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SKU: 9780357802212-TEST-BANK

Name:_____ Class:_____ Date:_____

Chapter 02 - Introduction to the Human Body

1. Which of the following definitions describes the scientific study of human anatomy?
   a. The study of the body's metabolic functions.
   b. The study of the body's structures.
   c. The study of body's chemical processes.
   d. The study of the body's molecular processes.
   e. The study of the body's evolution.

ANSWER: b

2. What two approaches do anatomists use to study the body's structures?
   a. regional and systemic
   b. global and detailed
   c. holistic and microscopic
   d. internal and external
   e. active and passive

ANSWER: a

3. Which of the following describes the study of regional anatomy?
   a. The skin and its functions.
   b. The interrelationships of all of the structures in a specific body region.
   c. Human evolution by regions of the world.
   d. The specific functions of an organ.
   e. Chemical changes in the human body.

ANSWER: b

4. Which of the following describes the study of systemic anatomy?
   a. The operation of body functions.
   b. The sequence of chemical reactions in the body.
   c. The structures that make up a discrete body system.
   d. The evolution of the human body.
   e. The changes in the body over time.

ANSWER: c

5. What is phosphorylation?
   a. The most common form of molecular regulation in animal cells – the addition of a phosphate group to specific molecules.
   b. The ingestion and absorption of excessive phosphorus from the environment.
   c. The production of excessive amounts of phosphorus by the body.
   d. The conversion of phosphorus through a series of reactions in the environment.
   e. The removal of phosphorus from our bodies.

ANSWER: a

6. Early humans evolved a restructured pelvis to accommodate for what specific function?
   a. increased intelligence
   b. bipedalism

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c. childbirth
d. self defense
e. sense of smell and taste

ANSWER: b

7. How is human evolution defined?
a. The impact of the earth's climate on human development.
b. Changes in human intelligence over time.
c. The development of cognitive and motor skills over time.
d. A change in gene expression that occurs from generation to generation.
e. The ability to adapt to constantly changing environments.

ANSWER: d

8. Why does the body require UV radiation from sunlight?
a. To control the spread of bacteria.
b. To improve skin tone and quality.
c. For the production of proteins.
d. To control blood flow.
e. For the synthesis of vitamin D.

ANSWER: e

9. UV radiation from sunlight is harmful to folate (folic acid) structure, a vitamin. What is a reason folate is essential?
a. It is essential for skin cell growth and development.
b. It is essential for single cell growth and muscular strength.
c. It aids in sperm production and embryonic development.
d. It is important for eye sight and night vision.
e. It is involved with digestion.

ANSWER: c

10. What are the three types of gradients that drive flow in a physiological context?
a. high, medium, and low gradients
b. elevated, standard, and reduced gradients
c. organic, inorganic, and chemical gradients
d. concentration, electrical, and pressure gradients
e. kinetic, dynamic, and static gradients

ANSWER: d

11. What type of gradient drives the flow of fluids and gases?
a. concentration gradients
b. electrical gradients
c. pressure gradients
d. organic gradients
e. gravitational gradients

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ANSWER: c

12. Which of the following variables provides resistance to flow rate in liquids and gases?
    a. diameter and length of the tube
    b. speed of the molecules
    c. size of the molecules
    d. temperature of the environment
    e. viscosity of the medium

ANSWER: a

13. What is the definition of homeostasis?
    a. The state of dynamic stability of the body's internal conditions.
    b. The condition of humanity at any point in history.
    c. The sum of all chemical reactions within the blood stream.
    d. Molecular concentrations within specific organs.
    e. The environment for human development.

ANSWER: a

14. Which of the following statements describes the set point for maintaining homeostasis?
    a. The physiological value around which the normal range fluctuates.
    b. The physiological value that should not be exceeded.
    c. The minimal physiological value that should be maintained.
    d. One of a range of values that could be maintained.
    e. A fixed value that must be maintained.

ANSWER: a

15. What is the set point for normal body temperature?
    a. Approximately 35 °C (95.0 °F)
    b. Approximately 36 °C (96.8 °F)
    c. Approximately 37 °C (98.6 °F)
    d. Approximately 38 °C (100.4 °F)
    e. Approximately 35 °C (102.2 °F)

ANSWER: c

16. Which of the following variables is homeostatically regulated?
    a. body weight
    b. blood sugar levels
    c. stress levels
    d. bone density
    e. metal alertness

ANSWER: b

17. Which statement best describes a negative feedback loop?
    a. A mechanism that reverses a deviation from the set point.

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b. A mechanism that eliminates the cause of the deviation from the set point.
c. A mechanism that replaces molecules required by the body.
d. A mechanism that accelerates the production of hormones.
e. A mechanism that freezes the cause of negative impacts to the body.

ANSWER: a

18. Which of the following variables is regulated by a positive feedback loop?
a. body temperature
b. blood sugar levels
c. childbirth
d. thyroid hormone levels
e. pH levels

ANSWER: c

19. Which statement best describes a negative feedback loop?
a. A mechanism that reverses a deviation from the set point.
b. A mechanism that eliminates the cause of the deviation from the set point.
c. A mechanism that replaces molecules required by the body.
d. A mechanism that accelerates the production of hormones.
e. A mechanism that freezes the cause of negative impacts to the body.

ANSWER: a

20. What is the smallest independently functioning unit of a living organism?
a. An atom
b. A molecule
c. A cell
d. An element
e. A proton

ANSWER: c

21. What is the name of the protective membranous structure that encloses a variety of tiny functioning units within human cells?
a. molecules
b. elements
c. organelles
d. cytoskeleton
e. enzymes

ANSWER: c

22. What do you call a group of many cells that work together to perform a specific function?
a. tissue
b. organism
c. molecules
d. organ

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e. element

ANSWER: a

23. What do you call a structure of the body that is composed of two or more tissue types?
a. cell
b. membrane
c. organ
d. element
e. enzyme

ANSWER: c

24. What do you call a group of organs that work together to perform major functions to meet the physiological needs of the body?
a. organ system
b. biological system
c. tissue groups
d. molecular grouping
e. physiological group

ANSWER: a

25. Which of the following refers to a living being that has a cellular structure and can perform independently all physiologic functions necessary for life?
a. human
b. animal
c. organism
d. citizen
e. lifeform

ANSWER: c

26. Which of the following statements best describes the standard anatomical position?
a. The body standing upright, with feet shoulder width apart and parallel, palms facing forward.
b. The body horizontal, with feet together, toes pointing forward, and palms facing up.
c. The body face down with feet together, toes pointing downward, and palms facing down.
d. The body on its side with feet together, toes pointing and arms resting.
e. The body standing upright, with feet together, toes forward, and arms relaxed.

ANSWER: a

27. What is meant by 'right' and 'left' when referring to anatomical positioning?
a. The right and left of the observer.
b. The patient's or cadaver's right and left.
c. The body's orientation.
d. The position as viewed by the front or back.
e. They are different based on viewing position.

ANSWER: b

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28. What is meant by a body in a prone position during a physical examination or surgical procedure?
    a. The body is lying face up.
    b. The body is lying face down.
    c. The body is on lying on the right side.
    d. The body is on lying on the left side.
    e. The body is in an upright seated position.

ANSWER: b

29. What is meant by a body in a supine position during a physical examination or surgical procedure?
    a. The body is lying face up.
    b. The body is lying face down.
    c. The body is on lying on the right side.
    d. The body is on lying on the left side.
    e. The body is in an upright seated position.

ANSWER: a

30. What term would you use to describe the front (belly) of a body in anatomical position?
    a. anterior
    b. posterior
    c. superior
    d. inferior
    e. lateral

ANSWER: a

31. To describe the BACK (spine) of the body you would use the term ___.
    a. anterior
    b. posterior
    c. superior
    d. inferior
    e. lateral

ANSWER: b

32. What term would you use to describe a position above, or higher than, another part of the body?
    a. anterior
    b. posterior
    c. superior
    d. inferior
    e. lateral

ANSWER: c

33. What term would you use to describe a position below, or lower than, another part of the body proper?
    a. anterior
    b. posterior

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c. superior
d. inferior
e. lateral

ANSWER: d

34. What term would you use to describe a structure toward the side of the body?
a. anterior
b. posterior
c. superior
d. inferior
e. lateral

ANSWER: e

35. What term would you use to describe an anatomical structure along the midline or toward the middle of the body?
a. anterior
b. posterior
c. superior
d. medial
e. lateral

ANSWER: d

36. What term would you use to describe a position closer to the surface of the body?
a. anterior
b. posterior
c. superior
d. superficial
e. lateral

ANSWER: d

37. What term would you use to describe a position further away from the surface of the body, or within the body?
a. anterior
b. posterior
c. superior
d. superficial
e. deep

ANSWER: e

38. How would you describe an anatomical structure on a limb that is near the point of attachment or the trunk of the body?
a. anterior
b. posterior
c. proximal
d. superficial
e. lateral

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ANSWER: c

39. How would you describe an anatomical structure on a limb that is father from the point of attachment or the trunk of the body?

a. anterior
b. posterior
c. proximal
d. distal
e. lateral

ANSWER: d

40. What do you call the vertical plane that divides the body or an organ into right and left sides?

a. sagittal plane
b. frontal plane
c. transverse plane
d. median plane
e. parasagittal plane

ANSWER: a

41. What do you call the plane that runs vertically directly down the middle of the body, bisecting the body into right and left halves?

a. sagittal plane
b. frontal plane
c. transverse plane
d. median plane
e. parasagittal plane

ANSWER: d

42. What do you call the plane that divides the body into unequal right and left sides?

a. sagittal plane
b. frontal plane
c. transverse plane
d. median plane
e. parasagittal plane

ANSWER: e

43. What do you call the plane that divides the body or an organ into an anterior (front) portion and a posterior (rear) portion?

a. sagittal plane
b. frontal plane
c. transverse plane
d. median plane
e. parasagittal plane

ANSWER: b

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44. What do you call the plane that divides the body or organ horizontally into upper and lower portions?
    a. sagittal plane
    b. frontal plane
    c. transverse plane
    d. median plane
    e. parasagittal plane

ANSWER: c

45. Which of the following is included in the anterior (ventral) cavity?
    a. thoracic and abdominopelvic cavities
    b. cranial and spinal cavities
    c. limbs and extremities
    d. heart and lungs only
    e. brain

ANSWER: a

46. Which of the following is included in the posterior (dorsal) cavity?
    a. thoracic and abdominopelvic cavities
    b. cranial and spinal cavities
    c. limbs and extremities
    d. heart and lungs only
    e. brain

ANSWER: b

47. The abdominopelvic cavities can be divided into how many regions?
    a. Two
    b. Five
    c. Seven
    d. Nine
    e. Twelve

ANSWER: d

48. Which of the following terms refers to the serous membrane that surrounds the lungs?
    a. pleura
    b. pericardium
    c. peritoneum
    d. perineum
    e. petunia

ANSWER: a

49. Which of the following terms refers to the serous membrane that surrounds the heart?
    a. pleura
    b. pericardium

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c. peritoneum
d. perineum
e. petunia

ANSWER: b

50. Which of the following terms refers to the serous membrane that surrounds the abdominopelvic cavity?
a. Pleura
b. Pericardium
c. Peritoneum
d. Perineum
e. Petunia

ANSWER: c

51. When early humans evolved to move primarily as bipeds instead of as our tree-dwelling primate ancestors, we evolved a restructured pelvis. What physiological changes resulted from the restructured pelvis?

ANSWER: The evolved restructured pelvis can support the weight of our abdominal organs as well as accommodate the much larger gluteal muscles that are required for stabilization of our torso and efficient forward motion. If we had not needed the function of the pelvis to accommodate bipedalism, we would not have observed the structural change of the pelvis over time.

52. As early humans evolved, they expressed less and less body hair. Why, and what impact did this have on the skin pigment, melanin?

ANSWER: This likely had to do with early humans spending less time in trees and more time under the hot sun. With less body hair, early humans may have been cooler, but they were at a much higher risk of folate damage from UV radiation. Therefore, successive generations of early humans grew less and less body hair, yet the expression of melanin, the skin pigment, increased. Production and expression of melanin conferred a tremendous advantage to humans who evolved over generations near the equator or at high altitudes, where UV radiation is the highest. Through genetic changes these populations evolved to express and maintain melanin levels that protected their cells from the strong UV rays of equatorial sunlight, while allowing sufficient UV radiation for the production of Vitamin D. As humans migrated to locations with less intense UV radiation, their skin cells adapted and expressed less melanin. Although these individuals had less melanin and lighter skin, they were still able to produce Vitamin D even with low UV radiation.

53. Substances, whether they are air or sodium ions, flow (i.e., move) according to gradients. What are the types of gradients that drive flow, or the movement of these molecules, from one area to another in physiological context? List the types of gradients, describe how molecules move for each, and give an example.

ANSWER: The three types of gradients that drive flow in the physiological context are concentration, electrical, and pressure gradients. Pressure gradients drive the flow of fluids or gases from high pressure to low pressure. For example, the pressure generated by the pumping of the heart drives the flow of blood. Concentration gradients drive the flow (here called diffusion) of individual molecules from a high concentration to a low concentration. For example, sodium ions flow from the outside of the cell (high concentration) to the inside of the cell (low concentration) when sodium ion channels are opened. Electrical gradients influence the flow of charged particles, including ions. For example, positively charged ions flow toward negatively charged ions.

54. Much of the study of physiology centers on the body's tendency to move toward homeostasis. Define homeostasis and give an example.

ANSWER: Homeostasis is the state of dynamic stability of the body's internal conditions. Our bodies can withstand a

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variety of external, or environmental, disturbances because our internal conditions stay relatively stable to maintain the health of our cells. Maintaining homeostasis requires the body to monitor internal conditions continuously, typically using a negative feedback loop. Parameters such as oxygen levels, pH, nutrient availability, and temperature must remain constant for our cells to survive and perform their functions. Each physiological condition has a particular set point. A **set point** is the physiological value around which the normal range fluctuates. For example, the set point for normal human body temperature is approximately 37°C (98.6°F). Examples may range from body temperature, blood pressure, or blood glucose levels (to name a few).

55. In homeostasis, many of our variables are regulated by feedback loops. Describe the two types of feedback loops and give an example of each.

ANSWER: The two types of feedback loops are negative and positive feedback loops. A negative feedback loop occurs when the stimulus deviates from the setpoint and is then reversed to return the body to homeostatic levels, or back to the setpoint. Examples are body temperature and blood sugar levels. A positive feedback system, in contrast, intensifies a change in the body's physiological condition. A deviation from the normal range results in more change, and the system moves farther away from the normal range, or the setpoint. A positive feedback cycle within the body will continue and intensify until there is a stop signal. Childbirth is one example of a positive feedback loop that is healthy but does not work to maintain homeostasis.

56. Anatomists take two general approaches to the study of the body's structure: regional and systemic. What are the differences between the two approaches?

ANSWER: Regional anatomy is the study of the interrelationships of all the structures in a specific body region, such as the abdomen or thorax. Studying regional anatomy helps us appreciate the relatedness of body structures, such as how muscles, nerves, blood vessels, and other organs work together to serve a particular body region. A significant learning goal through a regional anatomy approach is to build a three-dimensional understanding of the placement of and relationships among structures. When an individual is then presented with an image taken from a various perspective, or while performing surgery or dissection, there is a better understanding of the structures within the image. In contrast, a systemic anatomical approach is the study of the structures that make up a discrete body system, or a group of structures that work together to perform a unique body function. For example, a systemic anatomical approach of the muscular system would consider all the skeletal muscles of the body.

57. Organs and organ systems are fundamental levels of organization in human physiology. Define the terms organ and organ system.

ANSWER: An organ is a structure of the body that is composed of two or more tissue types; each organ performs one or more specific physiological function. An organ system is a group of organs that work together to perform major functions or meet physiological needs of the body.

58. The posterior and anterior body cavities are each subdivided into smaller cavities. Describe the smaller cavities within each major cavity.

ANSWER: In the posterior (dorsal) cavity, there is the cranial cavity and the spinal cavity. The cranial cavity houses the brain and the spinal cavity (or vertebral cavity) encloses the spinal cord. Just as the brain and spinal cord make up a continuous, uninterrupted structure, the cranial and spinal cavities that house them are also continuous. The brain and spinal cord are protected by the bones of the skull and vertebral column and by cerebrospinal fluid, a colorless fluid produced by the brain, which cushions the brain and spinal cord within the posterior cavity.

The anterior cavity has two main subdivisions: the thoracic cavity and the abdominopelvic cavity. The thoracic cavity is the superior subdivision enclosed by the rib cage and contains the lungs and the heart. A smaller cavity within the thoracic cavity is the mediastinum, which contains the heart, esophagus, trachea, and great vessels. Within the mediastinum is the pericardial cavity, which encloses only the heart. Each lung

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is contained within a separate pleural cavity, another smaller cavity within the thoracic cavity. The diaphragm forms the floor of the thoracic cavity and separates it from the abdominopelvic cavity. The abdominopelvic cavity is the largest cavity in the body. Although no membrane physically subdivides the abdominopelvic cavity, it can be useful to distinguish between the abdominal cavity, the division that houses the digestive organs, and the pelvic cavity, the division that houses the organs of reproduction.

59. Certain directional anatomical terms appear throughout your anatomy textbook. The ten most common directional terms describe front/back, above/below, toward the side/toward the middle, close to the surface/father from the surface, and near the point of attachment/farther from the point of attachment. List these terms and define them.

ANSWER: Anterior (front), posterior (back), superior (above), inferior (below), lateral (toward the side of the body), medial (toward the middle or midline), superficial (close to the surface), deep (away from the surface or within the structure), proximal (near the point of attachment) and distal (away from the point of attachment).

60. What is a significant goal of those individuals learning regional anatomy?

a. Build a three-dimensional understanding of the placement and relationships among structures
b. Gain a better understanding of the function and integration of multiple organs and organ systems
c. Determine the size and molecular structure of organs, their specific tissue, and cellular density
d. Determine the blood flow through the organs
e. Understand which regions are the most important

ANSWER: a

61. A systemic anatomical study of the muscular system would _____.

a. include selective muscles of the body
b. include all of the skeletal muscles of the body
c. determine the size and molecular structure of muscles
d. determine blood flow through the muscles of the body
e. deem which muscles of the body are most important

ANSWER: b

62. An anatomist would examine human sweat by _____.

a. analyzing the molecular composition of sweat
b. determining the nature and mechanism of sweating
c. describing the location of the glands and comparing different types of sweat glands
d. analyzing the structure of a specific sweat gland
e. analyzing the chemical composition of sweat

ANSWER: c

63. A physiologist would examine human sweat by _____.

a. analyzing the molecular composition of sweat
b. determining the atomic structure of sweat
c. describing the location of the glands and comparing different types of sweat glands
d. explaining how sweat is produced and its impacts on body function
e. analyzing the chemical composition of sweat

ANSWER: d

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