Arizona State University (ASU) BIO202 Human Anatomy and Physiology II Exam 1 Practice Exam (Sample)

Study Guide

Everything you need from our exam experts!

Questions

1. Into which chamber of the heart do the superior vena cava, inferior vena cava, and coronary sinus return deoxygenated blood?

   A. Right ventricle

   B. Left ventricle

   C. Right atrium

   D. Left atrium

2. Which type of hormone is responsible for long-distance communication within the body?

   A. Pheromone

   B. Neurotransmitter

   C. Hormonelike

   D. Hormone

3. Which mechanism provides slower, longer-lasting control than nerve impulses?

   A. Neurotransmission

   B. Reflex actions

   C. Hormones

   D. Positive feedback

4. What is the primary component of blood that contains white blood cells?

   A. Plasma

   B. Platelets

   C. Formed elements

   D. Red blood cells

5. What is the role of parathyroid hormone?

   A. Regulates metabolism

   B. Regulates calcium metabolism

   C. Regulates blood glucose levels

   D. Regulates heart rate

6. What does the aortic valve open into?

A. Pulmonary artery

B. Left ventricle

C. Aorta

D. Right ventricle

7. Which hormone is primarily associated with the regulation of fat storage and metabolism?

A. Insulin

B. Somatostatin

C. Glucagon

D. Adrenaline

8. What mechanism binds to receptors within the target cell nucleus and influences cell activity by acting on DNA?

A. Growth factors

B. Steroid hormones

C. Nonsteroid hormones

D. Neurotransmitters

9. What makes up approximately 55% of the total volume of whole blood?

A. Platelets

B. White blood cells

C. Plasma

D. Red blood cells

10. What type of hormone is most commonly associated with stress regulation?

A. Oxytocin

B. Thyroid hormone

C. Glucagon

D. Cortisol

Answers

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

Explanations

1. Into which chamber of the heart do the superior vena cava, inferior vena cava, and coronary sinus return deoxygenated blood?

A. Right ventricle

B. Left ventricle

C. Right atrium

D. Left atrium

The correct answer is the right atrium because it is the chamber of the heart that receives deoxygenated blood returning from the body. The superior vena cava brings blood from the upper part of the body, the inferior vena cava carries blood from the lower part, and the coronary sinus collects blood from the heart muscle itself. All of this deoxygenated blood enters the right atrium, where it is then directed into the right ventricle, which pumps it to the lungs for oxygenation. In contrast, the left atrium and left ventricle deal with oxygenated blood coming from the lungs, and the right ventricle is responsible for pumping deoxygenated blood to the lungs.

2. Which type of hormone is responsible for long-distance communication within the body?

A. Pheromone

B. Neurotransmitter

C. Hormonelike

D. Hormone

Hormones are chemical messengers produced by the endocrine glands and released into the bloodstream, allowing them to travel throughout the body and exert their effects on various target tissues and organs. This long-distance communication is essential for regulating many physiological processes, such as metabolism, growth, reproduction, and responses to stress. Unlike neurotransmitters, which are released at synapses to transmit signals over short distances between nerve cells, hormones can influence cells and tissues that are located far from their site of production. Additionally, pheromones are secreted to communicate between individuals of the same species, typically in relation to behaviors like mating or territory marking, and are therefore not involved in internal body communication. Hormonelike substances, while they may share some functions with hormones, do not define the primary mechanism of long-distance signaling used by the endocrine system. Thus, hormones are the key players in ensuring that organs and systems can coordinate and respond effectively to maintain homeostasis across the entire body.

3. Which mechanism provides slower, longer-lasting control than nerve impulses?

A. Neurotransmission

B. Reflex actions

C. Hormones

D. Positive feedback

The mechanism that provides slower, longer-lasting control than nerve impulses is hormones. Hormones are chemical messengers produced by endocrine glands and are released into the bloodstream. Once in the circulatory system, they can travel significant distances to reach target cells or organs, where they exert their effects over a more extended period. This process is inherently slower than nerve impulses, which are rapid and localized signals transmitted through neural pathways. Hormones can control various physiological processes, such as metabolism, growth, and reproduction, and their effects can last from minutes to days or even longer, depending on the specific hormone and its function. This prolonged response is critical for maintaining homeostasis and coordinating complex bodily functions that require sustained regulation, such as stress responses or changes in developmental stages. In contrast, neurotransmission acts quickly and typically involves precise and short-duration effects, making it unsuitable for long-term regulation. Reflex actions, while also involving rapid neural responses, do not offer the prolonged control provided by hormonal signaling. Positive feedback mechanisms may lead to a significant amplification of a response but do not define a method of control like hormones do. Thus, hormones stand out as the mechanism for slower and longer-lasting control in the body.

4. What is the primary component of blood that contains white blood cells?

A. Plasma

B. Platelets

C. Formed elements

D. Red blood cells

The primary component of blood that contains white blood cells is the formed elements. Formed elements refer to the cellular components of blood, which include red blood cells, white blood cells, and platelets. White blood cells, or leukocytes, play a critical role in the immune system by defending the body against infections and foreign substances. Plasma, while being a key component of blood, primarily consists of water, electrolytes, proteins, and waste products, and does not contain cells. Platelets are involved in the blood clotting process and are also part of the formed elements, but they themselves do not contain white blood cells. Red blood cells, primarily responsible for transporting oxygen throughout the body, also do not contain white blood cells within their structure. Therefore, formed elements is the most accurate answer, as it encompasses all the cellular components of blood, including the crucial white blood cells.

5. What is the role of parathyroid hormone?

A. Regulates metabolism

B. Regulates calcium metabolism

C. Regulates blood glucose levels

D. Regulates heart rate

Parathyroid hormone (PTH) plays a vital role in regulating calcium metabolism within the body. It is secreted by the parathyroid glands in response to low levels of calcium in the blood. PTH functions primarily by increasing calcium concentrations in the bloodstream through several mechanisms. Firstly, it stimulates the release of calcium from bones, where calcium is stored, into the bloodstream. Secondly, it enhances the reabsorption of calcium in the kidneys, reducing the amount excreted in urine. Lastly, PTH promotes the activation of vitamin D in the kidneys, which in turn increases intestinal absorption of calcium from food. These actions work together to maintain calcium homeostasis, which is crucial for various physiological processes, including nerve conduction, muscle contraction, and blood clotting. The regulation of calcium levels is essential for overall health, making PTH a key hormone in maintaining bone health and metabolic functions related to calcium.

6. What does the aortic valve open into?

A. Pulmonary artery

B. Left ventricle

C. Aorta

D. Right ventricle

The aortic valve opens into the aorta, which is the largest artery in the body. This valve plays a crucial role in the circulatory system by regulating blood flow from the left ventricle of the heart into the aorta. When the left ventricle contracts during systole, the aortic valve opens, allowing oxygen-rich blood to be pumped into the aorta. This blood then travels to the rest of the body to supply tissues and organs with the necessary oxygen and nutrients. Understanding this pathway is essential in grasping how the heart functions as a pump within the cardiovascular system and ensures that blood circulation occurs efficiently.

7. Which hormone is primarily associated with the regulation of fat storage and metabolism?

A. Insulin

B. Somatostatin

C. Glucagon

D. Adrenaline

Insulin is a key hormone involved in the regulation of fat storage and metabolism. It is produced by the beta cells of the pancreas and plays a crucial role in regulating blood sugar levels. When blood glucose levels rise, such as after a meal, insulin is released into the bloodstream. Insulin promotes the uptake of glucose by cells, particularly muscle and adipose (fat) tissues, converting glucose into glycogen for storage in the liver and muscles. Additionally, insulin facilitates the conversion of excess glucose into fatty acids and triglycerides, which are then stored in adipose tissue. This action encourages the body to store energy rather than using it immediately, promoting fat accumulation. Furthermore, insulin inhibits the breakdown of fat in adipose tissue, encouraging fat storage instead of fat utilization. This hormone also has a synergistic relationship with other hormones and metabolic pathways that further regulate fat storage and metabolism, showcasing its pivotal role in energy homeostasis. Understanding the function of insulin highlights its central role in managing how the body uses and stores energy, making it fundamental to metabolic health and the regulation of body weight.

8. What mechanism binds to receptors within the target cell nucleus and influences cell activity by acting on DNA?

A. Growth factors

B. Steroid hormones

C. Nonsteroid hormones

D. Neurotransmitters

Steroid hormones interact with receptors located in the target cell's nucleus, which allows them to directly influence cell activity at the genetic level. These hormones are lipid-soluble, enabling them to easily cross the cell membrane and bind to specific intracellular receptors. Once bound, the hormone-receptor complex translocates to the nucleus, where it can bind to specific regions of DNA and regulate the transcription of certain genes. This mechanism leads to changes in protein synthesis and ultimately alters the function and behavior of the target cell. In contrast, growth factors typically bind to surface receptors and initiate signaling cascades without directly engaging DNA. Nonsteroid hormones often rely on secondary messengers to convey their signals, which occurs outside the nucleus and does not involve direct binding to DNA. Neurotransmitters also operate primarily at synaptic junctions and interact with receptors on the cell surface rather than entering the nucleus to affect genetic transcription. The defining feature of steroid hormones is their ability to modify gene expression directly within the nucleus, making them the correct answer.

9. What makes up approximately 55% of the total volume of whole blood?

A. Platelets

B. White blood cells

C. Plasma

D. Red blood cells

Plasma is the component that makes up approximately 55% of the total volume of whole blood. It is a pale-yellow liquid that consists mostly of water, but also contains proteins, electrolytes, nutrients, hormones, and waste products. The primary function of plasma is to transport various substances throughout the body, including nutrients to cells, hormones to target organs, and waste products to the kidneys for excretion. Additionally, plasma plays an essential role in maintaining blood pressure and regulating body temperature. In contrast, red blood cells, white blood cells, and platelets each contribute to the cellular components of blood, accounting for about 45% of the total blood volume. Red blood cells are critical for oxygen transport, white blood cells are involved in immune responses, and platelets are essential for blood clotting. Therefore, while all components are vital for bodily functions, plasma is the predominant component by volume.

10. What type of hormone is most commonly associated with stress regulation?

A. Oxytocin

B. Thyroid hormone

C. Glucagon

D. Cortisol

Cortisol is the primary hormone associated with stress regulation. It is produced by the adrenal cortex in response to stressors and is part of the body's fight-or-flight response. When faced with stress, the hypothalamus stimulates the pituitary gland to release adrenocorticotropic hormone (ACTH), which then prompts the adrenal glands to secrete cortisol. Cortisol plays several essential roles in the body during stressful situations. It helps in mobilizing energy by increasing glucose availability through gluconeogenesis and promoting the metabolism of fats and proteins. It also helps regulate blood pressure and has anti-inflammatory effects, which are crucial in managing the body's response to stress. Therefore, its role in stress regulation is vital for survival, allowing the body to respond effectively in times of danger or crisis. The other hormones listed, while important in their respective functions, do not primarily serve the role of stress regulation in the same direct manner as cortisol. Oxytocin is often linked to social bonding and reproduction, thyroid hormone is primarily involved in metabolism regulation, and glucagon plays a role in glucose metabolism, typically in response to low blood sugar levels rather than stress.