What is Homeostasis?

Worksheet

Homeostasis is the regulation of internal conditions, like temperature, pH and blood glucose, within a narrow, stable range, mainly through negative feedback loops that sense change and trigger a corrective response.

Questions

1. What is the main mechanism the body uses to maintain homeostasis?

A) Positive feedback loops
B) Negative feedback loops
C) Random fluctuation
D) Constant growth

2. Which hormone lowers blood glucose levels?

A) Glucagon
B) Insulin
C) Adrenaline
D) Cortisol

3. What happens when body temperature rises above the set point?

A) Shivering begins
B) Sweating and vasodilation occur
C) Blood vessels constrict
D) Metabolism stops

4. Which organ system helps regulate blood pH by adjusting breathing rate?

A) Digestive system
B) Respiratory system
C) Skeletal system
D) Integumentary system

5. Explain how the body regulates blood sugar after a meal using a feedback loop.

6. Describe how the body responds to overheating during exercise.

7. Explain how the body maintains blood pH within a narrow range.

8. Define: What is homeostasis?

9. Define: What is a negative feedback loop?

10. Define: What is the 'set point'?

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Answer Key

1. B) Negative feedback loops - Negative feedback loops counteract changes to restore balance.

2. B) Insulin - Insulin helps cells absorb glucose, lowering blood sugar.

3. B) Sweating and vasodilation occur - Sweating and vasodilation help release excess heat.

4. B) Respiratory system - Increasing breathing rate expels more CO2, raising blood pH.

5. Blood glucose rises after eating Pancreatic beta cells detect the rise and release insulin Insulin signals cells to absorb glucose, lowering blood sugar back to normal When glucose drops too low, the pancreas releases glucagon to raise it again

6. Core temperature rises above the ~37C set point Thermoreceptors signal the hypothalamus Sweat glands activate and blood vessels dilate (vasodilation) to release heat Temperature drops back toward normal, and sweating slows

7. Blood pH is normally tightly controlled around 7.35-7.45 Chemoreceptors detect a drop in pH (more acidic blood) The respiratory system increases breathing rate to expel more CO2 Kidneys also adjust bicarbonate excretion to restore pH balance

8. The maintenance of a stable internal environment despite external changes.

9. A regulatory mechanism where a response counteracts and reverses the initial change.

10. The target value the body tries to maintain, like 37C for body temperature.

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