Arizona State University (ASU) BIO201 Human Anatomy and Physiology I Exam 1 Practice (Sample)

Study Guide

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Questions

1. Which body system breaks down food into absorbable units that enter the blood and eliminates waste as feces?

   A. Cardiovascular system

   B. Digestive system

   C. Respiratory system

   D. Urinary system

2. What term is used to describe the study of anatomical and physiological development throughout life?

   A. Developmental Anatomy

   B. Morphology

   C. Histology

   D. Physiological Psychology

3. What process do white blood cells use to defend the body from infectious bacteria?

   A. Endocytosis

   B. Phagocytosis

   C. Pinocytosis

   D. Exocytosis

4. In RNA, which nucleotide binds to an A nucleotide?

   A. T

   B. C

   C. U

   D. G

5. In the ventral body cavity, which cavity contains the heart and lungs?

   A. Abdominal cavity

   B. Dorsal cavity

   C. Thoracic cavity

   D. Pelvic cavity

6. What is another name for fats that are insoluble in water?

A. Amino acids

B. Carbohydrates

C. Lipids

D. Nucleotides

7. What type of energy is directly involved in moving matter, such as during muscle contractions?

A. Mechanical energy

B. Chemical energy

C. Kinetic energy

D. Thermal energy

8. What is the starch called that we store in our muscle cells for available energy?

A. Glucose

B. Cellulose

C. Starch

D. Glycogen

9. What is the study of incorrect, broken, or diseased anatomy called?

A. Histology

B. Pathophysiology

C. Pathology

D. Anatomy

10. What type of reaction would you classify as exergonic, where larger molecules are broken down?

A. Endergonic

B. Synthetic

C. Catabolic

D. Oxidative

Answers

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

Explanations

1. Which body system breaks down food into absorbable units that enter the blood and eliminates waste as feces?

A. Cardiovascular system

B. Digestive system

C. Respiratory system

D. Urinary system

The digestive system is responsible for breaking down food into absorbable units that the body can utilize for energy, growth, and cellular repair. It involves the mechanical and chemical processing of food, which begins in the mouth and continues through the stomach and intestines. Here, enzymes and acids further digest the food into smaller molecules, such as amino acids, sugars, and fatty acids, which are then absorbed into the bloodstream through the lining of the intestines. As food is processed, the digestive system also plays a key role in eliminating waste. Undigested material and leftover byproducts that the body cannot use are compacted into feces and excreted from the body. This elimination process is crucial for maintaining homeostasis and preventing the buildup of potentially harmful substances. The other systems listed do have important functions, but they do not perform the combined tasks of food breakdown, nutrient absorption, and waste elimination as effectively as the digestive system does. The cardiovascular system is essential for transporting nutrients and gases but does not handle digestion. The respiratory system is responsible for gas exchange, primarily oxygen and carbon dioxide, and does not process food. The urinary system is involved in filtering blood and eliminating waste products from metabolism through urine, but it does not play a role in the

2. What term is used to describe the study of anatomical and physiological development throughout life?

A. Developmental Anatomy

B. Morphology

C. Histology

D. Physiological Psychology

The study of anatomical and physiological development throughout life is termed Developmental Anatomy. This field focuses on the changes that occur from fertilization through adulthood and even into senescence. It explores how structures form and evolve over time, providing insights into both normal development and potential congenital anomalies. Developmental Anatomy encompasses various phases of development, including embryonic, fetal, and postnatal stages. It examines the processes involved in the formation of organs and systems, their growth, and how they adapt throughout different life stages. Understanding these concepts is crucial for fields such as medicine, biology, and even anthropology, giving context to how organisms grow and change in response to their environment. Other terms like Morphology relate more generally to the study of forms and structures but do not specifically address the developmental aspect over the lifespan. Histology focuses on the microscopic structure of tissues, which is a narrower view. Physiological Psychology intertwines psychology with physiology but does not concern itself directly with anatomical or developmental changes over time. Hence, Developmental Anatomy is the most accurate descriptor for the study of anatomical and physiological development across the life span.

3. What process do white blood cells use to defend the body from infectious bacteria?

A. Endocytosis

B. Phagocytosis

C. Pinocytosis

D. Exocytosis

White blood cells utilize phagocytosis as a critical process to defend the body against infectious bacteria. Phagocytosis is a form of endocytosis specifically designed for the uptake and internalization of large particles, such as bacteria, dead cells, and other debris. During phagocytosis, white blood cells—such as macrophages and neutrophils—recognize pathogens. The cell membrane extends to encircle the bacteria, forming a membrane-bound vesicle called a phagosome. This phagosome then fuses with lysosomes, which contain digestive enzymes. The enzymes break down the engulfed bacteria, effectively neutralizing the threat and allowing the white blood cell to clear the infection. This process is essential for the immune response, as it not only eliminates pathogens but also signals other immune cells to respond, thereby orchestrating a more extensive immune defense strategy. Phagocytosis is a fundamental mechanism that underscores the body's ability to maintain health by recognizing and eliminating harmful microorganisms.

4. In RNA, which nucleotide binds to an A nucleotide?

A. T

B. C

C. U

D. G

In RNA, the nucleotide that binds to an adenine (A) nucleotide is uracil (U). This pairing occurs because RNA uses uracil instead of thymine (T), which is found in DNA. Adenine and uracil form complementary base pairs, similar to the way adenine pairs with thymine in DNA. This base pairing is essential for the processes of transcription and translation, where the information encoded in DNA is expressed in proteins. During transcription, the DNA sequence is converted into RNA, where adenine in the DNA strand is paired with uracil in the newly synthesized RNA strand. The pairing rules ensure that the genetic information is correctly transferred and utilized in cellular functions. The other nucleotides (C and G) do not directly pair with A in RNA; cytosine (C) pairs with guanine (G) instead. Thus, uracil is the correct pairing for adenine in RNA.

5. In the ventral body cavity, which cavity contains the heart and lungs?

A. Abdominal cavity

B. Dorsal cavity

C. Thoracic cavity

D. Pelvic cavity

The thoracic cavity is the correct choice because it is specifically designed to encase and protect vital organs such as the heart and lungs. This cavity is located superior to the abdominal cavity and is separated from it by the diaphragm, a muscle that plays a significant role in respiration. Within the thoracic cavity, further subdivisions exist, including the pleural cavities that surround the lungs and the pericardial cavity that envelops the heart. This anatomical arrangement is critical for proper respiratory function and circulatory dynamics, as the lungs are responsible for gas exchange while the heart pumps blood throughout the body. Understanding the thoracic cavity's role is essential for recognizing how these organs interact and function within the larger context of human anatomy. The other options refer to different areas: the abdominal cavity houses digestive organs; the dorsal cavity consists mainly of the cranial and spinal cavities, housing the brain and spinal cord; and the pelvic cavity contains reproductive organs and the lower part of the digestive tract. None of these options are involved in housing both the heart and lungs as the thoracic cavity is.

6. What is another name for fats that are insoluble in water?

A. Amino acids

B. Carbohydrates

C. Lipids

D. Nucleotides

Fats that are insoluble in water are commonly referred to as lipids. This classification includes a diverse group of compounds, such as triglycerides, phospholipids, and steroids, all of which share the characteristic of being hydrophobic or nonpolar. The hydrophobic nature of lipids is due to their long hydrocarbon chains, making them insoluble in water while still able to dissolve in nonpolar solvents. Understanding lipids is crucial in anatomy and physiology, as they play vital roles in cellular structure, energy storage, and signaling within the body. The other options represent different macromolecules: amino acids are the building blocks of proteins, carbohydrates primarily serve as energy sources, and nucleotides are the fundamental units of nucleic acids. None of these correctly describe substances that are insoluble in water. Thus, lipid is the appropriate term for fats in this context.

7. What type of energy is directly involved in moving matter, such as during muscle contractions?

A. Mechanical energy

B. Chemical energy

C. Kinetic energy

D. Thermal energy

The correct answer involves mechanical energy, which is the type of energy directly responsible for moving matter. In the context of muscle contractions, mechanical energy is produced when muscles generate force and shorten, allowing for movement. This energy translates into physical motion, enabling activities such as walking, lifting, and other bodily movements. Muscle contractions begin with the conversion of chemical energy stored in ATP (adenosine triphosphate) into mechanical energy. During this process, the interaction of muscle fibers and the sliding filament mechanism leads to movement. Hence, while chemical energy initiates the contraction, it is the mechanical energy that actually effect changes in position and movement. Kinetic energy, on the other hand, refers to the energy of an object in motion and would apply once the muscle is contracted and movement is occurring. Thermal energy is related to heat production and is a byproduct rather than the primary energy type involved in the movement itself. Thus, when considering the type of energy that facilitates the action of moving matter during muscle contractions, mechanical energy is the most fitting choice.

8. What is the starch called that we store in our muscle cells for available energy?

A. Glucose

B. Cellulose

C. Starch

D. Glycogen

The substance stored in our muscle cells for available energy is called glycogen. Glycogen is a polysaccharide that serves as a form of energy storage in animals and fungi. It is made up of long chains of glucose molecules and is primarily found in the liver and muscle tissues. When the body needs energy, especially during exercise, glycogen can be quickly broken down into glucose, which is then used by muscle cells to produce ATP (adenosine triphosphate), the molecule that provides energy for cellular activities. This rapid conversion makes glycogen an efficient energy reserve, particularly for high-intensity activities. In contrast, glucose is a simple sugar and the primary energy source, but it is not stored in significant amounts in muscle cells. Cellulose, a structural component of plant cell walls, is not utilized by the human body for energy in the same way. Starch, while a form of energy storage in plants, is not what is stored in human muscle cells; instead, humans store energy in the form of glycogen. Thus, glycogen is the correct term for the stored energy source in muscle cells.

9. What is the study of incorrect, broken, or diseased anatomy called?

A. Histology

B. Pathophysiology

C. Pathology

D. Anatomy

The study of incorrect, broken, or diseased anatomy is referred to as pathology. This branch of medical science focuses specifically on understanding the nature and causes of diseases, as well as the structural and functional changes they produce in tissues and organs. Pathology encompasses both the study of the anatomical and biochemical changes that occur in disease processes and the clinical implications of these anomalies. For example, pathologists examine tissue samples from biopsies to identify cancer or other diseases, providing essential insights that inform diagnosis and treatment. This understanding of how diseases alter normal anatomy is critical for both diagnosis and developing therapeutic interventions. While histology pertains to the microscopic structure of tissues, and pathophysiology explores the functional changes in the body due to disease, neither specifically addresses the study of anatomy in the context of disease as directly as pathology does. Anatomy itself is the study of normal structure rather than the implications of disease or injury.

10. What type of reaction would you classify as exergonic, where larger molecules are broken down?

A. Endergonic

B. Synthetic

C. Catabolic

D. Oxidative

The correct classification for a reaction in which larger molecules are broken down is catabolic. Catabolic reactions are a type of metabolic reaction that involves the breakdown of complex molecules into simpler ones, releasing energy in the process. This energy release is what makes these reactions exergonic. In contrast, endergonic reactions require an input of energy to proceed, often involving the synthesis of larger molecules from smaller ones. Synthetic reactions, which are not synonymous with catabolic reactions, also require energy to combine smaller units into a larger molecule. Oxidative reactions can sometimes be involved in catabolism, particularly in energy production pathways, but they do not inherently refer to the breakdown of larger molecules. Thus, catabolic processes specifically align with the characteristic of breaking down larger molecules while releasing energy, clearly categorizing them as exergonic.