Anatomy and Physiology (ANAPHY) Battery Practice Exam (Sample)

Study Guide

Everything you need from our exam experts!

Questions

1. What is the function of myelin in neurons?

A. To store neurotransmitters

B. To insulate axons and speed up nerve impulses

C. To connect sensory organs to the brain

D. To provide structural support to the neuron

2. Which type of muscle is involuntary and found in the walls of organs?

A. Cardiac muscle

B. Skeletal muscle

C. Smooth muscle

D. Voluntary muscle

3. What is one of the primary benefits of sebaceous gland secretion?

A. Increases bacterial growth

B. Skin becomes rough

C. Prevents dryness

D. Promotes inflammation

4. What is the primary component found in the extracellular matrix of bone?

A. Collagen fibers

B. Adipose tissue

C. Hyaline cartilage

D. Elastic cartilage

5. What is the fundamental tissue type found in the liver?

A. Connective

B. Muscle

C. Epithelial

D. Nervous

6. In describing properties of muscular tissues, elasticity refers to:

- **A. The ability to conduct electrical impulses**
- **B. The ability to stretch beyond resting length**
- **C. The ability to return to original shape after contraction or extension**
- **D. The ability to create force or tension**

7. What does the term "synchondrosis" refer to in the context of joint classification?

- **A. A type of fibrous joint**
- **B. A type of cartilaginous joint**
- **C. A type of synovial joint**
- **D. A type of compound joint**

8. What is the sliding filament theory?

- **A. The mechanism of nerve impulse transmission**
- **B. The concept of how muscles relax and return to resting length**
- **C. The explanation of how muscles contract by the sliding of actin and myosin filaments past each other**
- **D. The process of energy production in muscle cells**

9. What part of the neuron receives signals from other neurons?

- **A. The axon**
- **B. The cell body**
- **C. The dendrites**
- **D. The synapse**

10. What occurs during inspiration?

- **A. The diaphragm contracts and air is drawn into the lungs**
- **B. The diaphragm relaxes and air is expelled from the lungs**
- **C. Oxygen is transported from the blood to the tissues**
- **D. The rib cage collapses and decreases lung volume**

Answers

1. B
2. C
3. C
4. A
5. C
6. C
7. B
8. C
9. C
10. A

Explanations

1. What is the function of myelin in neurons?

A. To store neurotransmitters

B. To insulate axons and speed up nerve impulses

C. To connect sensory organs to the brain

D. To provide structural support to the neuron

Myelin plays a critical role in the functioning of neurons, primarily by insulating axons, which significantly enhances the speed of nerve impulse conduction. Myelin is a fatty substance that wraps around the axons of certain neurons, forming what is known as the myelin sheath. This sheath not only protects the axon but also prevents the loss of electrical signals during the transmission of impulses. The presence of myelin allows action potentials, or electrical impulses, to jump from one node of Ranvier (gaps in the myelin sheath along the axon) to another, in a process called saltatory conduction. This mode of transmission is much faster than continuous conduction in unmeylinated axons, allowing for quicker communication between nerve cells and facilitating rapid responses in the nervous system. Through this mechanism, myelin is essential for efficient and effective neural communication, which is vital for the proper functioning of the nervous system.

2. Which type of muscle is involuntary and found in the walls of organs?

A. Cardiac muscle

B. Skeletal muscle

C. Smooth muscle

D. Voluntary muscle

Smooth muscle is the correct choice because it is a type of muscle tissue that is involuntary and found in the walls of hollow organs such as the intestines, blood vessels, bladder, and uterus. This muscle type functions without conscious control, allowing for automatic regulation of processes like digestion and blood flow. The cells of smooth muscle are non-striated, have a spindle shape, and contract slowly and rhythmically. Cardiac muscle is also involuntary, but it is specifically found only in the heart. It shares some characteristics with skeletal muscle, such as striations, but its primary function is to pump blood throughout the body. Skeletal muscle is voluntary muscle, meaning it is under conscious control and is responsible for movements of the skeleton. It is striated and typically attached to bones. Voluntary muscle refers to all muscles that are consciously controlled, which includes skeletal muscle but not smooth or cardiac muscle. Therefore, the distinctive characteristics of smooth muscle make it the appropriate answer to this question, as it is the only type specifically associated with the involuntary control and the walls of internal organs.

3. What is one of the primary benefits of sebaceous gland secretion?

A. Increases bacterial growth

B. Skin becomes rough

C. Prevents dryness

D. Promotes inflammation

Sebaceous glands secrete an oily substance called sebum, which plays a crucial role in maintaining skin health. One of the primary benefits of this secretion is its ability to prevent dryness. Sebum coats the skin and hair, providing a protective layer that helps retain moisture, keeping the skin hydrated and supple. This barrier is essential for preventing the skin from becoming dry, flaky, and irritated. The maintenance of skin moisture is vital for overall skin health, as it helps to protect against environmental factors and supports the skin's natural barrier function. In addition, the lubricating properties of sebum contribute to maintaining the integrity of the skin surface, promoting overall skin vitality and appearance.

4. What is the primary component found in the extracellular matrix of bone?

A. Collagen fibers

B. Adipose tissue

C. Hyaline cartilage

D. Elastic cartilage

The primary component found in the extracellular matrix of bone is collagen fibers. Collagen is a protein that provides structural support and strength to bone tissue, making it one of the most abundant proteins in the body. In bone, collagen fibers form a scaffold that helps to organize minerals such as hydroxyapatite, which gives bone its hardness and rigidity. This combination of collagen and mineral content is crucial for the overall mechanical properties of bone, allowing it to withstand various forces and stresses. Other components, like elastin, may be found in different types of connective tissues but are not predominant in bone. Adipose tissue, hyaline cartilage, and elastic cartilage serve specific roles in the body but do not constitute the primary structure of bone's extracellular matrix. Adipose tissue is primarily for energy storage, while hyaline and elastic cartilage provide support and flexibility in different joints and structures. Therefore, collagen fibers distinctly mark the primary element responsible for the integrity and structure of the bone's extracellular matrix.

5. What is the fundamental tissue type found in the liver?

A. Connective

B. Muscle

C. Epithelial

D. Nervous

The liver is primarily composed of epithelial tissue, specifically a specialized type known as hepatocytes, which are the main functional cells of the organ. Epithelial tissue serves various essential functions, including secretion, absorption, and protection. In the case of the liver, hepatocytes play a critical role in metabolic processes, detoxification, and the production of important substances like bile. While other tissue types such as connective, muscle, and nervous tissues are present in the liver, they serve supportive and regulatory roles rather than constituting the primary structure. For instance, connective tissue provides the framework for the liver and houses blood vessels, while muscle tissue is not a significant component. Nervous tissue is involved in the regulation of liver functions, but it is not a fundamental tissue type of the liver itself. Thus, the main functional aspect of the liver is rooted in its epithelial nature, making this answer the most accurate.

6. In describing properties of muscular tissues, elasticity refers to:

A. The ability to conduct electrical impulses

B. The ability to stretch beyond resting length

C. The ability to return to original shape after contraction or extension

D. The ability to create force or tension

Elasticity in muscular tissues specifically refers to their ability to return to their original shape after being stretched or contracted. This property is crucial for muscles to function effectively, as it allows them to relax and restore their shape after movement. For example, when a muscle contracts during an action, it temporarily shortens and can deform. Once the contraction ends, the muscle fibers regain their original length and shape due to their elastic properties, enabling them to be ready for subsequent contractions. This characteristic is essential for maintaining muscle function and stability in the body, ensuring that muscles can repeatedly cycle through contraction and relaxation without losing their structural integrity.

7. What does the term "synchondrosis" refer to in the context of joint classification?

A. A type of fibrous joint

B. A type of cartilaginous joint

C. A type of synovial joint

D. A type of compound joint

The term "synchondrosis" refers specifically to a type of cartilaginous joint. In a synchondrosis joint, the bones are joined together by hyaline cartilage. This type of joint allows for growth and movement to some extent, although it is generally less mobile than synovial joints. Synchondroses are typically found in locations such as the epiphyseal plates in growing bones or the joint between the first rib and the sternum, where the cartilaginous material provides stability while still accommodating growth. In contrast, fibrous joints are connected by dense connective tissue and typically do not allow for much movement, synovial joints are characterized by a synovial cavity allowing for a wide range of motion, and compound joints involve more than two articulating surfaces. Understanding these classifications helps clarify the functional capabilities and structural characteristics of the different types of joints in the human body.

8. What is the sliding filament theory?

A. The mechanism of nerve impulse transmission

B. The concept of how muscles relax and return to resting length

C. The explanation of how muscles contract by the sliding of actin and myosin filaments past each other

D. The process of energy production in muscle cells

The sliding filament theory is a fundamental concept that explains how muscles contract at the molecular level. This theory posits that muscle contraction occurs through the sliding of two types of filaments—actin (thin filaments) and myosin (thick filaments)—past each other. When a muscle is stimulated to contract, the myosin heads attach to specific binding sites on the actin filaments, forming cross-bridges. Through a series of steps fueled by ATP, the myosin heads pivot and pull the actin filaments toward the center of the sarcomere, which is the basic contractile unit of muscle tissue. This coordinated action leads to a shortening of the muscle fiber, resulting in muscle contraction. This explanation is crucial for understanding not just how muscles work, but also the interactions between different proteins involved in muscle physiology. By grasping the sliding filament theory, one gains insight into the mechanics of movement and the biochemical processes involved in muscle contraction.

9. What part of the neuron receives signals from other neurons?

A. The axon

B. The cell body

C. The dendrites

D. The synapse

The correct choice is the dendrites. Dendrites are specialized extensions of the neuron that are primarily responsible for receiving incoming signals from other neurons. They have numerous branch-like structures covered with tiny receptors that interact with neurotransmitters released from adjacent neurons. This allows dendrites to convert chemical signals into electrical signals, which then travel through the neuron. In contrast, the axon is responsible for transmitting electrical impulses away from the cell body to other neurons or muscles, making it part of the signaling process, but not involved in reception. The cell body contains the nucleus and cellular machinery but does not receive signals directly. The synapse is the junction between two neurons where neurotransmitter release occurs, facilitating communication, but it is not a structure that receives signals; rather, it is the site where the signals are transferred from one neuron to another. Thus, dendrites are crucial for the initial reception of signals in the neural communication process.

10. What occurs during inspiration?

A. The diaphragm contracts and air is drawn into the lungs

B. The diaphragm relaxes and air is expelled from the lungs

C. Oxygen is transported from the blood to the tissues

D. The rib cage collapses and decreases lung volume

During inspiration, the diaphragm contracts and moves downward, increasing the volume of the thoracic cavity. This expansion creates a negative pressure inside the lungs relative to the outside atmosphere, causing air to be drawn into the lungs through the airways. The intercostal muscles also assist by contracting to lift the rib cage upwards and outwards, further increasing lung capacity and facilitating air intake. This process is essential for the exchange of gases, as it allows oxygen to enter the lungs and subsequently diffuse into the bloodstream for transportation to the tissues. The correct understanding of this mechanism is crucial for grasping basic respiratory physiology.