

B13.3.1: What is Homeostasis?

Homeostasis is the process of maintaining a stable internal environment. This includes regulating factors like body temperature, blood sugar levels, and water balance.

B13.3.2: Negative Feedback: A Self-Regulatory Mechanism

Negative feedback is a control system that works to maintain a set point. When a variable deviates from the set point, a series of responses are triggered to bring it back to normal.

B13.3.3: Blood Glucose Regulation: A Delicate Balance

The liver plays a crucial role in regulating blood glucose levels. When blood sugar rises after a meal, the pancreas releases **insulin**. Insulin stimulates the liver to store excess glucose as glycogen.

When blood sugar levels drop, the pancreas releases **glucagon**. Glucagon signals the liver to break down glycogen and release glucose into the bloodstream.

B13.3.4: The Skin: Our Body's Protective Barrier

The skin contains several structures that help maintain body temperature:

- **Hairs:** Trap air, providing insulation.
- **Hair erector muscles:** Raise hairs to trap more air for warmth.
- **Sweat glands:** Release sweat to cool the body through evaporation.
- **Receptors:** Detect changes in temperature.
- **Sensory neurons:** Transmit temperature information to the brain.
- **Blood vessels:** Dilate or constrict to regulate blood flow to the skin.
- **Fatty tissue:** Provides insulation.

B13.3.5: Thermoregulation: Keeping the Body's Temperature Steady

Mammals use various mechanisms to maintain a constant body temperature:

- **Insulation:** Hair and fat help to retain heat.
- **Sweating:** Evaporation of sweat cools the body.
- **Shivering:** Muscle contractions generate heat.
- **Brain:** The hypothalamus in the brain acts as a thermostat, regulating body temperature.
- **Vasodilation:** Blood vessels dilate, increasing blood flow to the skin for heat loss.
- **Vasoconstriction:** Blood vessels constrict, reducing blood flow to the skin to conserve heat.

By understanding these mechanisms, we can appreciate the complexity of homeostasis and the importance of maintaining a stable internal environment.