproductive biotechnologies must be sent in before the course starts.

Target audience: PhD students and residents. Others that are interested are also welcome.

Time: One week 2020 (preliminary schedule is attached for timetable)

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

Application: Via GS-VMAS.

For further information, contact course organizers: Ylva.Sjunnesson@slu.se (course leader); Jane.Morrell@slu.se; Eva.Axner@slu.se; Stefan.Orn@slu.se; Gunnar.Carlsson@slu.se

Responsible department: Department of Clinical Sciences/Centre for Reproductive Biology in Uppsala (CRU)/Cells for Life Platform/ Developmental Biology Platform.

Location: VHC, Ultuna, Uppsala