

BIOM*6130

Early Vertebrate Development

Fall 2017

Preamble: Reproductive biology is a rapidly changing discipline that bridges basic science and clinical practice. The applied arm of this field, reproductive biotechnology, has far reaching economic and societal implications. In human medicine, the application is mainly as a treatment for infertility with over 2 million children born as a result of this technology since the advent of in vitro fertilization in 1977. In agriculture, the technology is used for breed improvement and selection of breeding stock. With the development of somatic cell nuclear transfer, the so called cloning technique, new challenges and opportunities have arisen including increasing the number of individuals with unique and valuable genomes, the creation of embryonic stem cells and the development of research models and tools. However, epidemiological studies in humans and retrospective studies in domestic animals have shown a number of abnormalities that appear to be associated with these technologies. To be able to appreciate the application, side effects and ethical issues surrounding reproductive biotechnologies, it is necessary to understand the underlying biological principles upon which these techniques are founded. Therefore, this course is designed to introduce key concepts in reproductive biology and principles of emerging reproductive technologies. To ensure exposure to state-of-the-art expertise and to promote inter-university collaborations at the student and instructor level, the course will be presented jointly with the Department of Biomedical Sciences, University of Guelph, Laval University and McGill University, via video-conferencing with the participation of students and lecturers from all institutions and guest lectures from other Canadian and American institutions.

Objectives: i) To introduce the biological principles that form the basis for Reproductive Biotechnologies ii) To introduce current and emerging topics in reproductive biology iii) To provide a platform for discussion of current research in Reproductive Biotechnologies iv) To develop an inter-university collaborative learning environment to promote exchange of ideas among graduate students in different Canadian Universities.

Course delivery: The course will consist of six modules spanning topics related to, embryo health, development and response to environment, reproductive biotechnologies and trans-generational affects, and emerging concepts in reproductive biology. Each module will consist of two lectures by experts working in the discipline to provide basic concepts and current research activities. Students at different Universities will be linked via video conferencing. Lectures will be presented “live” and/or by “video-conferencing”.

Each module will be followed by student discussions and presentations pertaining to the topic of the module.

Student expectations: Students are expected to do sufficient background reading in advance of each module to ensure an understanding of the basic concepts for each of the topics

presented by lecturers. For each module students will be presented with a question or issue that they will research and a group of 1 to 3 will present in the form of panel discussion or round table. Group size will depend on enrolment. Presenters will submit a 2-page summary in advance of the presentation. Each student is expected to be a “presenter” for two modules. At the end of the course students will present a group roundtable debate and each student will submit a “white paper” pertaining a topic chosen by the students.

Evaluation:

50% Selected topic/round table (20% per presentation [x2] +5% [x2] 2-page summary)

30% Debate

20% White Paper

Meet & Greet

Thursday September 7: 3:30-4:30pm Rm 3648

Modules:

I: Assisted Reproductive Technologies

Lectures: Rm 3648

-September 12: 3:30-5:30 pm: Assisted Reproductive Technologies and Human Fertility - Michael Neal, One-Fertility (Ontario Network of Experts in Fertility, Burlington, ON)

-September 14: 3:30-5:30 pm: ARTs: Applications for Animal Production - Dr. Gabriela Mastromonaco, Toronto Zoo.

Discussions: September 26 3:30-5:30 pm, Rm 3648

II: Gametogenesis and Fertilization

Lectures: Rm 3648

- September 19: 3:30-5:30 pm: Oogenesis - Dr. Sirard

- September 21: 3:30-5:30 pm: Spermatogenesis and Fertilization - Dr. Janice Bailey, Laval University

Discussions: October 3 3:30-5:30 pm, Rm 3648

III: Embryo Development I. Oocyte Developmental competence and biomarkers of development

Lectures: Rm 3648

- October 5: 3:30-5:30 pm: Embryo arrest and apoptosis/Biomarkers of embryo health- Dr. Pavneesh Madan, University of Guelph
Discussions: October 19 3:30-5:30 pm, Rm 3648

IV: Embryo Development II: Gene expression/Reproduction

Lectures: Rm 3648

- Oct 24: 3:30-5:30pm: Title and speaker TBA.
- Oct 26: 3:30-5:30pm: Gene expression and regulation of development: Tools and approaches.
- Dr. Claude Robert, Laval University.

Discussions: November 2 3:30-5:30 pm, Rm 3648

V: Transgenerational effects

Lectures: Rm 3648

- Nov 7 or Nov 9: 3:30-5:30 pm Title TBA – Speaker TBA

Discussions: November 21 3:30-5:30 pm, Rm 3648

VI: Cloning and Genome Modifications

Lectures: Rm 3648

- November 14: 3:30-5:30pm: Cloning - Dr. Vilceu Bordignon, McGill University

- November 16: 3:30-5:30pm: CRISPER – Dr. Rob Jones, University of Guelph

Discussions: November 28 3:30-5:30 pm, Rm 3648

Debate Tuesday December 5 3:30-5:00pm, Rm 3648

Contact information:

Course Coordinators:

Dr. Allan King, Biomedical Sciences waking@uoguelph.ca

Dr. Laura Favetta, Biomedical Sciences lfavetta@uoguelph.ca

E-mail Communication: As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement: When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course coordinator in writing, with your name, id#, and e-mail contact. See the graduate calendar for information on regulations and procedures for Academic Consideration:

http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1400.shtml

Drop Date: The last date to drop one-semester courses, without academic penalty, is **FRIDAY NOVEMBER 3, 2017**. Refer to the Graduate Calendar for the schedule of dates:

<http://www.uoguelph.ca/registrar/calendars/graduate/current/sched/sched-dates-f10.shtml>

Academic Misconduct The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. The Academic Misconduct Policy is detailed in the Graduate Calendar:

http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1687.shtml

Recording of Materials Presentations which are made in relation to course work—including lectures—cannot be recorded in any electronic media without the permission of the presenter, whether the instructor, a classmate or guest lecturer.

Resources The Graduate Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to graduate programs:

<http://www.uoguelph.ca/registrar/calendars/graduate/current/>