



BIOM*6130 Vertebrate Developmental Biology

Fall 2021

Section(s): 01

Department of Biomedical Sciences

Credit Weight: 0.50

Version 1.00 - September 01, 2021

1 Course Details

1.1 Calendar Description

The principles of vertebrate development are examined through lectures, discussions and practical exercises. Topics include aspects of gametogenesis, fertilization, implantation, embryonic and fetal development and experimental manipulation of embryos. Emphasis is on mammalian development and topics may vary depending on student needs and interests.

Restrictions: Restricted to Biomedical Sciences students

1.2 Course Description

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 eight 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 to a topic chosen by the students.

1.3 Timetable

Timetable is subject to change. Please see WebAdvisor for the latest information.

FALL 2021 SPECIAL NOTES: under these very special circumstances that we are all living, BIOM*6130 in F21 will be delivered in person in **Rm: BIOM 1642** with social distancing and restrictions in place on Tuesdays and Thursdays: 10am-11:20am.

The lectures will be also livestreamed (ZOOM) for students that are uncomfortable, unable or unwell and cannot be present in person.

The format of delivery may be adjusted throughout the semester as needed to align with provincial and local public health requirements.

1.4 Final Exam

Final exam is substituted by a Debate that takes place during lecture times usually at the beginning of December.

TENTATIVE - Final Debate/s Tuesday December 7 and Thursday December 9 = 10:00 - 11:30am, Rm TBA

More details will be available on course link once the course starts

2 Instructional Support

2.1 Instructional Support Team

Course Co-ordinator:	Laura Favetta
Email:	lfavetta@uoguelph.ca
Telephone:	+1-519-824-4120 x56212
Office:	OVCE 3621

3 Learning Resources

4 Learning Outcomes

5 Teaching and Learning Activities

5.1 Lecture

Topics:

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Modules:

I: Assisted Reproductive Technologies

Lectures:

-September 14: 10-11:30am: Assisted Reproductive Technologies and Human Fertility -Michael Neal, One-Fertility (Ontario Network of Experts in Fertility, Burlington, ON)

-September 16: 10-11:30am ARTs: Applications for Animal Production – Paula Mackie, Toronto Zoo.

Discussions: September 30 10-11:30am

II: Oocyte and Sperm

Lectures:

- September 21: 10-11:30am: Semen Processing, Analysis and Evaluation – Katie Hickey, Semex

- September 28: 10-11:30am: Oocytes – Reem Sabry - University of Guelph

Discussions: October 14 10-11:30am

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

Lectures:

- October 5: 10-11:30am: Embryo arrest and apoptosis - Dr. Pavneesh Madan, University of Guelph

- October 7: 10-11:30am: Biomarkers of embryo health- Dr. Pavneesh Madan, University of Guelph

Discussions: October 26 10-11:30am

IV: Embryo Development II: Gene expression
Reproduction

Lectures:

- October 19: 10-11:30am: Communications within the cumulus-oocyte complex - Dr. Claude Robert, Laval University.

- October 21: 10-11:30am: Non-coding RNA in Reproduction and Embryo Development - Dr. Allison Tscherner, Ottawa Hospital Research Institute

Discussions: November 4 10-11:30am

V: Environmental effects on development

Lectures:

- October 28: 10-11:30am: Environmental and toxicant influences on embryo development – Dr. Laura Favetta, University of Guelph

- November 2: 10-11:30am: Environmental Toxicology (Developmental/Reproductive) – Dr. Jim Gilmore, Ministry of Environment, Conservation and Parks

Discussions: November 23 10-11:30am

VI: Origin of Health and Disease - Pregnancy

Lectures: Rm 3648

- November 9: 10-11:30am: – Endometriosis and Pregnancy – Dr. Chandra Tayade, Queens University

- November 11: 10-11:30am: – The developmental origins of health and disease – Dr. Katherine Kennedy, Mac Master University

Discussions: November 25 10-11:30am

VII: Cloning and Stem Cells

Lectures:

- November 16: 10-11:30am: Cloning - Dr. Vilceu Bordignon, McGill University

- November 18: 10-11:30am: Stem Cells – Dr. Sarah LePage, University of Guelph

Discussions: December 2 10-11:30am

VIII: Gene modifications

Lectures:

- November 30: 10-11:30am: CRISPR – Dr. Rob Jones, University of Guelph

6 Assessments

6.1 Marking Schemes & Distributions

Evaluation:

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

30% Debate

20% White Paper

7 Course Statements

7.1 REQUIRED SAFETY TRAINING

It is the responsibility of each student to also fully review the COVID-19 safety plan on CourseLink for each in-person course activity in this course, and to adhere to all safety protocols that have been prescribed. Students not in compliance will be reminded of the protocols, and if they continue to be non-compliant, may be asked to leave the session or face disciplinary action as per campus policy.

If you are feeling unwell, please stay home. As well, students **must** follow the steps below before coming to campus:

1. Complete the COVID-19 Infection Prevention and Control Awareness Training course via CourseLink.
2. **For every day that you have an in-person course activity**, before you come to campus, complete U of G's COVID-19 Screening Form. **Do not come to campus if the form indicates you should stay home.**

7.2 STATEMENT ON SESSION RECORDINGS

By enrolling in a course, unless explicitly stated and brought forward to their instructor, it is

assumed that students agree to the possibility of being recorded during lecture, seminar or other “live” course activities, whether delivery is in-class or online/remote.

If a student prefers not to be distinguishable during a recording, they may:

1. turn off their camera
2. mute their microphone
3. edit their name (e.g., initials only) upon entry to each session
4. use the chat function to pose questions

Students who express to their instructor that they, or a reference to their name or person, do not wish to be recorded may discuss possible alternatives or accommodations with their instructor.

8 University Statements

8.1 Email Communication

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

8.2 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 instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The

deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website

<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website

<https://www.ridgetownc.com/services/accessibilityservices.cfm>

8.6 Academic Integrity

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 encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

8.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

8.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed

assessments or when involving a large part of a course (e.g.. final exam or major assignment).

8.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
