PHYSIOLOGY LAB MIDTERM REVIEW OUTLINE

This is just a study GUIDE. It is up to you how well you want to cover/understand the material. Remember all material from your slides and modules have the potential to be asked on the exam.

# HOMEOSTASIS AND FUNDAMENTAL CELL PHYSIOLOGY

## LECTURE SLIDES

* What is the average body temperature? (both ℃ and ℉). Be able to label parts of the cell membrane.
* Understand and define the following terms:

Sensor (receptor)

Set-point

Controlled variable

Integrating center (control center)

Effector

Negative Feedback Mechanism

Positive Feedback Mechanism

* + Understand selective permeability and be able examples of molecules that can and cannot permeate the membrane.
  + *Assisted* vs. *Unassisted* Transport mechanisms
  + Understand and be able to define:

Active transport

Passive transport

Simple diffusion

Channel mediated facilitated diffusion

Carrier mediated facilitated diffusion

Osmosis

Isotonic solution

Hypotonic solution

Hypertonic solution

* + All components of Fick’s Law of Diffusion
  + What is the optimal (isotonic) concentration of NaCl for a normal RBC? What would happen to the cell if it were placed into an *isotonic*, *hypotonic*, and *hypertonic* solution?

## LAB MODULE

* + Understand and be able to critically think about the various negative feedback mechanisms utilized by the body to maintain homeostasis.
  + Be able to apply knowledge to clinical scenarios/Case-Studies.

# ENZYMES AND METABOLISM

## LECTURE SLIDES

* + What properties affect the molecular activity of an enzyme?
  + How do enzymes function as biological catalysts?
  + Are they able to alter the nature of a reaction?
  + Can they induce chemical reactions to occur that don’t already occur spontaneously without an enzyme? Are they consumed by the reaction?
  + An enzyme’s 3D Ultrastructure allows it to bind its appropriate substrate with high affinity based on the elementary principle of *complementary shape*.
  + Cofactors are molecules that bind at various sites on an enzyme, which serve to activate the enzyme or improve its biological activity.

## LAB MODULE

* + Enzymes are able to breakdown carbohydrates, proteins, and lipids through a process known as enzymatic hydrolysis.
  + Know the substrate, enzyme, and products yielded by each reaction covered in the lab exercise.
  + What color indicators were used for each for the reaction? What do they indicate?

# INTERACTIVE SKELETAL MUSCLE

## LECTURE SLIDES

* + - What are the characteristics and main functions of skeletal muscle fiber?
    - Understand and be able to identify the main properties of skeletal muscle fiber.
    - What is a sarcomere? What is the functional unit of skeletal muscle?
    - Understand and be able to explain the contraction cycle and sliding filament theory of muscle contraction.
    - Be able to identify each of the following structures:
      1. **H zone**
      2. **A band**
      3. **I band**
      4. **Z disc**
      5. **M line**
    - What is a motor unit? What is the significance of the precision ratio found when discussing the amount of fibers a motor unit innervates?
    - Understand and be able to explain each of the steps involved in a monosynaptic reflex and a crossed-extensor reflex.
    - Understand and be able identify characteristics of each type of skeletal muscle fiber:
      1. **Slow Oxidative**
      2. **Fast Oxidative-Glycolytic**
      3. **Fast Glycolytic**
    - Understand and be able to critically think about each type of muscle contraction:
      1. **Isotonic Concentric contraction**
      2. **Isotonic Eccentric contraction**
      3. **Isometric contraction**

# SKIN AND SENSORY PHYHSIOLOGY

## LECTURE SLIDES

* + Know functional categories of sensory receptors

Chemoreceptors

Photoreceptors

Thermoreceptors

Mechanoreceptors

Nociceptors

* + Skin receptors (function and location)
  + Explain the difference between *myelinated* and *unmyelinated* axons
  + Understand and be able to explain the differences between *phasic* and *tonic* receptors. How does each of receptors respond to a constant stimulus?
  + Principle types of cutaneous glands
  + Skin color (pigmentation)
  + Skin cells: keratinocytes, melanocytes, Langerhans cells, and merkel cells.
  + Understand what dermatomes are (don’t memorize the location of each)
  + Given a light microscopy students should be able to identify each layer of the epidermis in both THICK and THIN skin.

Stratum basale

Stratum spinosum

Stratum granulosum

Stratum lucidum (thick skin only)

Stratum corneum

## LAB MODULE

* + Understand and be able to explain the concepts behind Two-Point Touch Threshold Testing.
  + Identify and match epidermal layers