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練習問題

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1年間無料アップデート

Exam : **CSCS**

Title : Certified Strength and Conditioning Specialist

Version : DEMO

1.Which structure carries the action potential from the muscle-fiber surface into its interior?
A. Myofibrils
B. T-tubules
C. Sarcoplasmic reticulum
Answer: B
Explanation:
T-tubules are inward extensions of the muscle-fiber membrane that carry electrical excitation into the cell. This helps coordinate activation throughout the fiber. The sarcoplasmic reticulum stores and releases calcium, whereas myofibrils contain the contractile apparatus; these structures have related but distinct roles.
Why A is incorrect: Myofibrils contain the contractile filaments rather than serving as membrane pathways for the action potential.
Why C is incorrect: The sarcoplasmic reticulum handles calcium storage and release; T-tubules conduct excitation inward.
Review: Essentials of Strength Training and Conditioning, 5th ed., Chapter 1, PDF pp. 51, 57.

2.A single sarcomere extends between which structures?
A. Two adjacent Z-lines
B. Two adjacent M-lines
C. The ends of one thick filament
Answer: A
Explanation:
The sarcomere is the repeating contractile unit between adjacent Z-lines. Thin filaments anchor to the Z-lines, and thick filaments occupy the central region around the M-line. A thick filament lies within a sarcomere but does not define the full boundaries of that unit.
Why B is incorrect: Adjacent M-lines span portions of two neighboring sarcomeres rather than the defined Z-line boundaries.
Why C is incorrect: The thick filament marks the A-band, which is only part of the sarcomere.
Review: Essentials of Strength Training and Conditioning, 5th ed., Chapter 1, PDF pp. 48–49, 51.

3.Which connective-tissue layer surrounds a fascicle within skeletal muscle?
A. Perimysium
B. Epimysium
C. Endomysium
Answer: A
Explanation:
A fascicle is a bundle of muscle fibers. The perimysium encloses each fascicle and helps organize force transmission through the muscle.
Why B is incorrect: Epimysium surrounds the entire muscle, a larger organizational level.
Why C is incorrect: Endomysium surrounds an individual muscle fiber, a smaller organizational level.
Review: Essentials of Strength Training and Conditioning, 5th ed., Chapter 1, PDF pp. 46.

4.Which muscle-fiber structure serves as the principal intracellular calcium store used for excitation–contraction coupling?

A. Myofibril
B. Sarcoplasmic reticulum
C. Sarcolemma
Answer: B
Explanation:
The sarcoplasmic reticulum stores calcium and releases it when the muscle fiber is activated. Calcium then permits the contractile proteins to interact.
Why A is incorrect: A myofibril contains the contractile machinery organized into sarcomeres; calcium is stored in the surrounding sarcoplasmic reticulum.
Why C is incorrect: The sarcolemma is the fiber membrane along which an action potential travels; it is not the principal calcium store.
Review: Essentials of Strength Training and Conditioning, 5th ed., Chapter 1, PDF pp. 51.

5.Which protein helps carry oxygen within skeletal muscle cells?
A. Myoglobin
B. Hemoglobin
C. Troponin
Answer: A
Explanation:
Myoglobin supports intracellular oxygen transport. Increased myoglobin content can complement mitochondrial adaptations to aerobic training.
Why B is incorrect: Hemoglobin carries oxygen in red blood cells and supplies the blood-side transport function.
Why C is incorrect: Troponin regulates the contractile apparatus in response to calcium, rather than carrying oxygen.
Review: Essentials of Strength Training and Conditioning, 5th ed., Chapter 6, PDF pp. 348.