

Practice Midterm 1 – Physiology 2130

TA: Greydon Gilmore

- Which of the following would cause membrane depolarization?**
 - Opening of voltage-gated Na⁺ channels
 - Opening of chemically-gated K⁺ channels
 - Closing of voltage-gated Na⁺ channels
 - Closing of mechanically-gated Na⁺ channels
- Which of the following solutions would cause a red blood cell to swell?**
 - 200mM NaCl
 - 300mM NaCl
 - 150 mM KCl
 - 100 mM KCl
- Which of the following is true regarding action potentials?**
 - They flow from axon terminal to soma
 - They flow from the axon hillock to the axon terminal
 - They flow from the post-synaptic membrane to the axon hillock
 - They flow from the axon hillock to the dendrites
- Which of the following would decrease diffusion of a small, hydrophobic molecule?**
 - Increased membrane surface area
 - Decreased membrane thickness
 - Decreased concentration gradient
 - Decreased ATP availability in the cell
- Which of the following will happen if an axon is unmyelinated (compared to a myelinated axon)?**
 - The neuron would be unable to propagate action potentials along its axon
 - The action potential would flow in the opposite direction
 - The action potential would be propagated slower
 - The action potential would be propagated faster
- Following a lesion of the arm area of somatosensory cortex, all of the following can occur except:**
 - Decreased ability to detect 2 points on the arm
 - Decreased ability to detect temperature changes on the skin of the arm
 - Decreased ability to feel pain on the skin of the arm
 - Decreased ability to move the arm
- Which of the following is responsible for restoring resting membrane potential?**
 - Potassium channels
 - Sodium/potassium pump
 - Sodium channels
 - Cytoplasmic resistance

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8. **A molecule of glucose is attempting to cross the membrane. Which of the following will affect the rate of its diffusion?**
- A. The number of carrier proteins in the membrane
 - B. The number of ion channels in the membrane
 - C. The amount of ATP in the cell
 - D. The number of Na⁺/K⁺ ATPases on the membrane
9. **If you placed a red blood cell in the following solutions, which one will make the cell swell?**
- A. 100 mM NaCl + 100 mM glucose
 - B. 100 mM NaCl + 100 mM KCl
 - C. 100 mM glucose + 100 mM CaCl₂
 - D. 50 mM NaCl + 50 mM glucose
10. **Which of the following happen at the peak of the action potential (+30 mV)?**
- A. Voltage gated Na⁺ channels inactivate
 - B. Voltage gated K⁺ channels inactivate
 - C. Voltage gated Ca²⁺ channels open
 - D. Voltage gated Na⁺ channels open
11. **Which of the following is true regarding the spinal cord? (This is just for practice)**
- A. The C1 spinal cord segment receives sensory input from all cervical dermatomes
 - B. The C1 spinal cord segment receives sensory input from the head and face
 - C. Lesion of the spinal cord at C8 will affect sensory input from all thoracic dermatomes
 - D. Lesion of the spinal cord at L1 will affect sensory input from all thoracic dermatomes
12. **In comparison to an action potential, a graded potential:**
- A. Has a longer absolute refractory period
 - B. Is always a depolarization
 - C. Duration varies with duration of stimulus
 - D. Only occurs if membrane potential reaches threshold
13. **Which of the following best describes endocrine/hormonal signaling?**
- A. A cell sending a signal to itself
 - B. A cell sending a signal to its neighbour
 - C. A neuron sending a neurotransmitter to another neuron
 - D. A cell sending a signal to a distant organ
14. **Which of the following is responsible for the absolute refractory period?**
- A. Increased activity of the sodium/potassium pump
 - B. The sodium channel activation gate closing
 - C. The sodium channel inactivation gate closing
 - D. Voltage gated potassium channels opening

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- 15. The aperture controlling the amount of light entering the eye is called?**
- A. The pupil
 - B. The lens
 - C. The iris
 - D. Ciliary muscles
- 16. The rods and the cones synapse directly on to:**
- A. Bipolar cells
 - B. Amacrine cells
 - C. Ganglion cells
 - D. Horizontal cells
- 17. The frequency range for human hearing is:**
- A. 10-10,000 Hz
 - B. 20-20,000 Hz
 - C. 30-30,000 Hz
 - D. 40-40,000 Hz
- 18. Which part of the ear is responsible for converting sound waves into fluid waves?**
- A. Tympanic membrane
 - B. Round window
 - C. Cochlea
 - D. Oval Window
- 19. The organization of the pathway in the ear, from lateral to medial:**
- A. Ear canal → Malleus → Incus → Stapes → Oval window
 - B. Ear canal → Malleus → Incus → Stapes → Round window
 - C. Ear canal → Incus → Malleus → Stapes → Oval window
 - D. Ear canal → Incus → Malleus → Stapes → Round window
- 20. Hypothalamus connected to pituitary gland via?**
- A. Pituitary stalk (infundibulum)
 - B. Nerves
 - C. Blood
 - D. No connection

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Directions: For each of the questions below, ONE or MORE of the answers given is correct. Answer:

(A) if only 1,2 and 3 are correct

(B) if only 1 and 3 are correct

(C) if only 2 and 4 are correct

(D) if only 4 is correct

(E) if ALL are correct

21. You accidentally prick your finger with a needle. Which of the following will happen?

- 1) The signal will be sent through the dorsal root of the spinal nerve
- 2) The signal will be sent through the ventral root of the spinal nerve
- 3) The signal will be sent to the parietal lobe of the brain
- 4) The signal will be sent to the occipital lobe of the brain

- A. 1,2 and 3 are correct
- B. 1 and 3 are correct
- C. 2 and 4 are correct
- D. Only 4 is correct
- E. ALL are correct

22. Which of the following is/are true regarding cellular communication?

- 1) Hormone signaling relies on transport through the circulation
- 2) Paracrine signaling allows for long-distance communication
- 3) Autocrine signaling is a cell communicating with itself
- 4) Neurotransmission occurs through gap-junctions

- A. 1,2 and 3 are correct
- B. 1 and 3 are correct
- C. 2 and 4 are correct
- D. Only 4 is correct
- E. ALL are correct

23. Which of the following substances can undergo simple diffusion through the plasma membrane?

- 1) Oxygen
- 2) Water
- 3) Steroid hormones
- 4) Potassium ions

- A. 1,2 and 3 are correct
- B. 1 and 3 are correct
- C. 2 and 4 are correct
- D. Only 4 is correct
- E. ALL are correct

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24. Which of the following relationships are true regarding mechanoreceptors?

- 1) Receptors superficial in the skin have small receptive fields
- 2) Receptors deep in the skin have low tactile acuity
- 3) Receptors with small receptive fields have high tactile acuity
- 4) Receptors with large receptive fields have high tactile acuity

- A. 1,2 and 3 are correct
- B. 1 and 3 are correct
- C. 2 and 4 are correct
- D. Only 4 is correct
- E. ALL are correct

25. A patient goes to the doctor with vision trouble. The patient cannot see the right hemifield.

Where does this patient most likely have a lesion?

- 1) Left optic tract
- 2) Right LGN
- 3) Left LGN
- 4) Right optic nerve

- A. 1,2 and 3 are correct
- B. 1 and 3 are correct
- C. 2 and 4 are correct
- D. Only 4 is correct
- E. ALL are correct

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Answer Key

1. A
2. D
3. B
4. C
5. C
6. D
7. A
8. A
9. D
10. A
11. C
12. C
13. D
14. C
15. C
16. A
17. B
18. D
19. A
20. A
21. B
22. B
23. B
24. A
25. B