What is Homeostasis?

Worksheet

Homeostasis is the maintenance of a stable internal environment through self-regulating feedback loops, mainly negative feedback, where a change triggers a response that reverses the change and returns the body to its set point.

Questions

1. What is the main purpose of homeostasis?

A) To grow the body faster
B) To keep the internal environment stable
C) To increase heart rate
D) To produce more hormones

2. In a negative feedback loop, a response to rising blood glucose is to

A) raise glucose further
B) release insulin to lower it
C) release glucagon to raise it
D) do nothing

3. Which structure detects a change in the internal environment?

A) Effector
B) Receptor
C) Hormone
D) Set point

4. Which of these is an example of homeostasis?

A) Puberty
B) Thermoregulation
C) Cell division
D) Photosynthesis

5. After a meal, blood glucose rises to 160 mg/dL. Explain how negative feedback brings it back to normal (~90 mg/dL).

6. Body temperature rises to 39C during exercise. Trace the negative feedback response.

7. Blood pressure drops after blood loss. How does negative feedback restore it?

8. Define: What is homeostasis?

9. Define: What is a negative feedback loop?

10. Define: Name the four parts of a feedback loop.

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Answer Key

1. B) To keep the internal environment stable - Homeostasis maintains a stable internal environment despite external change.

2. B) release insulin to lower it - Insulin lowers blood glucose, reversing the rise - that's negative feedback.

3. B) Receptor - Receptors sense deviations from the set point and send signals to the control center.

4. B) Thermoregulation - Thermoregulation keeps body temperature at a stable set point via feedback.

5. Receptor: pancreatic beta cells detect high glucose Control: pancreas releases insulin into the blood Effector: liver and muscle cells absorb glucose and store it as glycogen Result: blood glucose falls back toward the 90 mg/dL set point, and insulin release slows down

6. Receptor: thermoreceptors in the skin and hypothalamus detect the rise Control: the hypothalamus (the body's thermostat) triggers cooling responses Effector: sweat glands increase sweat production; skin blood vessels dilate Result: heat loss increases, temperature drops back toward 37C, and the response switches off

7. Receptor: baroreceptors in the aorta and carotid arteries detect low pressure Control: the medulla oblongata increases sympathetic nervous system activity Effector: heart rate and vessel constriction increase Result: blood pressure rises back toward normal, reducing baroreceptor signaling

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

9. A response that reverses a change and returns a variable to its set point.

10. Stimulus, receptor, control center, effector.

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