

ANSC*6460 - Lactation Biology

Fall 2024 Course Outline

Section: 01

Credits: 0.50

Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn.

Calendar Description

An in-depth systems analysis of lactation, comparing the cow, pig, rat, human and seal. Mammary development from conception through to lactogenesis, lactation and involution will be covered. Hypotheses of regulation of the biochemical pathways of milk synthesis will be tested in relation to experimental observations.

Department(s): Department of Animal Biosciences

Course Description

Current areas of research activity will be presented by discussion of cutting-edge and classic publications. Each week will consist of 2 lectures and 1 session for discussion of a scientific paper, including history of the research topic and methodology. Students will write a term paper in which a hypothesis to explain some phenomenon of lactation is proposed.

Lecture Schedule

MonWedFri 10:30am-11:20am in ANNU*002 (9/5 to 12/13)

Instructor Information

John Cant

Email: jcant@uoguelph.ca

Course Level Learning Outcomes

1. Critical and Creative Thinking
2. Literacy
3. Global Understanding
4. Communication
5. Professional and Ethical Behaviour

Teaching and Learning Activities

Weekly Activities

1. mammary anatomy/development
2. lactogenesis

3. lactation curve/involution
4. milk synthetic pathways and methodology
5. milk secretion and osmotics
6. regulation of milk synthesis - nutrition
7. regulation of milk synthesis - nutrition
8. regulation of milk synthesis - hormones
9. gut function
10. adipose function
11. muscle function
12. transgenics/breast cancer

Assessment Breakdown

Description	Weighting (%)	Due Date
journal article selection report	10%	tues of discussion week
journal article leading	10	fri of discussion week
journal article summary report	10	mon after discussion week
journal article discussing	20	every fri
term paper	50	week 7, 10 and 13

Last Day to Drop Course

The final day to drop Fall 2024 courses without academic penalty is the last day of classes: November 29

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Assessments

paper discussions

Two people will be chosen to select the paper and lead the friday discussion each week. The paper selection process will be documented in a report each of the discussion leaders submits on the tuesday of their discussion week. The purpose of the process is to find an article that stimulates a lot of comment and questions from your peers in the class, and builds on information that was presented in lecture. I will provide a list of potential papers for each topic. As discussion leader, you can do your own literature search (I recommend web of science through the UG library <https://www.lib.uoguelph.ca/>) but you must nominate at least 1 paper from my list in the 3 suggested as good candidates for discussion. You want to pick a paper that stimulates other students to ask questions like:

why did they do things in a certain way, as opposed to alternatives?

what did they find out from doing the experiment?

what did you find out from reading the paper?

what are (or were) the consequences of this new knowledge?

what would you like to know more about?

The process is expected to take a few hours. The report due on Tuesday, which will be marked, should list the 3 candidate papers in order of preference, and propose discussion points from each paper. A template for the report is provided on CourseLink.

Everybody should read the paper before friday's discussion. The discussion leader should be prepared to go over the paper in detail but each person in class will need to bring at least one question of their own for discussion. It would be a good idea for the leader to bring a few questions as backup in case the others fizzle out early. It is not the job of the leader to answer the questions but to turn them back on the group as a whole and

perpetuate the discussion. Furthermore, the discussion points should not be critiques of the paper, trying to find fault. Remember that the authors of the papers are experienced scientists and if there is an aspect that seems wrong to you, it is more than likely a fault of your own, not of the paper. The papers have been peer-reviewed prior to publication and they are written by people familiar with many other papers on this particular topic. If there are any mysterious aspects to the paper, let them provide you with your discussion points, as listed above.

Each leader will write a summary of the discussion by answering the following 3 questions:

what method did the group think was coolest?

what findings were most interesting to the group?

what applications of the research were suggested?

The summary will be posted on CourseLink. The mark for the leader will be based on the selection report, the summary report, and the elaboration of the discussion.

The discussion mark for everyone will be based on the questions brought to class each week and the contributions made in finding answers to the questions brought up during discussion.

Course Learning Outcomes Assessed: 1, 2, 3, 4, 5

term paper

The purpose of the term paper is to give you practice with integrating experimental results together to invent an explanation of some well-known phenomenon of lactation. The particular phenomenon to be explained will be chosen by you in consultation with me, the instructor. It might be some effect of diet or nutrient infusion or hormone injection or lighting, season, transgenics, sound, etc. on milk production, composition, mammary function, or lactational performance of cows, pigs, humans, dogs, rats, etc. Something that has been repeatedly observed and recorded in the scientific literature but about which there is no established hypothesis to explain it. A hypothesis is a tentative explanation of the cause of some phenomenon. Let's take the stimulatory effect of growth hormone on milk production in cows as our example phenomenon. A hypothesis might be that growth hormone hits the mammary receptor, which stimulates expression of such-and-such genes in the secretory cell that lead to a speeding up of the cell cycle and greater numbers of cells accumulating in the udder so that more milk is synthesized per day. The paper would then be a presentation of what the phenomenon is, followed by descriptions of what changes have been observed in the metabolism of cows, or rats or cells during growth hormone administration and how these might explain the effect observed on milk yield. The paper will be marked based on clarity of the presentation, degree of characterization of the phenomenon with citations, the logical sense of the hypothesis, and the strength of the supporting evidence for the hypothesis (i.e. citations).

There are 3 deadlines for submission of term paper-related material. The end of week 7, a <250-word description of the phenomenon and tentative hypothesis is due on DropBox. The end of week 10, a longer 500- to 1000-word description of the phenomenon and hypothesis is due. And the final paper is due at an agreed-upon deadline after classes end.

Course Learning Outcomes Assessed: 1, 2, 3, 4, 5

Standard Statements for Graduate Courses

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 discourages misconduct. 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.

The Academic Misconduct Policy (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/academic-misconduct/>) is outlined in the Graduate Calendar.

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.

Use of the SAS Exam Centre requires students to make a booking at least 10 business days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website. (<https://www.uoguelph.ca/sas/>)

Accommodation of Religious Obligations

If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements.

See the Academic calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/academic-accommodation-religious-obligations/>)

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.

Drop Date

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping Courses (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/registration/>) dropping courses are available in the Graduate Calendar (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/registration/>).

Email 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.

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (<https://wellness.uoguelph.ca/>). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (<https://wellness.uoguelph.ca/navigation/>) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources. (<https://wellness.uoguelph.ca/shine-this-year/>) The Student Wellness team are here to help and welcome the opportunity to connect with you.

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).

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.

Resources

The Academic Calendars (<http://www.uoguelph.ca/registrar/calendars/?index>) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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. See the Graduate Calendar for information on regulations and procedures for Academic Consideration (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/grounds-academic-consideration/>).