What is Homeostasis?

Worksheet

Homeostasis is the maintenance of a stable internal environment (like temperature, pH, or glucose level) through self-regulating feedback mechanisms, mainly negative feedback.

Questions

1. Homeostasis refers to

A) Constant growth
B) A stable internal environment
C) Random cell division
D) External weather changes

2. Which is the correct order of a feedback loop?

A) Effector receptor response
B) Stimulus receptor control center effector response
C) Response stimulus effector
D) Control center stimulus receptor

3. Sweating to cool the body is an example of

A) Positive feedback
B) Negative feedback
C) No feedback
D) Random response

4. Which of these is a homeostatically regulated variable?

A) Hair color
B) Blood glucose level
C) Eye color
D) Height

5. Body temperature rises to 39C after exercise. Describe the homeostatic response using the feedback loop.

6. After a meal, blood glucose rises to 160 mg/dL. Explain how the body restores homeostasis.

7. During childbirth, contractions get progressively stronger instead of returning to normal. Why doesn't this fit the usual homeostatic pattern?

8. Define: What is homeostasis?

9. Define: What is a 'set point'?

10. Define: Which feedback type is most common in homeostasis?

Answer Key

1. B) A stable internal environment - Homeostasis is the body's regulation to keep internal conditions stable.

2. B) Stimulus receptor control center effector response - A stimulus is detected by a receptor, processed by a control center, and acted on by an effector to produce a response.

3. B) Negative feedback - Sweating reverses the rise in temperature, which is negative feedback.

4. B) Blood glucose level - Blood glucose is tightly regulated around a set point; hair/eye color and height are not homeostatic variables.

5. The hypothalamus (control center) detects the temperature rise via thermoreceptors. It signals effectors: sweat glands activate and blood vessels near the skin dilate. Sweating and heat loss bring the temperature back down toward the 37C set point - negative feedback.

6. Rising glucose is detected by the pancreas. The pancreas releases insulin, which signals cells to take up glucose from the blood. Blood glucose falls back toward the normal range (~70-100 mg/dL) - negative feedback.

7. This is positive feedback, not negative feedback. Oxytocin causes contractions, which stimulate more oxytocin release, intensifying contractions further. The loop amplifies the change until birth occurs, then the cycle is broken - a special, self-limiting exception to typical homeostasis.

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

9. The target/normal value the body tries to maintain (e.g. 37C body temperature).

10. Negative feedback - it reverses a change to restore balance.