

Quiz Yourself: Chapter 9

Choices can be used more than once or not at all

1-5. Matching

- | | | |
|-------------------|--|-----------------|
| A) emmetropic eye | eyeball is normal length | 1) <u> A </u> |
| B) hyperopic eye | eyeball is longer than normal | 2) <u> C </u> |
| C) myopic eye | eyeball is shorter than normal | 3) <u> B </u> |
| | Eye lens cannot become more convex as needed for near vision | 4) <u> B </u> |
| | Eye lens cannot become less convex as needed for distance vision | 5) <u> C </u> |

6-10. Matching (connects to)

- | | | |
|-----------------------------|---------------------------------|------------------|
| A) left retina of left eye | left optic tract | 6) <u> D </u> |
| B) left retina of right eye | left optic nerve | 7) <u> E </u> |
| C) right retina of left eye | left superior colliculus | 8) <u> D </u> |
| D) A and B | left primary visual cortex | 9) <u> D </u> |
| E) A and C | left lateral geniculate nucleus | 10) <u> D </u> |

11-15. Place in order the events following a photoreceptor absorbing light.

- | | | |
|--|--------|------------------|
| A) release of glutamate is reduced | first | 11) <u> C </u> |
| B) phosphodiesterase is activated | second | 12) <u> B </u> |
| C) opsin activates G-protein (transducin) | third | 13) <u> D </u> |
| D) Phosphodiesterase breaks down cyclic-GMP | fourth | 14) <u> E </u> |
| E) voltage gated sodium and calcium channels close | fifth | 15) <u> A </u> |

16-20. Place in order the events following exposure of the basilar membrane to movement.

- | | | |
|---|--------|------------------|
| A) movement of the stereocilia toward the tallest cilia opens K ⁺ channels | first | 16) <u> B </u> |
| B) stereocilia of hair cells bend against tectorial membrane | second | 17) <u> A </u> |
| C) synaptic vesicles fuse with the presynaptic membrane | third | 18) <u> D </u> |
| D) voltage gated calcium channels open | fourth | 19) <u> C </u> |
| E) glutamate is released | fifth | 20) <u> E </u> |

Fill in

21. Near sightedness is corrected with concave lenses.
22. Yellow light causes a (n) increase in glutamate release from blue absorbing photoreceptors.
23. Damage to the left optic nerve would cause blindness in the left eye.
24. High frequency sound is detected by portions of the cochlea near the oval window.
25. Movement of the vestibular and basement membranes is detected by hair cells in the cochlear duct.

Study Questions

1. Explain the mechanisms responsible for accommodation of the lens.
2. Describe the organization of the retina and explain the mechanisms responsible for the detection of lightness and darkness by the photoreceptors.
3. Describe the organization of the cochlea and explain the mechanisms responsible for the detection of sound by the hair cells. Include the detection of different frequencies.

Quiz Yourself: Chapter 11

Choices can be used more than once or not at all

1-5. Matching

- | | | |
|--------------------|--|-------------|
| A) Skeletal muscle | Contain(s) troponin | 1) <u>E</u> |
| B) Cardiac muscle | Contain(s) tropomyosin | 2) <u>D</u> |
| C) Smooth muscle | Contain(s) actin and myosin | 3) <u>D</u> |
| D) A, B, and C | ATPase of myosin heads is intrinsically active | 4) <u>E</u> |
| E) A and B | ATPase of myosin heads must be activated by light-chain kinase | 5) <u>C</u> |

6-10. Place the following in order as they would occur in a skeletal or cardiac muscle cell.

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|---|--------|--------------|
| A) Muscle cell contracts | first | 6) <u>C</u> |
| B) Myosin heads bind to actin | second | 7) <u>E</u> |
| C) Ca^{2+} diffuses into intracellular fluid | third | 8) <u>B</u> |
| D) Myosin head bends and pulls actin toward M-line | fourth | 9) <u>D</u> |
| E) Ca^{2+} binds to troponin and moves tropomyosin away from actin | fifth | 10) <u>A</u> |

11-15. Place these steps in the order causing activation of skeletal muscle cell by a neuron.

- | | | |
|---|--------|--------------|
| A) Action potential propagates along sarcolemma | first | 11) <u>D</u> |
| B) Calcium ions are released from sarcoplasmic reticulum (SR) | second | 12) <u>C</u> |
| C) Acetylcholine binds to nicotinic-m receptors in motor end plate | third | 13) <u>A</u> |
| D) Acetylcholine is released from motor neuron bulb into synaptic cleft | fourth | 14) <u>E</u> |
| E) Action potential opens voltage gated Ca^{2+} channels in T-tubules and SR | fifth | 15) <u>B</u> |

16-20. Place these steps in order for initiating smooth muscle contraction.

- | | | |
|---|--------|--------------|
| A) Myosin light chain (MLC) kinase is activated by calcium-calmodulin | first | 16) <u>A</u> |
| B) MLC kinase activates (Pi) the ATPase of myosin head | second | 17) <u>B</u> |
| C) ATPase splits ATP and energizes the cross bridges | third | 18) <u>C</u> |
| D) Myosin head bends and pulls actin toward M-line | fourth | 19) <u>E</u> |
| E) Myosin head bind to actin | fifth | 20) <u>D</u> |

Fill in (MLC = myosin light chain)

21. In skeletal and cardiac muscle myosin cross bridges are phosphorylated and activated by ATP.
22. In skeletal and cardiac muscle actin must be uncovered to allow cross bridge cycling.
23. In skeletal and cardiac muscle calcium binds to troponin and uncovers actin.
24. In smooth muscle calcium is involved in activating MLC kinase.
25. In smooth muscle MLC kinase is necessary to activate / phosphorylate the ATPase of the myosin heads and allow cross bridge cycling.

Study Questions

1. Explain how nervous stimulation will cause the contraction of skeletal muscle.
2. Explain the role of calcium in muscle contraction. Include differences between skeletal, cardiac, and smooth muscle.
3. Compare and contrast the mechanisms for control of contraction of skeletal muscle, cardiac muscle, and smooth muscle.

Quiz Yourself: Chapter 12

Choices can be used more than once or not at all

1-5. Matching (in the context of Motor Neurons)

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|-------------------|--|-----------------|
| A) Synaptic bulbs | generate action potentials | 1) <u> B </u> |
| B) Axon Hillock | release neurotransmitters | 2) <u> A </u> |
| C) Dendrites | convey signals from the dendrite | 3) <u> D </u> |
| D) Cell body | receive signals from other neurons | 4) <u> C </u> |
| E) Axon | conduct signals toward the synaptic bulb | 5) <u> E </u> |

6-10. Matching

- | | | |
|----------------------|--|------------------|
| A) Stretch reflexes | provide for automatic adjustment of skeletal muscle length | 6) <u> A </u> |
| B) Myotatic reflexes | prevent unusually high tension in a muscle | 7) <u> B </u> |
| C) Flexor reflexes | withdraw a limb from noxious stimuli | 8) <u> C </u> |
| | triggered by Golgi tendon organs | 9) <u> B </u> |
| | triggered by muscle spindles | 10) <u> A </u> |

11-15. Place the following events in order following stretch of a skeletal muscle.

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|---|------------------|
| A) Muscle spindle stretches | 11) <u> A </u> |
| B) Action potential is initiated in the alpha motor neuron | 12) <u> D </u> |
| C) Neurotransmitter is released onto alpha motor neuron | 13) <u> C </u> |
| D) Action potential is initiated in the spindle sensory neuron | 14) <u> B </u> |
| E) Acetylcholine is released onto skeletal (extrafusal) muscle cell | 15) <u> E </u> |

16-20. Matching

- | | | |
|--------------------------|---|------------------|
| A) Medial motor pathway | tectospinal tract | 16) <u> A </u> |
| B) Lateral motor pathway | corticospinal tract | 17) <u> B </u> |
| | vestibulospinal tract | 18) <u> A </u> |
| | involved in control of distal muscles and fine movement | 19) <u> B </u> |
| | involved in control of proximal, head and trunk muscles and posture | 20) <u> A </u> |

Fill in

21. A motor unit is an alpha motor neuron and the skeletal muscle cells it innervates
22. Gamma motor neurons adjust the set point of muscle spindles.
23. The posterior parietal cortex is involved in control of body image and perception of spatial relations.
24. The primary motor cortex is involved in control of distal muscles.
25. The basal nuclei are involved in the selection / initiation of willed movement.

Study Questions

1. Describe the organization of motor neurons and motor units.
2. Describe the function of and circuitry for stretch reflexes. Include the role of muscle spindles, alpha motor neurons, and gamma motor neurons.
3. Compare and contrast the organization and function of the medial and lateral motor pathways.
4. Explain the role of the pre-central gyrus, pre-motor area, supplementary motor area, pre-frontal cortex, posterior parietal cortex, thalamus and basal nuclei in the control of voluntary movement.