

Examination 3 Review

1. Know the basic structure of the neuron. Important components include: soma, dendrites, axon. What is the function for each of these structures?
2. Know the difference between the following: myelinated and unmyelinated neurons, central vs. peripheral nervous system, afferent vs. efferent neurons, sensory vs. excitatory neurons, white matter vs. gray matter.
3. Understand the basics of how an action potential is generated. What is a resting potential? How do ion channels in the membrane produce a resting membrane potential?
4. What does it mean when we say that “membrane depolarization must reach threshold to initiate an action potential”? If membrane depolarization does not reach threshold what happens?
5. It can be said that an action potential is an “all or none” phenomenon. What does this mean?
6. So how does an action potential travel down the axon of an unmyelinated nerve?
7. How is action potential travel different in myelinated nerves?
8. What is saltatory conduction along a nerve axon? What is a node of Ranvier?
9. Understand this sentence. When an action potential reaches the end of the axon it initiates release of neurotransmitter into the synaptic cleft. The neurotransmitter binds to ion channels on the post-synaptic membrane causing it to depolarize. This changes an electrical signal into a chemical one. If the depolarized post-synaptic membrane reaches threshold then the chemical signal becomes an electrical signal once again and the signal is carried on by the post synaptic neuron.
10. What is a spinal reflex? Give an example of something that would initiate one.
11. What is the difference between a sensory and motor neuron in terms of where they connect to the spinal cord, where the neurons for each are located relative to the spinal cord and what their ultimate function is.
12. What is the difference between gray and white matter in the spinal cord?
13. What are the basic components of the central nervous system; spinal cord, brain stem, cerebellum, thalamus, hypothalamus, cerebral cortex. What are the main functions of each of these regions?
14. What is a hormone receptor? What types of hormones bind to cell membrane receptors vs. intracellular receptors?

15. What is signal transduction with regard to hormone receptors?
16. How does a hormone receptor activate a cell if the hormone is a protein? If the hormone is a steroid?
17. How does a negative feedback system control hormone secretion and how does it work?
18. What is a hormone carrier and what are two functions that it has?
19. Know the basic function for the following endocrine glands: pituitary, thyroid, parathyroid, thymus, adrenal cortex and medulla, endocrine pancreas.
20. The pituitary gland is really two separate glands that have two different mechanisms of function. Know how each works to initiate hormone secretion by that part of the gland.
21. Know the difference between an exocrine and endocrine gland. Hormones produced in the body do not necessarily have to circulate in the blood they can act by a paracrine or autocrine mechanism. What does this mean?
22. Hormones circulate in the blood throughout the body. Why do they not act on all the cells in the body?
23. What is the function of a hormone receptor? When hormones bind to a receptor they must initiate transduction and intracellular signaling within the cell. What does this mean?
24. Some hormones bind to a cell membrane receptor and initiate a signaling cascade of 2nd messengers within the cell. What is a 2nd messenger? How is it generated? How does it affect the cell? What is a signaling cascade and what is its purpose?
25. Where are steroid receptors located and how do they stimulate the cell when bound by a steroid?
26. What is the function of a carrier protein and what is its function? Which types of hormones are associated with carriers?
27. What is hormone half-life? How would a change in half-life affect the ability of a hormone to stimulate cells in the body?
28. Hormone receptors have a high affinity for hormone binding. What does this mean and why is it important to hormone action?
29. What is the primary function of the following hormones and where are they synthesized: cortisol, aldosterone, growth hormone, epinephrine, thyroid hormone, parathyroid hormone