Homeostasis

Key Idea: Homeostasis is the ability to maintain a constant internal environment despite changes in the external environment.

What is homeostasis?

Homeostasis literally means "constant state". Organisms maintain homeostasis, i.e. a relatively constant internal environment, even when the external environmental is changing. This takes energy.

For example, when you exercise (right), your body must keep your body temperature constant at about 37.0 °C despite the increased heat generated by activity. Similarly, you must regulate blood sugar levels and blood pH, water and electrolyte balance, and blood pressure. Your body's organ systems carry out these tasks.

To maintain homeostasis, the body must detect changes in the environment (through receptors), process this sensory information, and respond to it appropriately. The response provides new feedback to the receptor. These three components are illustrated below.

How homeostasis is maintained

- **Receptor**: Detects change and sends a message to the control center.
- **Effector**: Responds to the output from the control center.
- **Control center**: Receives the message and coordinates a response. Sends an output message to an effector.

The analogy of a thermostat on a heater is a good way to understand how homeostasis is maintained. A heater has sensors (a receptor) to monitor room temperature. It also has a control center to receive and process the data from the sensors. Depending on the data it receives, the control center activates the effector (heating unit), switching it on or off. When the room is too cold, the heater switches on. When it is too hot, the heater switches off. This maintains a constant temperature.

1. What is homeostasis? 

2. What is the role of the following components in maintaining homeostasis:

   (a) Receptor: 

   (b) Control center: 

   (c) Effector: 

© 2014 BIOZONE International
ISBN: 978-1-927173-84-8
Photocopying Prohibited