

**Endocrine Physiology**  
**BIOM\*4030**  
**Winter 2011**

**Lectures:** Time - 1.30-2.20 pm; Monday, Wednesday & Friday  
Place - Macdonald Institute R300

**Co-ordinator:** Dr. James Greenaway  
Room OVC 2608 Biomedical Sciences  
james.greenaway@uoguelph.ca

**Additional Instructors:** Dr. Pavneesh Madan (lectures on Mar 9 & 11)  
Room OVC 3605 Biomedical Sciences  
pmadan@uoguelph.ca

Dr. Roger Moorehead (lectures on Jan 31 and Feb 2)  
Room OVC 3626 Biomedical Sciences  
rmoorehe@uoguelph.ca

Dr. Jim Petrik (lectures on Jan 24 & 26, Mar 2- Mar 7)  
Room OVC 3627 Biomedical Sciences  
jpetrik@uoguelph.ca

**Course TAs** Ms. Lisa Kellenberger  
lkellenb@uoguelph.ca

Ms. Laura Stratton  
lstratto@uoguelph.ca

**Course and learning objectives:**

The course is intended for senior students who have a strong background in physiology (at a minimum BIOM\*3100, Mammalian Physiology). The majority of lectures in the course will be taught by the course coordinator, with a few guest lecturers contributing specific topics in endocrinology that are relevant to their particular areas of expertise and research interests.

The course will focus primarily on human endocrinology, with some consideration of both animal models in endocrine research and parallels between human medicine and veterinary clinical practice using the expertise available in the Ontario Veterinary College. The lectures will address the investigational methods that are used in endocrine research, the mode of action of hormones, the intracellular signaling pathways of target cells, aspects of hormone synthesis and secretion and the main regulatory functions of the hormones. The course will emphasize the integrative nature of hormone action in the regulation of processes such as metabolic control, growth and reproduction. Much of the basic endocrinology taught in third year B.Sc. courses evaluates hormones and their actions

individually, as if any given hormone is produced and acts in isolation, independently of other physiological processes. In reality, of course, endocrinology involves considerable “cross talk” between hormonal signaling pathways, so that the actions of different hormones are integrated and coordinated.

The course will not attempt to cover all aspects of the growing field of endocrinology. Rather, it will focus on specific underlying concepts and use examples to illustrate the broader implications of hormonal control of physiological events, including the consideration of how endocrine problems can contribute to many common human disease states. As a fourth year course, the emphasis is on learning objectives and class activities that will instill “real world” skills, using many of the same approaches that we use in graduate courses in Biomedical Sciences such as: group work in the development of presentations based on the scientific literature, as well as scenario-based take home individual writing assignments.

**Recommended Course Text:** Textbook of Endocrine Physiology (5th Edition) 2004.  
Edited by JE Griffin and SR Ojeda.  
Oxford University Press

The textbook is recommended, BUT NOT REQUIRED. The essential material covered in each lecture will be included in the lecture notes posted to D2L, so it should be possible for students to complete the course and do well without purchasing a text book. However, the text book does provide a good, fairly concise and inexpensive (currently under \$50 Canadian from Amazon.ca or Chapters) paperback summary of endocrinology (with particular strengths in Reproductive Endocrinology) which can be useful for both background reading and as a resource if you continue in future to graduate/professional training in Endocrinology.

**Prior experience has shown that reserve materials were not well used, and therefore no material has been put on reserve. However, the following provides the access numbers for textbooks that might be useful.**

- Textbook of Endocrine Physiology (4th Edition) 2000.  
JE Griffin and SR Ojeda [QP 187.T43]
- Endocrine Physiology 2000. B Kacsoh [QP 187.3P49.K33]
- Basic and Clinical Endocrinology 2001.  
FS Greenspan, GJ Strewler [RC 648.B27.2001]

### **Evaluation of performance in the course:**

- Performance in the course will be evaluated on the basis of a midterm assignment, a draft electronic poster, in class presentations and a final assignment
- The distribution of marks is as follows:

|                            |     |
|----------------------------|-----|
| Midterm                    | 20% |
| Poster Handout             | 10% |
| Oral Seminar Presentation  | 25% |
| Final take-home assignment | 45% |

### **Midterm assignment:**

Midterm examinations are viewed as essential tools that facilitate your learning, and provide you with an early indication as to your progress. The midterm assignment will examine the content of approximately one third of the course lecture materials. It will use a take-home short-essay based format, in which students will be presented with case scenarios and required to develop answers (3-4 pages per question, double spaced) using the class notes as a starting point, developing their answers with reference to the original scientific and clinical endocrine literature.

Any student who is unable to write the midterm examination for personal or medical reasons, or who writes the mid-term only as a learning experience to get feedback on this type of written assignment, will be allowed to write a longer final assignment (covering the entire course). No alternate midterm examination will be available. The coordinator must be informed of the situation within a week following the date when the mid-term grades are handed back. Experience shows that students who complete the mid-term benefit both in terms of feedback on progress and reducing their work load at the end of the semester. The mid-term is provided to give you experience in answering take-home case-scenario questions. This type of question is demanding, testing the ability of students to use their basic knowledge to develop a deeper understanding of the field and express scientific information in a coherent, logical and concise format. The questions also may require considerable thought and independent research, because they sometimes involve judgment and choices between alternatives – with no absolute “right” answer (as is often the case, with real world problems). Leaving everything to the end of the course, to the final assignment, is not advisable because students who do so usually have trouble trying to fit the amount of work required around their other course and examination requirements. **STUDENTS ARE THEREFORE ENCOURAGED TO MAKE EVERY POSSIBLE EFFORT TO COMPLETE THE MID-TERM.**

## **Poster and Seminar in class presentations:**

The in-class assignments are mandatory and require that you work as part of a team of 4 students/group to prepare presentations that will be evaluated by the course instructors in class time at the end of the course (see schedule). Each student group will be allocated one of the presentation times. It is essential that all the members of the team actively participate in the presentations. It is also STRONGLY encouraged for all students to attend the presentations by other student groups, both to show support and because every year many of the student presentations are extraordinarily good and provide new, interesting information relevant to the material presented elsewhere in the course.

A list of presentation topics, together with a reference for a key review paper on the topic will be posted on the course D2L site. Please review the topics and make first and second choices which should be communicated to the course coordinator via E-mail (along with the names of the group participants and any preferences regarding presentation dates; see below). Students are encouraged to choose their own team members early in the course. Discussion and message sections will be available on the D2L site, to allow people to contact one another and coordinate setting up groups for the presentations. If students are not able to find a group to work with, they will be assigned to groups by the course coordinator.

As far as possible, students will be assigned their first choice of topic, but some flexibility in this would be appreciated – we don't want multiple groups all presenting the same subject. If a group has an alternate topic (not on the posted list) that they would like to use as a theme, they should discuss the project with the course coordinator to obtain permission (and mentoring!). In the past, many student groups have chosen topics that are endocrine-related but not on the class list, because of personal interests in the subject matter. This can work very well, but you **MUST** get feedback before you start, so that you don't end up choosing a subject that cannot be covered effectively within the time available.

Topics can be chosen that are directly related to the course lecture materials, but in this case it is expected that the presentation will include information based on your own research that goes beyond what has been presented in the lectures. Alternatively, you can choose subjects that are not directly related to the lectures. There are many current issues in endocrinology that have achieved considerable public attention in recent years, many of them controversial, and presentations based on such issues can be both effective and of real interest to the rest of the class. Presentations can either be based on an in depth summary and evaluation of a single paper in the literature (a "journal club" type presentation) or they can review a specific area of research, covering more than one specific study – the only limitation is that whatever you present, it must be possible to summarize it in poster format, as well as in a presentation that does not extend much beyond 12 minutes, so that there is time for discussion within the 15 minutes available for each group. As a general rule, the most effective presentations are those based on a genuine interest in the subject by the group participants, so choose something that interests you!

Once your choices have been made and approved, you will be expected to work as a team to prepare an electronic poster (in Powerpoint) on the assigned topic. You can ask the faculty or the course TA for assistance in developing the poster: examples from previous years of the course will be posted to Blackboard. Conference posters are also displayed at various locations in the Department of Biomedical Sciences and elsewhere in the University.

The poster presentation files must be submitted electronically to the course coordinator at least 24h before your presentation is scheduled, so that they can be distributed to the rest of the class for other students to be able to review the poster before the in-class presentation.

Part 2 of the assignment is for each group to develop a short oral slide presentation (~10-12 minutes, leaving 3 minutes for questions), to be given in class, at which time you will be expected to outline your research and answer questions from the instructors and fellow students. The schedule for the presentations is somewhat flexible, so that if students have specific days on which they cannot present, or conversely a specific date on which they would prefer to present, this can be communicated to the course coordinator and every attempt will be made to arrange the schedule accordingly. However, the constraints of the schedule do of course mean that it may not be possible to accommodate all requests (not everyone can choose to present on the last day of classes!). Therefore, if there are specific dates in the student presentation schedule on which your group cannot present, let the course coordinator know as soon as possible.

### **Grading of the presentations:**

The **electronic poster** will be graded on the basis of its scientific accuracy, organization and clarity, out of a maximum of 10 marks (**each member of the group will receive the same mark**)

The electronic poster file **must**:

- include a specific title that you will also use for the final in class slide presentation, along with the names of the authors (the group members)
- contain a section entitled “Background” or “Introduction”, depending on which is the most appropriate for the topic
- clearly indicate, using a couple of bullets, the main scientific/scholarly objectives of the poster
- contain sections, preferably in bullet form, that have a logical progression from the introduction and purpose of the poster to a conclusion statement
- contain a brief summary section as a conclusion

Failure to submit the electronic poster in time to allow distribution to the rest of the class the day before the presentation will result in an automatic 5% deduction.

## **Final Powerpoint presentation.**

- Each team will develop a Powerpoint slide presentation that expands on the summary provided in the poster. How the work load and presentation responsibilities are divided up is entirely up to the members of each team – but it is important to ensure that each group member has an opportunity to contribute to both development of the presentation, and the presentation itself.
- All members of the team must be in class for the presentation. Team members who are absent will be assigned a grade of zero for this component of the course, unless they are able to provide documentation of personal or medical problems that preclude attendance.
- The course instructors will review the presentations, and ask pertinent questions of each team. Other students in the class will also be encouraged to ask questions and engage in discussion of the subject presented. To assist the course instructors in making a final assessment, the course instructors will retain electronic copies of each presentation, for review.

Failure to keep within the time allocated for the presentation will reduce the maximum mark available for this assignment. Running over 15 minutes and thereby eliminating any time for questions will result in a 5% grade reduction.

## **Group self-assessment & presentation summary reports:**

Each member of the team will individually assess the contributions from the rest of the group. These marks will be submitted by E-mail to the course coordinator and kept confidential. The mean of the marks submitted will contribute to the final mark for each group member. In most cases, students contribute equally to the team and will be assigned similar marks by their colleagues – if everyone works hard on the project and does their best to develop an effective presentation there is ABSOLUTELY NOTHING WRONG with group members giving each other 5/5. You should use your judgment in being fair and honest in your evaluations. Only in rare instances, in the past, have we had situations in which students have, for one reason or another, not put a great deal of effort into the presentation, leaving other members of the team to do most of the work. This is inevitably reflected in low marks from the other team members, which will adversely affect the final grade for the course.

Students are expected to generate summary reports on fellow students' presentations on 5 of the 9 days at minimum. Presentation summary reports consist of BRIEF summary of fellow student's presentations (Mar 21-Apr 8), one mark for each report for a total of 5. The report should consist of a 3 to 5 lines that summarize key concepts of each of the three presentations presented during a specific lecture. These reports will contribute a maximum 5 marks to your oral seminar presentation score. Please do not submit a report on the day you present your lecture, which should leave you 8 possible lectures to submit 5 reports. Presentation summary reports are due electronically at midnight two days after a student presentation lecture.

**Final take-home written assignment:**

The final assignment will follow the same format as the mid-term, utilizing take-home short essay questions that will primarily cover the last two-thirds of the course. Any students who miss the mid-term, or who want to discard their mid-term mark, will be assigned a more extensive take-home final, covering the entire course. Students will have approximately three weeks from the date on which the final is posted on D2L to complete the assignment and hand it in.

**Overall Learning objectives:**

The overall learning objectives of the University can be found in the University of Guelph calendar ([http://www.uoguelph.ca/undergrad\\_calendar/05-06](http://www.uoguelph.ca/undergrad_calendar/05-06)). Please note the section on plagiarism. Although this course is based in part on group assignments and there is nothing wrong with doing research in groups on the assignment questions, the written reports MUST be your own, individual work. It is completely unacceptable to submit someone else's written work under your own name. For this reason, in the posters, the oral in-class presentations as well as in the take-home assignments, if you cite statements or results from other people, you must indicate the original source and cite it in your reference list.

The overall learning objective of the course is to gain an appreciation of how the rapid increases in our understanding of endocrinology that have taken place over the last 20-30 years are now being applied in developing new approaches to the management of disease. By the end of the course, students should be able to use their basic knowledge of endocrinology as a foundation for independent research, to develop an understanding of the subject that can be used to inform others, as well as to solve endocrine-related problems. In all the components of the course – the take home assignments, as well as the presentations – the emphasis is on students being able to express themselves individually while exploring their own interests and abilities, rather than following a rigid formula. The only constraint is that there must have a clear link to Endocrinology, but within this overall framework there is considerable latitude for students to approach the tasks in the course creatively and flexibly, using whatever approach works best.

| Date   | Topic   | Instructor | Notes   |
|--|---|------------|---|
|  | General introduction to the course  |            |   |
| Jan 10   | <ul style="list-style-type: none"> <li>• Scope &amp; goals of the course</li> <li>• Examinations, assignments</li> </ul>            | JG         |   |
| Jan 12   | <ul style="list-style-type: none"> <li>• The GnRH-LH/FSH-gonadal axis</li> </ul>  | JG         |   |
| Jan 14   | <ul style="list-style-type: none"> <li>• Steroid synthesis, transport and action</li> </ul>   | JG         |   |
| Jan 17   | <ul style="list-style-type: none"> <li>• Puberty &amp; the male reproductive system</li> </ul>                                      | JG         |   |
| Jan 19   | <ul style="list-style-type: none"> <li>• Female reproduction: the ovarian cycle</li> </ul>  | JG         |   |
| Jan 21   | <ul style="list-style-type: none"> <li>• Pregnancy, parturition and lactation</li> </ul>  | JG         |   |
| Jan 24   | <ul style="list-style-type: none"> <li>• Hormonal control of angiogenesis I</li> </ul>  | JP         |   |
| Jan 26   | <ul style="list-style-type: none"> <li>• Hormonal control of angiogenesis II</li> </ul>   | JP         |   |
| Jan 28   | <ul style="list-style-type: none"> <li>• Non-reproductive effects of gonadal steroids</li> </ul>                                    | JG         |   |
| Jan 31   | <ul style="list-style-type: none"> <li>• Control of Growth</li> </ul>   | RM         |   |
| Feb 2  | <ul style="list-style-type: none"> <li>• Bone and Calcium Metabolism</li> </ul>   | RM         |   |
| Feb 4  | <ul style="list-style-type: none"> <li>• TRH-TSH-thyroid gland I</li> </ul>   | JG         |   |
| Feb 7  | <ul style="list-style-type: none"> <li>• TRH-TSH-thyroid gland II</li> </ul>  | JG         | Mid-term posted Feb 7<br>(covers classes<br>Jan 10 – Feb 7) |
| Feb 9  | <ul style="list-style-type: none"> <li>• CRF-ACTH-adrenal gland I</li> </ul>  | JG         |   |
| Feb 11   | <ul style="list-style-type: none"> <li>• CRF-ACTH-adrenal gland II</li> </ul>   | JG         |   |
| Feb 14   | <ul style="list-style-type: none"> <li>• Intestinal and fat hormones: integration of appetite, energy balance and stress</li> </ul> | JG         |   |
| Feb 16   | <ul style="list-style-type: none"> <li>• The incretins, insulin and diabetes</li> </ul>   | JG         |   |
| Feb 18   | <ul style="list-style-type: none"> <li>• Developmental Programming of Disease I</li> </ul>  | JG         |   |
| Feb 21 – Feb 25 Winter Break – Reading Week          |   |            |   |
| <b>Hand in Midterm Assignment in class on Feb 28</b> |   |            |   |
| Feb 28   | <ul style="list-style-type: none"> <li>• Developmental Programming of Disease II</li> </ul>   | JG         |   |
| Mar 2  | <ul style="list-style-type: none"> <li>• Endocrine disruptors in the Environment</li> </ul>   | JP         |   |
| Mar 4  | <ul style="list-style-type: none"> <li>• Endocrine related diseases 1</li> </ul>  | JP         |   |
| Mar 7  | <ul style="list-style-type: none"> <li>• Endocrine related diseases 2</li> </ul>  | JP         |   |
| Mar 9  | <ul style="list-style-type: none"> <li>• Clinical aspects of Endocrinology</li> </ul>   | PM         |   |
| Mar 11   | <ul style="list-style-type: none"> <li>• Clinical aspects of Endocrinology</li> </ul>   | PM         |   |
| Mar 14   | <ul style="list-style-type: none"> <li>• Clinical aspects of Endocrinology</li> </ul>   | TBA        |   |
| Mar 16   | <ul style="list-style-type: none"> <li>• Clinical aspects of Endocrinology</li> </ul>   | TBA        |   |
| Mar 18   | <ul style="list-style-type: none"> <li>• Clinical aspects of Endocrinology</li> </ul>   | TBA        | Final posted March 21                                       |
| Mar 21   | <ul style="list-style-type: none"> <li>• Student Presentations I</li> </ul>   |            |   |
| Mar 23   | <ul style="list-style-type: none"> <li>• Student Presentations II</li> </ul>  |            |   |
| Mar 25   | <ul style="list-style-type: none"> <li>• Student Presentations III</li> </ul>   |            |   |
| Mar 28   | <ul style="list-style-type: none"> <li>• Student Presentations IV</li> </ul>  |            |   |
| Mar 30   | <ul style="list-style-type: none"> <li>• Student Presentations V</li> </ul>   |            |   |
| Apr 1  | <ul style="list-style-type: none"> <li>• Student Presentations VI</li> </ul>  |            |   |
| Apr 4  | <ul style="list-style-type: none"> <li>• Student Presentations VII</li> </ul>   |            |   |
| Apr 6  | <ul style="list-style-type: none"> <li>• Student Presentations VIII</li> </ul>  |            |   |
| Apr 8  | <ul style="list-style-type: none"> <li>• Student Presentations IX</li> </ul>  |            |   |
| Final Assignment Due 5.00 pm April 11                |   |            |   |