Post graduate course “Epigenetics in Reproduction 1.5 ECTS”,
November 12-15, 2018

Organized by CRU with support from the SLU Research School GS-VMAS
Course leader: Ylva Sjunnesson
Course organizers: Göran Andersson, Theodora Kunovac Kallak, Anneli Stavreus-Evers, Malin Gustavsson.
Venue: SLU Campus, Ulls väg 26, Uppsala, VHC building, Room Ratatosk
Participants: 20 students and 15 lecturers (see schedule below).

Some of the lecturers and participants from Tuesday the 13th of November

The syllabus of the course can be found last in this document.
Summary of the course

The course included a brief biological background and basic genomics before dealing with the molecular background of epigenetics and methodologies used in epigenetic studies. Epigenetic modifications and their alterations were described in all steps of embryo production (in vivo and in vitro). Several species were exemplified (e.g. bovine, ovine, porcine, human, murine) and their similarities/diversities were discussed. The epigenetic control of pluripotency and the potential of artificially regulating gene expression and cell pluripotency by CRISPR/cas9-mediated epigenetic modifications were addressed. The impact of endocrine disrupting chemicals on epigenetic patterning during the early development was included as well as data on developmental exposures, adverse health outcomes and links to epigenetic changes in human as well as in animal models. As a specific example, the circumstances of the Dutch Hunger Winter Famine and epigenetic changes associated to this were discussed. Finally, the subject of cloning and epigenetics was approached. All participants gave at least a short oral presentation regarding their own work during the course and a workshop on ethics in assisted reproduction and epigenetics was held.

In addition to providing the participants with updated information in the field of epigenetics in reproduction, the participants were given an opportunity to network and discuss their work and ideas with each other. Most presentations were also attended by interested researchers who did not have the possibility to follow the entire course.

The course evaluation of the course was very positive with a mean score of 4.5 (on a scale 1 – 5 where 5 is the best possible score).

Schedule

Monday 12th of November

8.30 – 9.00 Registration
9.00 – 9.15 Introduction
   Ylva Sjunnesson, Swedish University of Agricultural Sciences, Sweden.
9.15 – 10.00 Basic cell biology
   Anneli Stavréus-Evers, Uppsala University, Sweden
10.00 – 10.30 COFFEE
10.30 – 11.15 Basic genomics
   Göran Andersson, Swedish University of Agricultural Sciences, Sweden.
11.15 – 11.25 Break
11.25 – 12.00 Introduction to epigenetics
   Poul Hyttel, University of Copenhagen, Denmark.
12.00 – 13.00 LUNCH
13.00 – 13.45 Introduction to epigenetics cont.
13.45 – 14.00 Break
14.00 – 15.00 Student presentations (Theodora Kunovac Kallak)
15.00 – 15.30 COFFEE and group discussions
15.30 – 16.15 Methodologies in epigenetics
   Åsa Johansson, Uppsala University, Sweden.
16.15 – 16.25 Break
16.25 – 17.00 Methodologies in epigenetics cont.
17.00 Get-together reception in the VHC building (light snacks)

Tuesday 13th of November

09.00 – 09.45 Epigenetics from a reproductive perspective
Christine Wrenzycki, Justus-Liebig-Universität Gießen, Germany.
9.45 – 10.15 COFFEE
10.15 – 11.00 Epigenetics from a reproductive perspective cont.
11.00 – 11.15 Break
11.15 – 12.00 Epigenetics and gametes.
Marc-André Sirard, Université Laval, Canada.
12.00 – 13.00 LUNCH
13.00 – 13.45 Epigenetics and gametes cont.
14.00 – 15.00 Student presentations (Ylva Sjunnesson)
15.00 – 15.30 COFFEE and group discussions
15.30 – 15.45 Epigenetic mechanisms involved in embryo development
Nathalie Beaujean Bobineau, French National Institute for Agricultural Research, France.
15.45 – 16.00 Break
16.00 – 16.45 Epigenetic mechanisms involved in embryo development cont.

17.45 – 18.45 Social event: tour of the Uppsala modern art museum in the Castle (Drottning Christians väg 1E)

19.00 Course dinner in Kitchen and Table (Dragarbrunngatan 23).

Wednesday 14th of November

09.00 – 09.45 Stem cell pluripotency
Poul Hyttel, University of Copenhagen, Denmark.
09.45 – 10.00 COFFEE
10.00 – 11.00 Using epigenetic to explore the early embryo environment
Marc-André Sirard, Université Laval, Canada.
11.00 – 11.15 Break
11.15 – 12.15 Student presentations (Anneli Stavréus-Evers)
12.15 – 13.15 LUNCH
13.15 – 14.00 Reproductive toxicology and epigenetics
Joelle Rüegg and Pauliina Damdimopoulou, Karolinska Institutet, Sweden.
14.00 – 14.30 COFFEE and group discussions
14.30 – 15.30 The Dutch Winter Famine
L.H. Lumey, Columbia University Medical Center.
15.30 – 15.45 Break
15.45 – 16.30 How SLUBI and NBIS can help you with your bioinformatics needs
Juliette Hayer. Coordinator of the SLU Bioinformatics Infrastructure (SLUBI)
Thursday 15th of November

09.00 – 09.45 Environmentally-induced transgenerational epigenetic effects and consequences on Reproduction
Carlos Guerrero-Bosagna, Linköping University, Sweden

09.45 – 10.15 COFFEE

10.15 – 12.00 Ethics in assisted reproduction and epigenetics Workshop
Olle Torpman, SLU and Stockholm University

12.00 – 13.00 LUNCH

13.00 – 14.00 Student presentations (Göran Andersson)

14.00 – 14.30 COFFEE and group discussions

14.30 – 15.15 Cloning and epigenetics
William A. Ritchie, Fellowship Royal Society of Biology, United Kingdom.

15.15 – 15.25 Break

15.25 – 15.45 Course summary and evaluation, Diploma

15.45 – 16.30 Tour of the VHC building for those who are interested

Syllabus

Course name: Epigenetics and reproduction

Number of credits: 1.5

Subject (according to SLUkurs): Biology

Part of research school: GS-VMAS

Marking scale: Passed / Failed

Prerequisites:
Minimum master degree in biology, medicine, reproductive health, nursing, veterinary medicine, animal science or equivalent

Objective:
The aim of the course is to enhance the knowledge and understanding of epigenetic modifications and how they influence gene regulation in relation to reproduction
After completing the course the student shall be able to…
1) Explain how epigenetic factors influence reproductive mechanisms
2) Describe ethical aspects and use the knowledge in relation to epigenetics
3) Describe epigenetic changes after assisted reproduction
4) Explain mechanisms behind stem cells and their differentiation
5) Implement methodology in epigenetic studies
Content:
Comparative aspects of epigenetic modifications in humans and animals will be covered as well as ethical aspects. The course will include lectures, group work and student presentations.

Literature: Scientific articles and speaker presentations.

Examination:
Successful completion requires 80% attendance. Participation in discussions during lectures, oral presentation of student’s own research and oral presentations of group work.

Responsible department: Department of clinical science / CRU

Location: Uppsala