

Welcome!
Human Physiology
IPHY 3430

Fall, 2009

Dr. Carey
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Review Sessions every Thursday
(except after exams and except this
week)

7:30 am here

Lecture starts promptly at 8:00
Lecture terminates at 9:15

Don't be late, don't leave early

Exams start at 7:45

Book-- Sherwood's Human
Physiology, 7th Ed.

. Reading is *essential* for success in the
class

. I will contradict book now and then

Recommended for those taking the MCAT:

Textbook of Human Physiology
AC Guyton and Hall

Order paperback from Amazon.com

Lecture outline available

<http://www.colorado.edu/intphys/iphy3430carey>

Mission of the Course

This course is designed for pre-health majors and those going on to graduate school in health sciences.

Goals

- 1. Human physiology for future professional use
- 2. Make informed decisions about your life and those you care about

What type of student gets an A?

- 1. Takes good notes daily
- 2. Reads book and integrates with lecture material
- 3. Studies well in advance of exam
- 4. Learns all lecture material
- 5. Asks questions
- 6. Learns material for future use, not just the exam

High standards

Too hard?

Students are expected to learn all lecture material (both slides and verbal)

You are asked to learn only a small fraction of what is known about the human body.

Exams: 100 points each
3 midterms (lowest one dropped if take all three) + final.

300 points on exams plus 20 clicker points: total points = 320

Grades

90-100% total points = A

80-89% = B

70-79% = C

60-69% = D

below 60% = F

Exam Formats

1. Multiple choice

2. Describe the graph

3. Fill the blank

4. Matching

5. Essays (15% of exam)

Essay questions given out in advance

Exam Policies

1. No exams given early or late.
2. One midterm score can be dropped if all three taken.
3. If one midterm missed, that is the score that is dropped.
4. A second midterm missed = 0 points
5. The final is mandatory and may not be missed.
6. No incompletes given for crummy grade

In the case of a severe H1N1 epidemic:

1. Set up groups to share notes
2. At least one person in group record lecture
3. Stay home if you are sick

Other tidbits:

Students approved by the Office of Disabled Students as needing special testing accommodations, please see me asap.

More tidbits:

2. Lack of course prerequisites
3. Family problems
4. Personal views about human evolution
5. Treat all of us with respect

So, here we go!

1. Course focuses on organ systems
2. One system at a time
3. By the end of semester, students must understand how organ systems interact.

Topics in each system will be taken in this order:

1. Morphology
2. How it works (function)
3. How it is regulated
4. How system can be varied by exercise or by pathology, disease, etc.

Energy is the theme around which course is organized.

1. **Energetics** (metabolism)
2. Procurement of **energy** from environment (digestion)
3. **Energy** is consumed with the utilization of O₂ and release of CO₂ (respiration)
4. Gases and **energy**-containing substrate must be transported to and from cells (circulation)

5. **Energy** is used to rid body of wastes (excretory system).

6. **Energy** is used to move materials in the body and to move body parts. (muscular system).

7. **Energy** is used by regulatory systems (nervous and endocrine systems).

8. Reproduction requires **energy**.

Three basic concepts that will recur throughout course:

1. Homeostasis
2. Regulation
3. Cause and effect

Homeostasis

“Maintenance of a relatively stable internal environment”

Cells require a constant internal environment for life

Examples of homeostatically regulated variables: body temperature, gas concentrations, ions, blood glucose, water content, etc.

Examples of homeostasis

1. Body temperature

Can vary from -50 F to + 140 F
with no temperature regulation
life possible for a short time = 78 F - 105 F
regulated limits = 98-99 F

2. Blood glucose

theoretical possibility = 0-400 mg%
life possible for short time = 50-150 mg%
regulated limits = 90-120 mg%

Important:

Homeostatic limits may vary in different states, such as exercise, disease.

Examples: body temperature increases during exercise and some diseases.

Therefore, the limits must be specified for each state.

Regulation

Homeostasis is possible only through negative feedback regulation.

Components of a regulatory system:

1. Homeostatically regulated variable
2. Sensors
3. Integrator
4. Output

Negative feedback

Tb --> sensors--> integrator--> output

↓ Tb --> thermoreceptors --> hypothalamus--> increases heat production by shivering --> ↑Tb

Tb --> sensors--> integrator--> output

↑ Tb --> thermoreceptors--> hypothalamus--> increases heat loss by sweating--> ↓ Tb

Cause and Effect relationships

Nothing in the human body happens by magic.

A causes B causes C causes D causes E causes F

A--> B--> C--> D--> E--> F

Example of Cause and Effect

1. A drop in blood pressure causes the kidney to secrete renin
2. Renin causes the conversion of a plasma protein to angiotensin I.
3. Conversion of angiotensin I to angiotensin II is caused by an enzyme in the lungs
4. Angiotensin II causes an increase in aldosterone secretion from the adrenals

more.....

5. Aldosterone causes the kidney to retain Na⁺ in the body
6. Retention of Na⁺ causes the retention of water from the urine filtrate
7. Retention of water causes blood pressure to rise
