

Lecture TR 10:50-12:05

CNS 115

Discussion T 12:00-1:00

CNS 163

Prerequisites: Animal Physiology

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Office Hours: MW 11-1, Th 9-9:50. Also, I will usually be available in my office (155 CNS) or laboratory (183 CNS). Feel free to stop by anytime, or make an appointment.

Course Description:

This course will explore hormonal control, emphasizing current research. Lectures will give background on the key concepts, then they will focus on in-depth analysis of the major vertebrate hormones using published research. We will study topics such as gender differentiation, growth, reproduction, weight control, diabetes, the stress response, and environmental endocrine disruption. The lectures will emphasize discussion and analysis of the scientific literature. The discussion period will provide time for more in-depth writing exercises, discussions and occasional demonstrations.

The reasons for using the scientific literature instead of a more typical, textbook-based lecture approach are three-fold:

- ? The primary literature provides detailed concrete examples, which are often more informative than a more abstract, generalized approach.
- ? Hormonal control, like most systems in the real world, is amazingly complex. This leads standard textbook-based approaches into two serious mistakes: 1) to gloss over the complexity, losing out on one of the key lessons in physiology, or 2) to try to catalogue all the complexity, losing students in a sea of confusing and often contradictory information. The best way to appreciate and truly understand complex physiological systems is to look at original data.
- ? Analysis of experimental logic will teach you critical thinking skills that are useful for dealing with complex, real-world problems.

The goals of this course are the following:

- ? **To understand mechanisms of hormonal control**
- ? **To become familiar with the structure, function and regulation of the major vertebrate hormones**
- ? **To develop your familiarity with modern research methods used in this field**
- ? **To develop your analytical skills through their application to complex experimental methods and data**
- ? **To develop your ability to communicate complex biological ideas effectively**

Text: *There is no required text for this class.* Most of your reading will consist of primary research reports. Since the text would only be used as a reference, I will not require you to spend ~\$70 on it. If you would like a text, I recommend Vertebrate Endocrinology, by D. Norris (Academic Press). I will put several texts on reserve, which may be useful as references (see list at end of syllabus). I also have texts in my office that you may sign out for short periods. I also strongly recommend using your old animal physiology text, or borrowing someone else's. The reason for not requiring a text is that endocrinology texts focus almost entirely on comprehensive detail. I do not want people memorizing every factor that controls the level of each identified hormone. I want you to spend your time analyzing scientific research, and no text can substitute for the original scientific literature.

Course requirements

Attendance: Because of the interactive nature of the class, attendance is expected. If you will be unable to attend a class, notify me in advance (I check e-mail and voice-mail regularly). If you do not, it will count against your class participation grade, as well as losing credit for in-class assignments that day.

Class participation: You will be expected to contribute regularly to the class. Anyone who is present every day and is involved in the class will get 100% of the points. Deductions will only be made for unexcused absences, if it appears that a student is not contributing to group or class discussions, or for unacceptable work on informal writings. If the effort you put into class is acceptable, you will get all the points.

Quizzes: There will be at least five quizzes throughout the semester and a final quiz (same length and format as the others). The quizzes will involve two types of questions, those that test your understanding of basic background material, and those that test your ability to analyze experimental work. You will *not* be expected to memorize the details of any particular experimental study.

Review paper: You will write a review paper on a topic of your choice within endocrinology. Your grade will depend on the thoroughness of your coverage, and the clarity of your write-up. These papers are typically ten pages or longer, and typically cite 10-20 primary sources. The review paper will be written in stages, with parts of the grade assigned at some of these stages.

Other writing assignments: There will typically be one or two shorter writing assignments each week. They may involve analyzing or commenting on a scientific paper, planning experiments, or reading and commenting on the drafts of other students' work. Some of these will be informal writings that will not be graded.

Presentations: During one of the discussion sections you will be expected to present to the class the results of a published paper (chosen from a prepared list). The presentations should be brief (roughly 10 min) and focused. You will be graded on the clarity of your presentation and your understanding of the paper as demonstrated during the ensuing discussion.

Grading:

Quizzes and final	30%
Review paper	25%
Written assignments	25%
Presentation	10%
Class participation	10%

Grade scale: A+ = 97-100, A = 93-96, A- = 90-92, B+ = 87-89, B = 83-86, B- = 80-82, C+ = 77-79, C = 73-76, C- = 70-72, D+ = 67-69, D = 63-66, D- = 60-62, F < 60

Tentative schedule

Week	Lecture	Discussion topic
1/20	Introduction, course overview Hormone/receptor interactions	Experimental design – insect molting
1/27	Feedback control of hormone levels Overview of the major vertebrate hormones	Histology of glands
2/3	Experimental methods in endocrinology Classes of hormones and their synthesis	TBA*
2/10	Complexity of hormone action Obesity and diabetes	TBA
2/17	Diabetes (continued) Leptin, weight control and fertility	TBA
2/24	Leptin (continued) Leptin resistance	TBA
3/3	Gender differentiation Gender differentiation (continued)	TBA
3/10	-- Spring Break --	-- Spring Break --
3/17	Gender differentiation and hyenas Oxytocin, prostaglandins and childbirth	TBA
3/24	Oxytocin and prostaglandins (continued) Health risk and estrogens – environmental and natural	TBA
3/31	Estrogens (continued) Androgens	TBA
4/7	Arginine Vasopressin and monogamy Growth hormone, aging and cancer	TBA
4/14	GH (continued) Melatonin and the day/night cycle	TBA
4/21	Melatonin (continued) Orphan receptors // Parathyroid hormone and bone density	TBA
4/28	The cortisol system and stress: effects on the immune response Cortisol and stress (continued)	TBA

*When a discussion is listed as TBA, it will involve an assignment to be determined – either analysis of some type of experimental data, student-led discussions of papers, or discussions growing out of writing assignments.

Texts on reserve: *Vertebrate Endocrinology* (Pang, vol. 2), *Endocrinology* (Hadley),
Available from reference section of library: *Textbook of Medical Physiology* (Guyton)

The following books on reserve review current research in specific areas:

<i>The Endocrinology of Bone</i>	Farrow (1997)
<i>Insulin Resistance and Cardiovascular Disease</i>	O’Rahilly
<i>Hormonally Induced Changes in Mind and Brain</i>	Schulkin (1993)
<i>Human Reproductive Biology</i>	Jones (1996)
<i>Hormones and Signalling</i>	O’Malley
<i>Hormones and their actions A and B</i>	Cooke et al.