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10.1 Introduction to Homeostasis



Read 10.1 (pp. 606-610).

Exercises

Circle the letter of the best answer.

- 1. What is an animal's internal environment?
 - a. the fluid in which the cells reside
 - b. all the cells, organs, and fluids within the body
 - c. internal processes that contribute to homeostasis
 - d. body temperature, metabolism rate, and other internal conditions
- 2. How do all animals maintain a stable internal environment?
 - a. by producing heat and wastes
 - b. by using behavior and internal processes to combat pressures
 - c. by maintaining a precise internal body temperature at all times
 - d. by changing under pressures from the cells and the external environment
- **3.** What is the main factor that directs how body structures will develop and function to maintain homeostasis?
 - a. diet
 - b. nervous system
 - c. genetic information
 - d. environmental pressures
- 4. What processes provide the energy needed to maintain homeostasis?
 - **a.** gas exchange and metabolism
 - b. movement and body fluid circulation
 - c. nutrient absorption and waste elimination
 - d. food consumption and cellular respiration
- 5. What are two main tasks of an animal's control systems?
 - a. absorb nutrients and eliminate wastes
 - **b.** consume food and transfer potential energy
 - c. form proper structures and combat mutations
 - d. monitor internal environment and trigger responses

a. immune system

10.1

- **b.** endocrine system
- c. respiratory system
- d. musculoskeletal system

Circle *T* **if the statement is true or** *F* **if it is false.**

- **7. T F** Homeostasis helps animals survive because it responds to pressures that would otherwise lead to death.
- **8. T F** The shape of microscopic structures is just as important to homeostasis as the shape of large structures.
- **9. T F** Organ systems work against homeostasis because each system is specialized to perform specific functions.
- **10. T F** Energy is vital for maintaining homeostasis because it is needed for all biological functions.
- **11. T F** Large animals need specialized organs for exchanging materials mainly because their skin is too thick to exchange materials.
- **12. T F** To maintain homeostasis, an animal must be able to sense and oppose changes to its internal environment.

Match each example with the concept it illustrates.

- **13.** _____ Camels in the desert face high heat and lack of water.
- **14.** _____ A respiratory system gets oxygen and expels carbon dioxide.
- **15.** _____ The pancreas releases insulin to decrease high glucose levels.
- **16.** _____ A gull's body fluid supports the health of the cells it contains.
- **17.** _____ White blood cells make antibodies with specific shapes to disable pathogens.

Answer these questions.

18. What are two major sources of pressure that affect an animal's internal environment, and what are two pressures from each source?

- a. external environment
- **b.** internal environment
- c. method of control
- d. method of exchange
- e. proper structure

- **19.** What is homeostasis? Define it in your own words.
- 20. What are the four requirements for an animal to be able to maintain homeostasis?
- **21.** What are the three basic steps involved in making energy from sunlight available to animals for use in internal processes?

- **22.** Why do animals need to be able to exchange substances between their internal and external environments?
- 23. By what means are materials usually exchanged in animals?
- 24. How do animals benefit from having organs of exchange that are folded and wrinkled?
- **25.** What two systems do animals use for controlling their internal environment and responding to changes?



Read 10.2 (pp. 611-616).

Exercises

Circle the letter of the correct answer.

- 1. What is the most significant role of an animal's digestive system?
 - a. absorbing needed materials from the external environment
 - b. assembling the molecules required by the internal environment
 - c. killing pathogens and eliminating unneeded materials from the body
 - **d.** converting thermal energy to chemical energy stored in biomolecules
- 2. What type of biomolecule is richest in energy, making it ideal for energy storage?
 - a. carbohydrates
 - **b.** lipids
 - c. proteins
 - d. vitamins
- 3. What is the primary source of energy in the food that most animals eat?
 - a. ATP
 - b. carbohydrates
 - c. lipids
 - d. proteins
- 4. What is used to break down most biomolecules during digestion?
 - a. acids
 - b. enzymes
 - c. beaks or teeth
 - d. villi and microvilli
- 5. What substance do animals use to unfold proteins and kill bacteria during digestion?
 - a. acids
 - **b.** bile
 - c. collagen
 - d. enzymes
- 6. Why are the surfaces of digestive tracts often covered with villi?
 - a. to limit the amount of nutrients absorbed
 - **b.** to produce the needed digestive enzymes
 - c. to allow absorption of the smallest nutrients
 - d. to increase the surface area of a compact structure

- 7. What produces most of the digestive juices used by complex animals?
 - a. accessory organs
 - **b.** alimentary organs
 - c. acids and enzymes
 - d. gastrovascular cells

Circle *T* **if the statement is true or** *F* **if it is false.**

- 8. T F Animals get all their matter and energy by consuming food and absorbing its nutrients.
- **9. T F** Animals reform proteins from food into their own biomolecules.
- **10. T F** A vitamin is any molecule that the body needs but cannot produce.
- **11. T F** Chemical digestion is mainly accomplished through chewing and churning in the mouth and stomach.
- **12. T F** Bile breaks large carbohydrates into smaller monomers that animals can easily digest.
- **13. T F** The amount of nutrients a digestive tract can absorb in a given time depends largely on the surface area of the digestive tract wall.
- **14. T F** Animals with no digestive system or with a gastrovascular cavity use endocytosis to absorb food.
- **15. T F** The components of food that are not needed by the body pass through the digestive tract without entering the internal environment.

Answer these questions.

16. Why is the digestion and absorption of food necessary to maintain homeostasis?

- 17. What are six types of nutrients animals absorb from food and use in their bodies?
- 18. Why do animals need to eat foods that contain essential nutrients?
- **19.** What are the two main purposes of digestion?

- 20. Why is it important for an animal to begin the digestive process with mechanical digestion?
- 21. What is the difference between villi and microvilli?
- 22. What is the basic structural difference between a gastrovascular cavity and an alimentary canal?

Review

Circle the letter of the best answer. 10.1

- 23. Why is homeostasis necessary for an animal to survive?
 - **a.** It converts potential energy into a usable form.
 - **b.** It allows pressures to affect the internal environment.
 - c. It counteracts pressures that would otherwise kill the animal.
 - **d.** It balances metabolism with body temperature to use energy efficiently.
- 24. Why must larger animals have specialized organs for absorption and excretion?
 - **a.** Their skin is not as permeable.
 - **b.** Specialized organs require less energy.
 - c. The wastes large animals produce are usually more toxic.
 - d. Large animals need more surface area to perform these processes.

Write E for external environment or / for internal environment. 10.1

- **25.** _____ outside of an animal
- 26. _____ fluid in which cells live
- **27.** _____ pressure comes from an animal's own cells
- 28. _____ must be maintained at a stable condition for animals to survive
- **29.** _____ conditions depend on animal's location and time of day or year