What Is Animal Physiology?

Worksheet

Animal physiology is the study of how animal bodies function - how organ systems such as the circulatory, respiratory, digestive, and nervous systems work together to maintain homeostasis and support survival.

Questions

1. What best defines animal physiology?

A) The classification of animal species
B) The study of how animal body systems function
C) The study of animal fossils
D) The study of animal behavior only

2. Which animals regulate body temperature internally, independent of the environment?

A) Ectotherms
B) Endotherms
C) Both equally
D) Neither

3. Why is countercurrent exchange in fish gills efficient?

A) It slows blood flow to a stop
B) It maintains a diffusion gradient across the whole gill surface
C) It only works in warm water
D) It prevents oxygen from entering the blood

4. Shivering in cold conditions is an example of maintaining which physiological state?

A) Digestion
B) Homeostasis
C) Photosynthesis
D) Osmosis

5. A lizard basks on a sun-warmed rock every morning before hunting. Explain this behavior using animal physiology.

6. A human starts shivering when exposed to cold air. What physiological process is occurring?

7. A fish 'breathes' by pumping water over its gills instead of using lungs. Why does this work for a fish but not for a human?

8. Define: What is animal physiology?

9. Define: What is homeostasis?

10. Define: Difference between ectotherms and endotherms?

Answer Key

1. B) The study of how animal body systems function - Animal physiology focuses on how organs and systems function, not classification or fossils.

2. B) Endotherms - Endotherms, like mammals and birds, generate heat metabolically to keep body temperature constant.

3. B) It maintains a diffusion gradient across the whole gill surface - Water and blood flow in opposite directions, so a gradient favoring oxygen diffusion into blood is maintained the whole length of the gill.

4. B) Homeostasis - Shivering generates heat to keep internal body temperature stable - a homeostatic response.

5. Lizards are ectotherms - their body temperature depends on the environment Muscle and enzyme activity is slow when the body is cold Basking absorbs heat, raising internal temperature A warmer body allows faster muscle contraction and enzyme activity, improving hunting ability

6. Humans are endotherms that maintain a set internal temperature (~37C) Cold receptors in the skin detect a drop in temperature The hypothalamus triggers rapid, involuntary muscle contractions (shivering) Shivering generates metabolic heat, helping restore body temperature

7. Gills have thin, highly folded surfaces with a rich capillary network Water flows over gills in the opposite direction to blood flow (countercurrent exchange), maximizing oxygen uptake This system is efficient for extracting dissolved O2 from water but cannot function in air (gills collapse and dry out) Humans instead use lungs, adapted to extract O2 from air, not water

8. The study of how animal organ systems function and work together to keep the body alive and in balance.

9. The maintenance of a stable internal environment (temperature, pH, water balance) despite external changes.

10. Ectotherms rely on the environment for body heat; endotherms generate and regulate their own body heat internally.