

Muscle Tissue Quiz Questions and Answers PDF

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How does the phosphagen system contribute to muscle metabolism?

The phosphagen system contributes to muscle metabolism by rapidly regenerating ATP from creatine phosphate, enabling sustained muscle contraction during short, intense physical activities.

Which structure releases calcium ions to initiate muscle contraction?

- T-tubules
- Sarcoplasmic reticulum ✓**
- Myofibrils
- Sarcolemma

The sarcoplasmic reticulum is the structure responsible for storing and releasing calcium ions, which are crucial for initiating muscle contraction. When a muscle cell is stimulated, calcium ions are released from the sarcoplasmic reticulum into the cytoplasm, triggering the contraction process.

Explain the role of calcium ions in muscle contraction.



Calcium ions are released from the sarcoplasmic reticulum into the cytoplasm, where they bind to troponin, causing a conformational change that moves tropomyosin away from actin's binding sites, enabling myosin to bind to actin and facilitate muscle contraction.

Which factors contribute to muscle fatigue?

- Lactic acid accumulation ✓
- Oxygen debt ✓
- Increased ATP production
- Depletion of glycogen stores ✓

Several factors contribute to muscle fatigue, including the depletion of energy sources like ATP and glycogen, the accumulation of metabolic byproducts such as lactic acid, and the impairment of neuromuscular function.

Which muscle tissue type is found in the walls of hollow organs?

- Skeletal Muscle
- Cardiac Muscle
- Smooth Muscle ✓
- All of the above

Smooth muscle tissue is responsible for involuntary movements and is found in the walls of hollow organs such as the intestines, blood vessels, and bladder.

What neurotransmitter is involved at the neuromuscular junction?

- Dopamine
- Serotonin
- Acetylcholine ✓
- GABA

The neurotransmitter involved at the neuromuscular junction is acetylcholine. It plays a crucial role in transmitting signals from motor neurons to muscle fibers, leading to muscle contraction.

Which condition is characterized by a progressive loss of muscle mass due to aging?

- Muscular dystrophy
- Myasthenia gravis
- Sarcopenia ✓
- Hyperplasia

Sarcopenia is the condition characterized by a progressive loss of muscle mass and strength due to aging. It is a common issue among older adults and can significantly impact mobility and overall health.

Which muscle fiber type is more resistant to fatigue?

- Fast-twitch fibers
- Slow-twitch fibers ✓
- Intermediate fibers
- None of the above

Type I muscle fibers, also known as slow-twitch fibers, are more resistant to fatigue compared to Type II fibers. They are designed for endurance activities and can sustain prolonged contractions without tiring quickly.

Which of the following are components of a motor unit?

- Single motor neuron ✓
- All muscle fibers it innervates ✓
- Intercalated discs
- T-tubules

A motor unit consists of a motor neuron and all the muscle fibers it innervates. This unit is essential for muscle contraction and coordination of movement.

Which disorders are associated with muscle tissue?

- Muscular dystrophy ✓
- Osteoporosis
- Myasthenia gravis ✓
- Arthritis

Disorders associated with muscle tissue include muscular dystrophies, myopathies, and rhabdomyolysis, which affect muscle function and structure.

What is the function of satellite cells in muscle repair and regeneration?

Satellite cells are responsible for muscle repair and regeneration by activating in response to injury, proliferating, and differentiating into myoblasts that contribute to muscle fiber formation.

What is the primary function of cardiac muscle?

- Movement of bones
- Pumping blood ✓
- Digestion
- Heat production

The primary function of cardiac muscle is to contract and pump blood throughout the body, ensuring the circulation of oxygen and nutrients to tissues and organs.

Which type of muscle tissue is under voluntary control?

- Cardiac Muscle
- Smooth Muscle
- Skeletal Muscle ✓
- None of the above

Skeletal muscle tissue is the type of muscle that is under voluntary control, allowing for conscious movement of the body. This contrasts with cardiac and smooth muscle tissues, which operate involuntarily.

Which of the following are characteristics of skeletal muscle?

- Striated appearance ✓
- Involuntary control

- Multinucleated cells ✓**
- Found in heart walls

Skeletal muscle is characterized by its striated appearance, voluntary control, and ability to contract rapidly and powerfully. It is primarily responsible for movement and maintaining posture in the body.

What is the main energy source for muscle contraction?

- Glucose
- ATP ✓**
- Fatty acids
- Protein

The primary energy source for muscle contraction is adenosine triphosphate (ATP), which provides the necessary energy for the interaction between actin and myosin filaments during muscle contraction.

Describe the differences between hypertrophy and hyperplasia in muscle growth.

Hypertrophy is the enlargement of existing muscle fibers due to increased workload and resistance training, whereas hyperplasia is the formation of new muscle fibers, which is less common in humans and typically occurs in response to certain stimuli.

What processes are involved in muscle contraction according to the sliding filament theory?

- Actin and myosin interaction ✓**
- Release of calcium ions ✓**
- Breakdown of glycogen
- Use of ATP ✓**

The sliding filament theory explains that muscle contraction occurs through the interaction of actin and myosin filaments, where myosin heads attach to actin, pull, and slide the filaments past each other, shortening the muscle fiber.

What is the significance of intercalated discs in cardiac muscle?

Intercalated discs are significant in cardiac muscle because they enable electrical coupling and mechanical adhesion between adjacent cardiac myocytes, ensuring coordinated heart contractions.

Discuss the impact of aging on muscle tissue and how it leads to sarcopenia.

The impact of aging on muscle tissue includes a reduction in muscle fiber size and number, hormonal changes that affect muscle maintenance, and decreased physical activity, all contributing to sarcopenia.

What are the roles of smooth muscle in the body?

- Peristalsis ✓**
- Blood flow regulation ✓**
- Heat production
- Movement of bones

Smooth muscle plays a crucial role in involuntary movements within the body, including the contraction of blood vessels, the movement of food through the digestive tract, and the regulation of airflow in the respiratory system.