DIVE Biology Quarterly Exam 4 Practice (Sample)

Study Guide

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Questions

1. **What term describes a disorder where the immune system reacts to harmless substances?**
   - **A. Autoimmune disease**
   - **B. Allergy**
   - **C. Immunodeficiency**
   - **D. Inflammation**

2. **What is the name of the fluid-filled sac that surrounds and cushions the embryo?**
   - **A. Chorion**
   - **B. Amnion**
   - **C. Placenta**
   - **D. Yolk sac**

3. **Which type of immunity is developed after exposure to a pathogen?**
   - **A. Passive immunity**
   - **B. Active immunity**
   - **C. Innate immunity**
   - **D. Adaptive immunity**

4. **What is a simple linear representation of the nutritional relationships among various species within an ecosystem?**
   - **A. Food web**
   - **B. Food chain**
   - **C. Energy pyramid**
   - **D. Ecosystem diagram**

5. **Which type of muscle tissue is responsible for voluntary movements?**
   - **A. Skeletal muscle**
   - **B. Cardiac muscle**
   - **C. Visceral muscle**
   - **D. Antagonists**

6. What is the name of the involuntary muscle tissue found in the heart?

A. Cardiac muscle

B. Visceral muscle

C. Antagonists

D. Origin

7. Which structures are extremely small vessels that absorb excess fluid from tissue spaces?

A. Lymph nodes

B. Lymph vessels

C. Lymph capillaries

D. Capillaries

8. Which of the following best describes the role of glucagon in the body?

A. Stimulates insulin production

B. Increases blood sugar levels

C. Decreases metabolic rate

D. Inhibits adrenal activity

9. What is one type of protein found in blood plasma?

A. Globulin

B. Insulin

C. Fibrinogen

D. Keratin

10. What is it called when organisms collectively are disturbed by changes in their ecosystem?

A. Habitat destruction

B. Environmental degradation

C. Ecological disruption

D. Species extinction

Answers

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

Explanations

1. What term describes a disorder where the immune system reacts to harmless substances?

A. Autoimmune disease

B. Allergy

C. Immunodeficiency

D. Inflammation

The term that describes a disorder where the immune system reacts to harmless substances is "allergy." In an allergic reaction, the immune system mistakenly identifies a typically harmless substance, such as pollen, pet dander, or certain foods, as a threat. This misidentification triggers an inappropriate immune response, leading to various symptoms such as itching, swelling, and respiratory issues. Allergies involve a specific type of immune response where immunoglobulin E (IgE) antibodies are produced in response to the allergen. Upon subsequent exposure to the same allergen, these IgE antibodies bind to it and activate immune cells, releasing chemicals like histamines that cause the typical allergy symptoms. Understanding allergies is crucial, as they can significantly impact a person's quality of life and may require management strategies to avoid triggers and alleviate symptoms.

2. What is the name of the fluid-filled sac that surrounds and cushions the embryo?

A. Chorion

B. Amnion

C. Placenta

D. Yolk sac

The fluid-filled sac that surrounds and cushions the embryo is known as the amnion. This membrane is critical during development as it provides a protective environment for the embryo, allowing it to grow without physical stress and allowing for movement. The fluid within the amnion, known as amniotic fluid, serves several essential roles, including maintaining a stable temperature, providing a cushion against external pressure, and facilitating the development of the musculoskeletal system by allowing the embryo to move freely. The chorion, while also associated with embryonic development, primarily functions in gas exchange and nutrient transfer, establishing a vital connection with the placenta but does not directly cushion the embryo. The placenta is responsible for nutrient and waste exchange between the mother and the developing embryo but does not act as a physical buffer. The yolk sac, present in some early embryonic development stages, provides nutritional support during the initial stages but is not a protective sac like the amnion. Thus, the amnion is specifically designed for the protection and cushioning of the embryo, highlighting its importance in embryonic development.

3. Which type of immunity is developed after exposure to a pathogen?

A. Passive immunity

B. Active immunity

C. Innate immunity

D. Adaptive immunity

Active immunity is the type developed after exposure to a pathogen because it arises when the immune system is stimulated to produce antibodies and memory cells in response to the presence of a foreign invader. This exposure can occur through natural infection, where the body encounters pathogens directly, or through vaccination, where a harmless component of the pathogen is introduced to trigger an immune response without causing disease. In active immunity, the body learns to recognize and remember the specific antigens associated with the pathogen, allowing for a faster and more effective response upon subsequent exposures. This long-lasting immunity is a key feature, as it typically provides protection for many years, sometimes even a lifetime. Other types of immunity, such as passive immunity, involve the transfer of antibodies from another source, which does not engage the recipient's immune system in the same way and is often temporary. Innate immunity refers to the body's first line of defense through physical and chemical barriers, and adaptive immunity is a broader category that encompasses the specifics of the immune response but doesn't exclusively focus on the effect of the pathogen exposure itself in generating active immunity.

4. What is a simple linear representation of the nutritional relationships among various species within an ecosystem?

A. Food web

B. Food chain

C. Energy pyramid

D. Ecosystem diagram

A food chain serves as a simple linear representation of the nutritional relationships among various species within an ecosystem. It illustrates how energy and nutrients flow from one organism to another in a straightforward, step-by-step manner. In a food chain, one organism typically eats another, starting with primary producers like plants that convert sunlight into energy, followed by herbivores that consume these plants, and then carnivores that feed on herbivores. This linear format helps to simplify complex interactions, breaking them down into a sequential model that highlights the direct relationships between different levels of consumers and producers. While options like food webs and energy pyramids provide a more comprehensive view of energy flow and interconnections among species, they do not represent these relationships in a simple linear format. A food web illustrates multiple interconnected food chains, while an energy pyramid visualizes the energy at different trophic levels. Ecosystem diagrams can encompass a variety of biotic and abiotic factors, further complicating the straightforward representation of nutritional relationships.

5. Which type of muscle tissue is responsible for voluntary movements?

A. Skeletal muscle

B. Cardiac muscle

C. Visceral muscle

D. Antagonists

Skeletal muscle is the type of muscle tissue responsible for voluntary movements. This muscle tissue is characterized by its striated appearance and is under conscious control, meaning that you can decide to move these muscles at will. Skeletal muscles are typically attached to bones and play a crucial role in facilitating movement throughout the body, such as walking, running, and lifting objects. The ability to control skeletal muscle deliberately is a defining feature of this tissue. It is connected to the nervous system, which sends signals that enable you to initiate and regulate these voluntary movements. In contrast, cardiac and visceral muscles operate involuntarily; cardiac muscle, found in the heart, contracts without conscious thought to pump blood, while visceral muscle, found in organs like the intestines, moves substances through the organ systems without conscious control. Antagonists refer to muscles that oppose each other's actions, but they are not a type of muscle tissue themselves.

6. What is the name of the involuntary muscle tissue found in the heart?

A. Cardiac muscle

B. Visceral muscle

C. Antagonists

D. Origin

The correct answer is the name of the involuntary muscle tissue found in the heart, which is cardiac muscle. Cardiac muscle is specialized for the continuous, rhythmic contractions necessary for maintaining blood circulation throughout the body. Unlike voluntary muscles, which are under conscious control, cardiac muscle functions automatically and is characterized by its striated appearance and intercalated discs that facilitate synchronized contractions. Visceral muscle refers to smooth muscle found in the walls of hollow organs such as the intestines and blood vessels; while it is also involuntary, it is not the type found in the heart. The terms antagonists refer to a pair of muscles that work against each other to facilitate movement rather than describing a specific muscle tissue type. The origin generally refers to the fixed attachment point of a muscle but does not describe a muscle tissue itself. Thus, the characteristics and functions of cardiac muscle uniquely identify it as the specific involuntary muscle tissue present in the heart.

7. Which structures are extremely small vessels that absorb excess fluid from tissue spaces?

A. Lymph nodes

B. Lymph vessels

C. Lymph capillaries

D. Capillaries

Lymph capillaries are extremely small vessels designed to absorb excess fluid that accumulates in tissue spaces, facilitating the maintenance of fluid balance in the body. They are a critical component of the lymphatic system, which helps transport lymph—a fluid containing white blood cells, proteins, and waste products—back into circulation. The structure of lymph capillaries allows them to effectively take up interstitial fluid, which can change in volume depending on various factors like activity levels and capillary permeability. These capillaries have a very thin wall that is permeable to larger molecules and fluids, unlike blood capillaries, which primarily transport blood and are less permeable. Additionally, while lymph vessels play a role in transporting lymph away from tissues, they are larger than lymph capillaries and thus do not perform the primary function of absorbing excess fluid. Lymph nodes are involved in filtering lymph and are not responsible for fluid absorption. Capillaries, while crucial for exchanging nutrients and gases in tissues, are part of the circulatory system and do not specialize in absorbing excess interstitial fluid in the manner that lymph capillaries do.

8. Which of the following best describes the role of glucagon in the body?

A. Stimulates insulin production

B. Increases blood sugar levels

C. Decreases metabolic rate

D. Inhibits adrenal activity

Glucagon plays a crucial role in maintaining blood glucose levels, particularly during periods of fasting or between meals. It is a hormone produced by the alpha cells of the pancreas and is primarily responsible for increasing blood sugar levels when they drop too low. This increase is achieved primarily through two mechanisms: glycogenolysis, which is the breakdown of glycogen stored in the liver into glucose, and gluconeogenesis, the synthesis of glucose from non-carbohydrate sources. When blood sugar levels fall, glucagon is secreted into the bloodstream, signaling the liver to release glucose. This response ensures that the body's cells have a continuous supply of glucose to use for energy, which is particularly important for tissues such as the brain that rely on glucose as their primary fuel source. The other options do not accurately reflect the function of glucagon. For example, glucagon does not stimulate insulin production; rather, it has the opposite effect, promoting the release of glucose when insulin is not present. Similarly, glucagon is not involved in decreasing metabolic rate or inhibiting adrenal activity. Instead, it acts to increase metabolic processes that elevate blood sugar levels, highlighting its vital role in glucose homeostasis.

9. What is one type of protein found in blood plasma?

A. Globulin

B. Insulin

C. Fibrinogen

D. Keratin

Globulins are indeed a type of protein found in blood plasma. They play several critical roles in the body, including the transport of nutrients and hormones, as well as functioning in the immune response. Specifically, gamma globulins are a type of globulin that act as antibodies to help protect the body from pathogens. While insulin is a crucial hormone involved in glucose metabolism, it is not classified as a plasma protein but rather as a peptide hormone produced by the pancreas. Fibrinogen is another essential plasma protein that plays a vital role in blood clotting, but it is not classified under the globulin group. Keratin, conversely, is a structural protein primarily found in hair, nails, and skin and is not present in blood plasma. Therefore, globulin is correctly identified as a type of protein found in blood plasma, highlighting its significant functions within the circulatory system.

10. What is it called when organisms collectively are disturbed by changes in their ecosystem?

A. Habitat destruction

B. Environmental degradation

C. Ecological disruption

D. Species extinction

The term that describes when organisms are collectively disturbed by changes in their ecosystem is known as ecological disruption. This concept encompasses a wide range of changes that can affect the balance of an ecosystem, including alterations in habitat, climate, or resource availability. When ecological disruption occurs, it can lead to shifts in species interactions, the loss of biodiversity, and changes in ecosystem function. This term effectively captures the idea of a system responding dynamically to disturbances that can stem from natural events or human-induced changes. In contrast, the other options, while related to ecological issues, address more specific scenarios or outcomes. Habitat destruction refers to the direct loss of the environment where organisms live, environmental degradation involves the decline in the quality of ecosystems, and species extinction pertains to the complete loss of particular species, which is a potential outcome of ecological disruption. Thus, ecological disruption is the most encompassing term for the collective disturbance of organisms within an ecosystem due to various changes.