

Summary of course in Comparative Reproductive Biotechnologies 2024

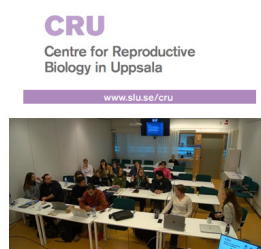
This course was organized with contributions from CRU, GS-VMAS and the SLU platforms Developmental biology and Cells for Life. The course was held at SLU, campus Ultuna and UU, Humanities theatre and 20 participants were admitted to take the course. Of these 18 participants followed and passed the course. Course participants were actively networking and found future colleagues and collaborators within the field of reproductive biotechnologies among both speakers and participants. The course had over 20 speakers and practical session organizers: we are most grateful for the fantastic work everybody put into the course. One day of the course was included in the CRU annual networking day with three longer lectures followed by eight short presentations on various research subjects connected to reproductive biology. Course evaluations were very positive and we hope to be able to give a new version of the course in a few years' time. Please see the schedule and syllabus below.



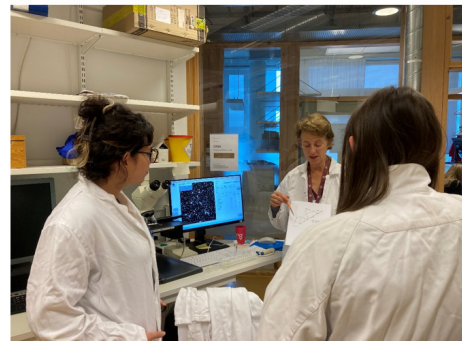
Course participants and some of the lecturers in the VHC building



Practical sessions in the VHC building: AI demonstrations with organs and CASA demonstrations



Discussions in Tannggrisner 1



Final Schedule

Monday October 14

9:00 – 9:30 Coffee and registration. Ulls väg 26, outside the reception and Room Tanngrisner 1 5th floor.

9:30 Introduction and practical information (Ylva Sjunnesson, Swedish University of Agricultural Sciences (SLU), Sweden).

9:35 – 10:15 Sperm production, sperm collection and quality evaluation in animals (Jane Morrell, SLU, Sweden)

10:25 – 10:55 Artificial insemination in animals and basic cryobiology (Jane Morrell/Eva Axné, SLU, Sweden)

11:05 – 11:45 Female cyclicity, fertilisation and early embryo development in animals (Renée Båge, SLU, Sweden)

11:45 Lunch

12:45 – 13:30 Human cyclicity, fertilisation and early embryo development (Matts Olovsson, Uppsala University (UU), Sweden)

13:35 – 14:05 Endocrine manipulation in animals (Eva Axné/Renée Båge)

14:15 – 14:45 Participants own presentations session 1 (Ylva Sjunnesson)

14:45 – 15:05 Coffee break

15:05 – 15:50 Culture and cryopreservation of human ovarian tissue (Pauliina Damdimopoulou, Karolinska Institutet (KI), Sweden)

16:00 – 16:45 Endocrine manipulation in humans (Sarah Nordqvist, Carl von Linné Clinic, Sweden)

17:30 Course Get Together for those who have the possibility (at own expense), O'Neills pub, Dragarbrunnsgatan 53, Uppsala.

Tuesday October 15

9:00 – 9:45 Preimplantation genetic testing (PGT) in humans (Erik Iwarsson, KI, Sweden)

9:45 – 10:00 Coffee break

10:00 - 10:30 Human embryo production *in vivo/in vitro* including OPU, ICSI, IVF, Cryopreservation, ET and AI (Stefano Canosa, IVIRMA Global Research Alliance LIVET, University of Turin, Italy)

10:30 – 10:40 Break

10:40 – 11:15 Cont. Human embryo production *in vivo/in vitro* including OPU, ICSI, IVF, Cryopreservation, ET and AI (Stefano Canosa)

11:15 – 11:45 Group discussions

11:45 Lunch

12:45 Participants own presentations session 2 (Ylva Sjunnesson)

13:15 Break

13:20 – 17:00 (including breaks) Animal embryo production *in vivo/in vitro* including OPU, ICSI, IVF, Cryopreservation, ET and AI (Katrien Smits, Ghent University, Belgium)

Wednesday: October 16

Practical session 1 8:00 – 11:00 Study visit at one of the local human IVF-clinics: Carl von Linne clinic/Uppsala University Hospital (in smaller groups, see separate schedule) and aspiration and oocyte handling before IVF (porcine).

12:00 Lunch

13:00 – 13:30 Group discussions

13:30 – 13:40 Break

13:40 – 14:10 Selection and evaluation of human sperm and testicular biopsies (Göran Westlander, Livio Fertility Center Göteborg, Sweden.)

14:10 Coffee break

14:30 - 15:15 Cont. Selection and evaluation of human sperm and testicular biopsies (Göran Westlander)

15:15 Break

15:25 – 16:00 Selection of sperm in animals (Jane Morrell)

16:10 – 17:00 Participants own presentations session 3 (Ylva Sjunnesson)

Thursday (including CRU networking day, Humanistiska teatern) October 17

9:00 – 9:15 Welcome and introduction (Ulf Magnusson, SLU, Sweden)

9:15 – 10:00 Transgenesis and cloning (William Ritchie, Roslin Embryology, UK)

10:00 – 10:30 Coffee break and poster session

10:30 – 11:10 How assisted reproduction techniques can contribute to conservation breeding programs of endangered species. (Pierre Comizzoli, Smithsonian Institution, USA)

11:10 – 11:20 Break

11:20 – 12:00 Cont. How assisted reproduction techniques can contribute to conservation breeding programs of endangered species. (Pierre Comizzoli)

12:00 – 12:30 Group discussions

12:00 Lunch and Poster break

13:00 – 13:45 Epigenetic effects of reproductive biotechnologies (Carlos Guerrero Bosagna, UU, Sweden)

13:45 – 16:45 Speakers from CRU and coffee break. This part was not mandatory for course participants but they were welcome to attend.

1. Bodil Ström Holst, SLU. Endocrine and inflammatory changes during canine pregnancy
 2. Thomas Brodin, UU. Human IVF - decades of improvements
 3. Ida Hallberg, SLU. From Follicles to Embryos: The Influence of Chemicals on Reproductive Health
 4. Monica Lind, UU. Effects of Low-dose developmental exposure to bisphenol A
 5. Joëlle Rüegg, UU. Epigenetic effects of endocrine disrupting chemicals: from mechanistic insights to human biomarkers
 6. Amir Fallahshahroudi, UU. Generating gene-modified birds: Agricultural, medical, and research uses
 7. Alkistis Skalkidou, UU. Biological correlates of perinatal depression
 8. Göran Andersson, SLU. Epigenomic studies of bovine endometritis
- 17:15 CRU networking dinner in Heart and Bones. Course participants are welcome to attend.
Around 20:30 – continuation of networking in a pub (at own expense)

Friday October 18

- 9:00 – 9:45 Zebrafish animal model in research; insights into breeding and reproductive research (Karin Pernold KI, Sweden)
- 9:45 – 10:00 Coffee break
- 10:00 – 10:45 Basic bird reproduction and reproductive biotechnologies in birds (Carlos Guerrero Bosagna)
- 10:45 – 14:00 Practical session 2 (including lunch break) in smaller groups (see separate schedule)
- Demonstrations of CASA (various species), aspiration and oocyte handling before IVF (porcine), aquatic laboratory study visit, AI in pig and bovine (practice using organs).
- 14:00 – 16:00 Ethics workshop (Patrik Baard, SLU, and Kristina Hug, Lund University, Sweden)
- 16:00 – 16:30 Evaluation and course certificates (Ylva Sjunnesson)

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 Graduate School for veterinary medicine and animal sciences (GS-VMAS), 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 2024 (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. Application will open May 1, 2024.

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