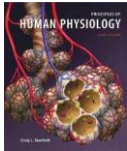


Physiology Survival Kit



Factors That Contribute to Your Success in Physiology 1



- Motivation
 - Why are you here?
 - The will to succeed is important, but what is more important is the will to prepare." Basketball Coach Bobby Knight

Factors That Contribute to Your Success in Physiology 1



- Priority
 - The average study time after school:
 - 22 hours for an A (6 hours per day)
 - 16 hours for a B (4 hours per day)
 - 14 hours for a C (3.5 hours per day)
 - 10 hours for a D (2.5 hours per day)
 - 0 hours for an F (0 hours per day)



<http://tep.uoregon.edu/resources/faqs/outsidehelp/study.html>

Factors That Contribute to Your Success in Physiology 1



Priority

- How much effort and time are you willing to invest in this class?
- Is this class on the top of your priority list?
- If you don't have time to do it right, when will you have time to do it over?
John Wooden

Factors That Contribute to Your Success in Physiology 1



- Time Management
 - Be efficient
 - Make the best out of the class time
 - Review frequently to enforce memory



"How long have you been multitasking?"

Factors That Contribute to Your Success in Physiology 1



- Study methods
 - Know your learning style
 - Improve your study skills
 - Polish your test taking skills

How Do You Study Physiology 1?

What does “learn” mean?

- Learn = Make neurological connections and be able to
 - Retain and Recite
 - Explain
 - Apply

How to Retain Information?

- Before class
 - Plan your day the night before
 - Print out notes and keep them in a ring binder
 - Have extra note paper
 - Have at least two different color pens
 - Read the chapter the night before

How to Retain Information?

- During class
 - PARTICIPIPATE actively by
 - Being an active listener
 - Highlighting or underlining the important points
 - Asking questions
 - Answering questions
 - Taking notes
 - *If you study to remember you will forget. If you study to understand, you will remember.*

How to Retain Information?

- After class
 - Daily review
 - **Complete chapter study questions**
 - Write your own notes
 - Make flash cards
 - Make table and flow charts to organize the concepts

Prepare for Test

Check your knowledge

- Form a study group and quiz each other
- Write your own exam questions
- Use interactive CD to understand difficult concepts

Prepare for Test

- Go over notes and chapter study questions
- Go over quizzes at Tutoring and Resource Center (AHS 232)
- Analyze your answer
 - Why this is the right answer?
 - Why did you miss the answer?
 - Why the rest answers are wrong?
- Use the: “Quick Test and Exercises” section in your textbook”

Anatomy and Physiology Study Techniques Compared

- Anatomy = Memorization + understanding
- Physiology = Memorization + understanding + explanation + application

Useful Links To Improve Learning

- Study Skill
 - <http://www.ucc.vt.edu/stdysk/stdyhelp.html>
- Time management
 - <http://ub-counseling.buffalo.edu/studytime.shtml>
- How to take exam?
 - <http://ccc.byu.edu/learning/strategy.php#mc>

Investments

- Text Book : \$ 160
- Supplies: \$20
- Tuition: \$106
- Study time: 6 hour/week

Return

- A person with a bachelor degree earns more than 1 million dollars than a person with a high school degree
- Average salary in USA as of Jan 31, 2008 [Registered Nurse in Los Angeles, CA](http://www.indeed.com/salary?q1=Registered+Nurse&l1=Los+Angeles%2C+CA): **\$60,000**
<http://www.indeed.com/salary?q1=Registered+Nurse&l1=Los+Angeles%2C+CA>

Welcome to Physiology 1



Chapter 1 Outline

- Introduction to Physiology
- Four themes of Physiology
- Homeostasis
- Homeostatic Regulation
- Hierarchy of Physiology
 - Function of Organs & Systems

What is Human Physiology?

- **Physiology** is the study of how normal body works to maintain life.
- Physiology is an integrative discipline that utilizes biology, chemistry and physics to explain:
 - Functions of the human body
 - Mechanisms (physical and chemical processes) of these functions (cells, tissues, organs and organ systems)
 - Regulation of body function

Anatomy and Physiology Compared

Anatomic Form	Physiological Function
Cell body	Makes macromolecules such as neurotransmitters
Dendrites	Receive information, convey it to cell body
Axons	Conduct impulses away from cell body

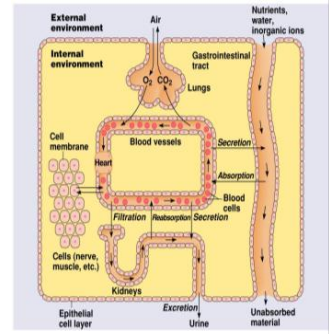
7-9

Anatomy and Physiology Compared

- Physiology discusses
 - How do neurons receive information?
 - How do neurons manufacture neurotransmitters?
 - How do neurons transmit information?
 - What are the factors that regulate the processes of receiving and transmitting information?

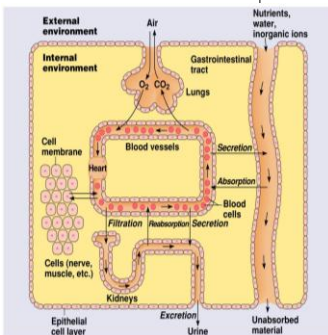
The Body's External Environment

- External environment = external side of epithelial body barrier such as
 - Surroundings external to skin
 - Connection to outside
 - Air in lungs
 - Food in GI tract
 - Urine in renal tubules



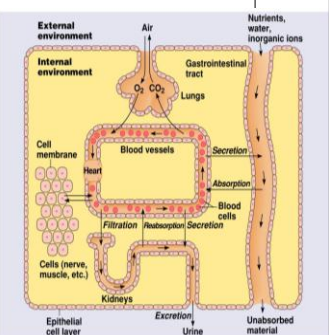
The Body's Internal Environment?

- Internal environment = immediate environment of most cells such as
 - tissue fluid
 - plasma



The Exchange of Materials Between External and Internal Environment

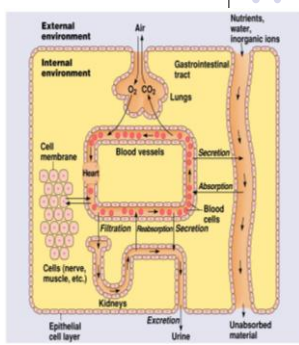
- Between blood and external environment
 - Lungs
 - Gastrointestinal tract
 - Kidneys



Mechanisms of Exchange

• Across gastrointestinal tract

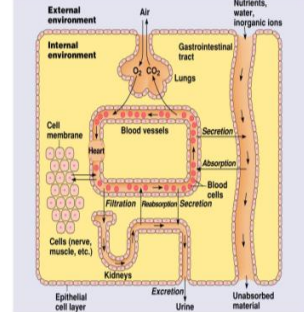
- Absorption
 - Nutrients and water are transported from the lumen to the blood
- Secretion
 - Materials are transported from the blood to the lumen



Mechanisms of Exchange

• Across kidneys

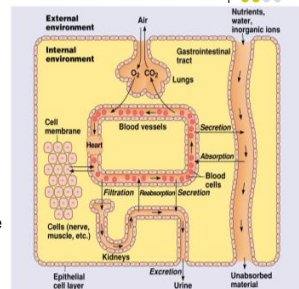
- Filtration
 - The movement of fluid across the capillary wall from the plasma to the interstitium
- Reabsorption
 - The materials are transported back to the blood stream



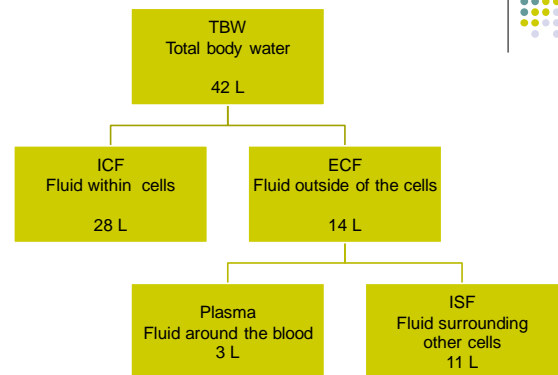
Mechanisms of Exchange

• Across kidneys

- Secretion
 - The unwanted materials are transported from the bloodstream into the tubules
- Excretion
 - Unwanted materials are eliminated from the human body



Body Fluid Compartments of a 70 kg man



Four Themes in Physiology

1. Homeostasis
2. Structure-function relationships exist
3. Communication
4. Metabolism

1. Homeostasis

- Homeostasis is the ability to maintain a relatively constant internal environment around physiological set points
- Set points (normal)
 - Expected value of regulated variable
 - Examples
 - Core body temperature = 37° C
 - Blood glucose (sugar) = 100 mg/dL
 - Blood pH = 7.4

1. Homeostasis

- Why is homeostasis important?
 - Disruption of homeostasis is the basis for disease and death
- How to achieve homeostasis?
 - Homeostatic regulatory mechanisms minimize the error signals
 - Error signals = actual value of a regulated variable- set point

1. Homeostasis

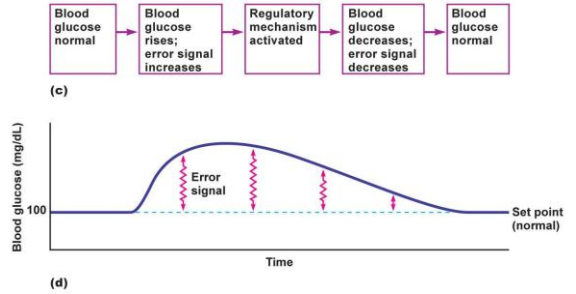
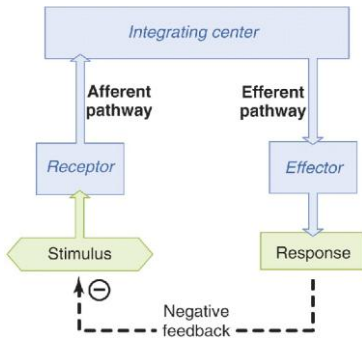


Figure 1.6c-d

1. Homeostasis



1. Homeostasis

- Homeostasis regulatory mechanism components
 - Receptors or sensors detect stimuli and input signals to an integrating center
 - Integrating center orchestrates an appropriate response
 - Effectors responsible for body responses
 - Effectors include
 - Muscles (smooth, striated, and cardiac)
 - Glands

1. Homeostasis

- How is homeostasis maintained?
 - Most by negative feedback loop
 - The effectors act antagonistically to defend the set point against the deviations in any direction

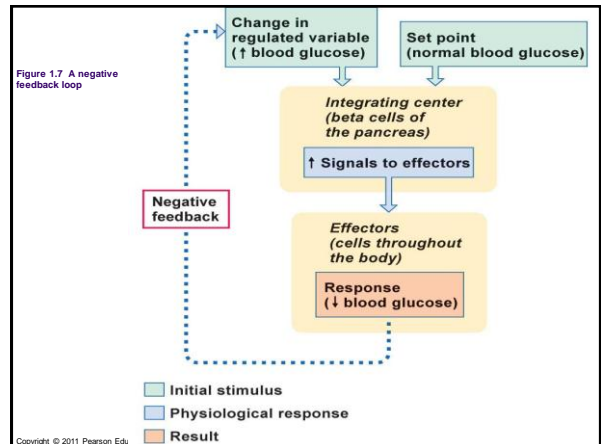


Figure 1.7 A negative feedback loop

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Positive Feedback Loop

- Positive feedback loops are not homeostatic
 - In a positive feedback loop, the action of effectors amplifies the changes that stimulated the effectors
 - It reinforces the stimulus and its responses sends the regulated variable farther away from its set points

Positive Feedback Loop

- Examples
 - Luteinizing hormone (LH) stimulates the secretion of estrogen
 - Child birth
 - Blood clotting
 - Urination

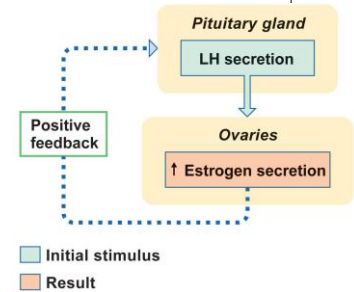


Figure 1.8 A positive feedback loop

2. Structure-function Relationships

- The integration of structure and function
- Molecule interactions
 - A molecule binds and reacts with other molecules
- Compartmentalization at various levels of biological organization (cell, tissue, organ and organ system) allows each component has specialized function

TABLE 1.1 Organ Systems

System	Some organs/tissues within system	Function
Endocrine	Hypothalamus, pituitary gland, adrenal gland, thyroid gland, parathyroid glands, thymus, pancreas	Provide communication between cells of the body through the release of hormones into the bloodstream
Nervous	Brain, spinal cord, peripheral nerves	Provide communication between cells of the body through electrical signals and the release of neurotransmitters into small gaps between certain cells
Musculoskeletal	Skeletal muscle, bones, tendons, ligaments	Support the body; allow voluntary movement of the body; allow facial expressions
Cardiovascular	Heart, blood vessels, blood	Transport molecules throughout the body in the bloodstream
Respiratory	Lungs, pharynx, trachea, bronchi	Bring oxygen into the body and eliminate carbon dioxide from the body
Urinary	Kidneys, ureters, bladder, urethra	Filter the blood to regulate acidity, blood volume, and ion concentrations; eliminate wastes
Gastrointestinal	Mouth, esophagus, stomach, small intestine, large intestine, liver, pancreas, gallbladder	Break down food and absorb it into the body
Reproductive	Gonads, reproductive tracts and glands	Generate offspring
Immune	White blood cells, thymus, lymph nodes, spleen, tonsils, adenoids	Defend the body against pathogens and abnormal cells
Integumentary	Skin	Protect the body from the external environment

3. Communication

- Permits coordination of events and homeostasis via
 - Endocrine system
 - Nervous system

4. Metabolism

- Food provides energy to produce energy currency ATP.
- Work, repair and growth of human body consume ATP.