Physiology Study Guide

Things you need to know/ be able to answer:

Immunity

- Adaptive vs. Innate
- External Innate
- Cell Mediated
- Humoral
- HIV Virus, AIDS, & Viruses in general
- Response rate of secondary immune response (when you’ve already been exposed once before)
- Other Immune Disorders

Hormones

- Types of hormone molecules & the differences between them
- Types of signals & examples
- Glands, Hormones, & Functions of:
  - Thyroid & Parathyroid
  - Pancreas
  - Adrenals
  - Auxins & Ethylene
  - Glucagon vs. Insulin

Neurons & Nervous System

- Neuron structure
- ACTION POTENTIALS
- Steps of signal transmission through a neuron

Transport

- Respiratory surfaces in mammals & arthropods
- Transpiration
- Water Potential

MISC.

- Urine & ADH
- Alcohol & ADH
- Negative vs. positive feedback systems & specific examples of each
- How to interpret or create graphs & calculate rate of transpiration
Example Questions:

Questions 86-87 refer to the diagram below of nerve-impulse transmission.

The average size of stomata will change during different times of a day according to the conditions of the environment. The relationship between the size of stomata opening in a plant and the rate of transpiration is shown in the graph on the right. The graph however is not complete because of missing information X and Y. What could X and Y represent?

- a) Y: The rate of transpiration / X: In still air
- b) Y: The rate of transpiration / X: In the rain
- c) Y: The number of stomata found in the leaves / X: In still air
- d) Y: The number of stomata found in the leaves / X: In the rain
4. The diagram above depicts the response to a pinprick (stimulus) on the tip of a human finger. The arrows show the direction of impulse transmission along the labeled axons. If axon II was damaged before the pinprick, which of the following is most likely?

(A) The person will not feel the pinprick.
(B) The person can no longer feel pain.
(C) The person’s finger will not withdraw reflexively.
(D) The person cannot transmit nerve impulses to the brain.

Antidiuretic hormone (ADH) is important in maintaining homeostasis in mammals. ADH is released from the hypothalamus in response to high tissue osmolarity. In response to ADH, the collecting duct and distal tubule in the kidney become more permeable to water, which increases water reabsorption into the capillaries. The amount of hormone released is controlled by a negative feedback loop.

Based on the model presented, which of the following statements expresses the proper relationship between osmolarity, ADH release, and urine production?

(A) As tissue osmolarity rises, more ADH is released, causing less water to be excreted as urine.
(B) As tissue osmolarity rises, less ADH is released, causing less water to be excreted as urine.
(C) As tissue osmolarity rises, more ADH is released, causing more water to be excreted as urine.
(D) As tissue osmolarity rises, less ADH is released, causing more water to be excreted as urine.
Calculate the rate of transpiration of the control (room) plant and the plant exposed to bright light from minutes 6-12. If you don’t know where to start, try using the slope formula! Compare the rates and give an explanation to why they are similar or different.

9. The diagram above illustrates feedback control as exerted by the hormone thyroxine. Following surgical removal of the thyroid gland, the level of TSH in the blood will increase. Which of the following best explains this increase?

(A) Residual blood thyroxine, from prior to thyroid gland removal, will bind to cells in the anterior pituitary, signaling more TSH secretion.
(B) Thyroxine will remain bound to thyroxine receptors on various body cells, and these body cells will secrete additional hormones that stimulate the anterior pituitary to secrete TSH.
(C) Thyroxine that was stored in the anterior pituitary prior to thyroid gland removal will signal more TSH secretion.
(D) A decrease in thyroxine levels means a loss of inhibition to the hypothalamus and anterior pituitary, leading to increased TSH secretion.