

Chapter 1 - The Foundation of Physiology

1. Which one of these pairs is correctly matched?

- a. anatomy/body function
- b. bacteria/multicellular
- c. organs/one primary tissue
- d. physiology/body function

ANSWER: d

2. Which of the following is a mechanistic rather than a teleological explanation of a physiological phenomenon?

- a. A person breathes to obtain oxygen.
- b. A person sweats to cool off.
- c. A person's stomach secretes digestive juices because it is stimulated by the nervous system.
- d. A person's heart beats to pump blood.

ANSWER: c

3. When a blood capillary is cut, a clot forms under which feedback control system?

- a. negative feedback
- b. positive feedback
- c. extrinsic control
- d. feedforward

ANSWER: b

4. Which of these types of tissues uses the terminology "smooth"?

- a. connective tissue
- b. epithelial tissue
- c. glandular tissue
- d. muscle tissue

ANSWER: d

5. Which of the following is an example of a positive-feedback system?

- a. body temperature regulation
- b. birth of a baby
- c. room temperature regulation
- d. blood pH regulation

ANSWER: b

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6. Which of these tissues can be found on the outer layer of the skin?

- a. connective tissue
- b. endocrine tissue
- c. epithelial tissue
- d. muscle tissue

ANSWER: c

7. Which statement is correct for the respiratory system?

- a. It eliminates unwanted substances from the body.
- b. It consists of the heart, blood vessels, and lungs.
- c. It plays an important role in maintaining the proper pH of the internal environment by adjusting the rate of removal of acid-forming carbon dioxide.
- d. It is responsible for taking up nutrients for the body.

ANSWER: c

8. Which of the following statements is NOT correct for connective tissue?

- a. Bone is a connective tissue.
- b. Blood is a connective tissue.
- c. Elastin can be found in the extracellular material of connective tissue.
- d. Connective tissue forms coverings and linings of the body cavities.

ANSWER: d

9. Which one of these sequences represents the correct hierarchy of biological organization?

- a. cell, organ, tissue, system, organism
- b. cell, tissue, organ, system, organism
- c. tissue, cell, system, organism, organ
- d. organ, tissue, cell, organism, system

ANSWER: b

10. Which of the following statements applies to extracellular fluid?

- a. It is the external environment of the body.
- b. It is inside each cell.
- c. It consists of the plasma and interstitial fluid.
- d. It consists of plasma only.

ANSWER: c

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11. Which of the following systems mainly distributes nutrients and oxygen through the body?

- a. circulatory system
- b. digestive system
- c. endocrine system
- d. integumentary system

ANSWER: a

12. Which of the following statements concerning negative feedback is NOT correct?

- a. Negative feedback exists when a change in a regulated variable triggers a response that opposes the change.
- b. Negative feedback exists when the input to a system increases the output, and the output limits its own production by inhibiting the input.
- c. With negative feedback, a control system's input and output continue to enhance each other.
- d. Most of the body's homeostatic control mechanisms operate on the principle of negative feedback.

ANSWER: c

13. Which of these statements regarding endocrine glands is correct?

- a. They consist of ducts.
- b. They secrete hormones internally into the blood capillaries.
- c. They are derived from connective tissue.
- d. They include the salivary glands.

ANSWER: b

14. Which of the following is a type of connective tissue?

- a. exocrine glands
- b. endocrine glands
- c. blood
- d. smooth muscle tissue

ANSWER: c

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15. The hormone insulin enhances the transport of glucose (sugar) from the blood into most of the body's cells. Its secretion is controlled by a negative-feedback system between the concentration of glucose in the blood and the insulin-secreting cells. Therefore, which of the following statements is correct?
- a. A decrease in blood glucose concentration stimulates insulin secretion, which in turn further lowers the blood glucose concentration.
 - b. An increase in blood glucose concentration stimulates insulin secretion, which in turn lowers the blood glucose concentration.
 - c. A decrease in blood glucose concentration stimulates insulin secretion, which in turn increases the blood glucose concentration.
 - d. An increase in blood glucose concentration stimulates insulin secretion, which further increases the blood glucose concentration.

ANSWER: b

16. Sweating is initiated in response to a rise in body temperature that occurs on exposure to a hot environment. Evaporation of the sweat cools the body. What kind of example is this?
- a. negative feedback
 - b. positive feedback
 - c. feedforward mechanism
 - d. intrinsic (local) control mechanism

ANSWER: a

17. What are the two systems concerned with the control of body functioning by extrinsic controls?
- a. nervous and respiratory
 - b. nervous and endocrine
 - c. endocrine and respiratory
 - d. endocrine and lymphatic

ANSWER: b

18. In which of the body systems is calcium mainly stored?
- a. endocrine system
 - b. integumentary system
 - c. muscular system
 - d. skeletal system

ANSWER: d

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19. Which statements regarding stem cells is correct?

- a. They are well-differentiated embryonic cells.
- b. They may reproduce just one time.
- c. Their daughter cells may differentiate into a number of different specialized cell types.
- d. They cannot be readily grown.

ANSWER: c

20. Platelets, which have negatively charged cell membranes, adhere to the positively charged surface of a torn blood vessel. As they do so, they release substances that attract more platelets to the damaged area and change the charge on their cell membranes to positive. More platelets adhere to the damaged area. The cycle repeats until the damaged area is sealed. What sort of feedback loop is formed, and why?

- a. This is a positive-feedback loop because the response reinforces the initial change.
- b. This is a negative-feedback loop because the response opposes the initial stimulus.
- c. This is a negative-feedback loop because having too many platelets in one area blocks blood flow.
- d. This is a positive-feedback loop because the response prevents a person from haemorrhaging to death.

ANSWER: a

21. In a negative-feedback loop, which component produces a response that changes a controlled condition?

- a. receptor
- b. control centre
- c. effector
- d. set point

ANSWER: c

22. Which statement does NOT describe the study of physiology?

- a. identifying the location of the stomach and how it is related to the location of pancreas
- b. describing the factors that affect cardiac output
- c. describing the process by which nerve impulses are transmitted
- d. explaining how the hormone thyroxine is synthesized in the thyroid glands

ANSWER: a

23. The outer layer of the skin is composed of _____.

- a. epithelial tissue
- b. muscle tissue
- c. connective tissue
- d. exocrine tissue

ANSWER: a

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24. Which of these statements concerning internal environment is correct?

- a. It consists of intracellular fluid.
- b. It is in direct contact with the body's cells and consists of the extracellular fluid.
- c. It is inside the body but not in direct contact with the body's cells.
- d. It is outside of the body, keeping the fluid volume in unchanging composition.

ANSWER: b

25. Cells eliminate carbon dioxide as a waste product.

- a. True
- b. False

ANSWER: True

26. All cells are capable of reproducing.

- a. True
- b. False

ANSWER: False

27. Highly differentiated tissues such as nervous and cardiac muscle are incapable of new cell production.

- a. True
- b. False

ANSWER: False

28. Enzymes are carbohydrates.

- a. True
- b. False

ANSWER: False

29. A mechanistic explanation of why a person breathes is to obtain oxygen.

- a. True
- b. False

ANSWER: False

30. A mechanistic explanation of why a person sweats is to cool off.

- a. True
- b. False

ANSWER: False

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31. Tissues are composed of two or more types of cells organized to perform a particular function or functions.
- a. True
 - b. False

ANSWER: False

32. Muscle cells produce movement by expanding.
- a. True
 - b. False

ANSWER: False

33. Blood is a type of connective tissue.
- a. True
 - b. False

ANSWER: True

34. Glands are formed during embryonic development by pockets of epithelial tissue that dip inward from the surface.
- a. True
 - b. False

ANSWER: True

35. Endocrine glands secrete hormones through ducts into the blood.
- a. True
 - b. False

ANSWER: False

36. A lumen is a cavity within a hollow organ or tube.
- a. True
 - b. False

ANSWER: True

37. Organs are composed of two or more kinds of primary tissues.
- a. True
 - b. False

ANSWER: True

38. The external environment is found outside cells but inside the body.
- a. True
 - b. False

ANSWER: False

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39. Factors that are homeostatically regulated are maintained at a constant, fixed level unless disease is present.
- a. True
 - b. False

ANSWER: False

40. The lungs remove carbon dioxide from the blood plasma.
- a. True
 - b. False

ANSWER: True

41. To sustain life, the internal environment must be maintained in an absolutely unchanging state.
- a. True
 - b. False

ANSWER: False

42. Not all activities performed by the muscular and nervous systems are directed toward maintaining homeostasis.
- a. True
 - b. False

ANSWER: True

43. The plasma surrounds and bathes all the body's cells.
- a. True
 - b. False

ANSWER: False

44. The concentration of salt in the extracellular fluid influences how water enters and leaves cells.
- a. True
 - b. False

ANSWER: True

45. Exocrine glands are the only structures in the body capable of secretion.
- a. True
 - b. False

ANSWER: False

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46. Secretion refers to the release from a cell, in response to appropriate stimulation, of specific products that have, in large part, been synthesized by the cell.

- a. True
- b. False

ANSWER: True

47. The endocrine system functions with the circulatory system for the transport of hormones.

- a. True
- b. False

ANSWER: True

48. Some organs, such as the heart, skin, and intestine, belong to more than one body system.

- a. True
- b. False

ANSWER: True

49. The skin is part of the integumentary system.

- a. True
- b. False

ANSWER: True

50. Negative feedback operates to maintain a controlled factor in a relatively steady state, whereas positive feedback moves a controlled variable even further from a steady state.

- a. True
- b. False

ANSWER: True

51. With positive feedback, a control system's input and output continue to enhance each other.

- a. True
- b. False

ANSWER: True

52. Feedforward mechanisms bring about a response in reaction to a change in a regulated variable.

- a. True
- b. False

ANSWER: False

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53. Most homeostatic mechanisms operate on the principle of positive feedback.

- a. True
- b. False

ANSWER: False

54. All proteins are enzymes.

- a. True
- b. False

ANSWER: False

55. All stem cells are found in the umbilical cord.

- a. True
- b. False

ANSWER: False

56. Intestine, heart, and skin do not consist of hormone-secreting cells.

- a. True
- b. False

ANSWER: False

57. Stem cells are not common to all multicellular organisms.

- a. True
- b. False

ANSWER: False

58. Homeostatic control systems are grouped into two classes: intrinsic and extrinsic controls.

- a. True
- b. False

ANSWER: True

59. The smallest unit capable of carrying out the processes associated with life is the _____.

ANSWER: cell

60. _____ cells are specialized to send electrical signals.

ANSWER: Nerve

61. _____ muscle tissue composes the heart.

ANSWER: Cardiac

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62. _____ are composed of two or more types of primary tissue organized to perform a particular function or functions.

ANSWER: Organs

63. _____ glands secrete through ducts in the skin.

ANSWER: Exocrine

64. A _____ is a collection of organs that perform related functions and interact to accomplish a common activity that is essential for survival of the whole body.

ANSWER: body system

65. The internal environment consists of the _____, which is made up of _____, the fluid portion of the blood, and _____, which surrounds and bathes all cells.

ANSWER: extracellular fluid; plasma; interstitial fluid

66. The _____ is the liquid part of the blood.

ANSWER: plasma

67. The body cells are in direct contact with and make life-sustaining exchanges with the _____.

ANSWER: internal environment
extracellular fluid

68. _____ refers to maintenance of a relatively stable internal environment.

ANSWER: Homeostasis

69. _____ tissue is composed of cells specialized for contraction and force generation.

ANSWER: Muscle

70. The _____ system consists of all hormone-secreting tissues.

ANSWER: endocrine

71. The two major control systems of the body are the _____ and the _____.

ANSWER: nervous system; endocrine system
endocrine system; nervous system

72. _____ are the blood vessels in which materials are mixed between the blood plasma and the interstitial fluid.

ANSWER: Capillaries

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73. The _____ system is the transport system of the body.

ANSWER: circulatory

74. The _____ system eliminates waste products other than carbon dioxide, and plays a key role in regulating the volume, electrolyte composition, and acidity of the extracellular fluid.

ANSWER: urinary

75. The _____ system controls and coordinates bodily activities that require swift responses, especially to changes in the external environment.

ANSWER: nervous

76. _____ refers to the abnormal functioning of the body associated with disease.

ANSWER: Pathophysiology

77. Homeostasis is primarily operated by _____ mechanisms.

ANSWER: negative-feedback

78. The term _____ refers to the abnormal functioning of the body associated with disease.

ANSWER: pathophysiology

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Match the terms labelled a. through d. with their correct descriptions. (Options may be used more than once or not at all.)

- a. nervous tissue
- b. epithelial tissue
- c. muscle tissue
- d. connective tissue

79. This tissue type is composed of cells specialized for contraction.

ANSWER: c

80. This tissue type is made up of cells specialized in the exchange of materials between the cell and its environment.

ANSWER: b

81. This tissue type connects, supports, and anchors various body parts.

ANSWER: d

82. The heart is made of this type of tissue.

ANSWER: c

83. Bone is this tissue type.

ANSWER: d

84. Glands are a derivative of this tissue type.

ANSWER: b

85. The digestive tract is lined with this tissue.

ANSWER: b

86. The brain is made primarily of this tissue.

ANSWER: a

87. The blood is this tissue type.

ANSWER: d

88. This tissue is distinguished by relatively few cells within an extracellular material.

ANSWER: d

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Match the components labelled a. through d. with their correct role.

Temperature-sensitive nerve cells monitor the body temperature and provide information about its status to a temperature-control centre in the hypothalamus, a part of the brain. The hypothalamus can bring about adjustments in body temperature by inducing shivering or sweating, among other things.

- a. controlled variable
- b. integrator
- c. sensor
- d. effector

89. body temperature

ANSWER: a

90. temperature-sensitive nerve cells

ANSWER: c

91. skeletal muscles and sweat glands

ANSWER: d

92. hypothalamus

ANSWER: b

Match the terms labelled a. through d. with their correct physiological events. (Options may be used more than once or not at all.)

- a. intrinsic control
- b. negative-feedback control
- c. positive-feedback control
- d. feedforward control

93. increased blood flow into muscle tissue in response to a localized increase in carbon dioxide

ANSWER: a

94. the release of a hormone to lower blood calcium level when it gets too high

ANSWER: b

95. increased cardiac activity to elevate blood pressure when systemic pressure is low

ANSWER: b

96. rapid clotting of blood due to increasing levels of platelet activity at a site of vessel damage

ANSWER: c