

COMPARATIVE ANIMAL PHYSIOLOGY II – ZOO*3210 – W2010

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Teaching Assistants: TBA

COURSE OBJECTIVES:

1. To understand the concept of homeostasis
2. To illustrate physiological principles by studying form and function relationships
3. To explain physiological systems from the molecular and cellular events through to coordination at the whole animal level in selected invertebrates and vertebrate species
4. To describe how organisms interact with their environments and how environmental conditions modulate physiological regulatory mechanisms
5. To understand how the scientific method is used to advance our knowledge of animal physiology
6. To conduct laboratory experiments on living tissues and/or whole animals in order to obtain experience with a variety of physiological measurements.
7. To practise scientific writing through data collection, analysis, presentation and interpretation of laboratory results.

LECTURES:

Lectures will be held in MCLN Room 102 on Tuesday and Thursday, 01:00 – 02:20 PM

Lecture images will be posted on WebCT before each lecture and students are encouraged to print and bring these images to class.

TOPICS: (The questions below are just examples of the topics that will be covered under each section).

- | | <u>Hill Textbook</u> |
|---|-----------------------|
| 1. Introduction (TBD) | Chp 1 |
| 2. Respiration (TBD) - How do bird embryos respire through a hard shell? - Why do some animals have haemoglobin whereas others have haemocyanin? - Is supplemental oxygen necessary to successfully climb Mt. Everest? - Why is your blood pH lower than a shark? | Chp 21, 22, 23 |
| 3. Circulation(TBD) - How does the giraffe's circulatory system fight gravity? - How is the structure of an arteriole linked to its function? - How does countercurrent blood flow help to regulate body temperature? - How can cardiovascular changes prolong the dive time of a seal? | Chp 24, 25 |
| 4. Metabolism and Thermoregulation (TBD) - Who has the higher metabolic rate – an elephant or a shrew? - How does a Galápagos marine iguana stay cool in the hot sun? - Are some fishes warm-blooded? | Chp 6, 7, 9, 10 |
| 5. Ionic and Osmotic Regulation and Excretion (TBD) - Why are some animals osmoconformers? - Why does a turtle but not a whale drink seawater? - What part of the mammalian nephron is essential for production of concentrated urine? - What is a malpighian tubule and how does it function? | Chp 4, 26, 27, 28, 29 |
| 6. Digestion (TBD) - What types of physiological imbalances result from a large meal in fluid feeders? - How does the alimentary tract of a carnivore differ from a herbivore? - How do pythons ingest and digest an antelope? | Chp 5 |

LABORATORY:

Laboratories will be held in SCIE, Rm. 3314. Labs start the week of January 11th. Labs are every second week.

- Lab 1 Specific dynamic action in goldfish
- Lab 2 Impact of environment on embryonic heart rate
- Lab 3 Effects of salinity on plasma ions and osmolality
- Lab 4 Nitrogen excretion in metamorphosing tadpoles
- Lab 5 Digestive lab 8

Attendance and participation in laboratories is mandatory. Every student must attend and participate in all lab exercises in order to get credit for the lab report. No alternate assignments will be accepted for any of the lab exercises. In addition to the paper version submitted to the laboratory instructor, each lab report must be electronically on the WebCT site. Students are asked not to use cameras and/or cell phones in the lab.

This course involves participation in laboratory exercises that use animals. If you are opposed to this participation then you have two options. 1. You can choose not to participate in some labs and forfeit those marks. 2. You can take HK 3940–Human Physiology, it covers similar material (but not comparative) and does not have a lab component.

RECOMMENDED TEXTBOOK:

Animal Physiology (2nd edition) by Hill, Wyse, Anderson © 2008. ISBN 978-0-87893-317-4.

EVALUATION:

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|----------------------------------|--------------|-------------|
| Mid-term Exam – Feb 5 – in class | | 20% |
| Final Cumulative Exam | | 40% |
| Lab Assignments | | 40% |
| | Total | 100% |

NOTE: Medical or compassionate documentation is required to miss any lab, midterm, or final exam. This documentation must be submitted to Dr. Wright as soon as possible after your absence. If no documentation is provided, the assigned mark will be 0%.

No extension on lab reports. Late lab reports penalty – 10% of the earned mark per day, every day.

Office Hours: Please visit my office (SCIE, Rm. 3468) to ask questions about lecture material. Email or telephone (ext. 52719) first to check my availability.

ADDITIONAL TEXTBOOKS:

Eckert's Animal Physiology (5th Ed.) by Randall et al. © 2002 and Principles of Animal Physiology (1st Edition) by Moyes and Schulte © 2006 are on reserve at the library.