

B13.1.1: Electrical Signals in the Body

Our bodies are a complex network of electrical signals. These signals, called **impulses**, travel along specialized cells called **neurons**.

B13.1.2: The Nervous System: A Control Center

The nervous system is divided into two main parts:

1. **Central Nervous System (CNS):**
 - **Brain:** The control center, responsible for thought, memory, emotion, and movement.
 - **Spinal Cord:** Connects the brain to the rest of the body, transmitting signals between the brain and the body.
2. **Peripheral Nervous System (PNS):**
 - **Nerves:** These carry messages to and from the CNS, allowing us to sense and respond to our environment.

B13.1.3: The Role of the Nervous System

The nervous system is like the body's command center. It coordinates and regulates all body functions, from simple reflexes to complex thoughts and actions. It ensures that our body responds appropriately to both internal and external stimuli.

B13.1.4: Types of Neurons

There are three main types of neurons involved in transmitting nerve impulses:

1. **Sensory Neurons:** These carry impulses from sensory receptors (like those in the skin or eyes) to the CNS.
2. **Relay Neurons:** These connect sensory and motor neurons, allowing for complex processing of information within the CNS.
3. **Motor Neurons:** These carry impulses from the CNS to effectors (like muscles or glands), triggering a response.

B13.1.5: The Reflex Arc

A reflex arc is a simple, automatic response to a stimulus. It involves the following steps:

1. **Receptor:** Detects the stimulus (e.g., touching a hot object).
2. **Sensory Neuron:** Transmits the impulse to the spinal cord.
3. **Relay Neuron:** Processes the information and sends an impulse to a motor neuron.
4. **Motor Neuron:** Carries the impulse to an effector.
5. **Effector:** Responds to the stimulus (e.g., muscle contracts to pull the hand away).

B13.1.6: Reflex Actions

Reflex actions are rapid and automatic responses that help protect us from harm. They bypass the brain, allowing for quick reactions. For example, the knee-jerk reflex or pulling your hand away from a hot object.

B13.1.7: Sense Organs

Sense organs are specialized groups of receptor cells that detect specific stimuli:

- **Eyes:** Detect light.
- **Ears:** Detect sound and help maintain balance.
- **Skin:** Detects touch, pressure, temperature, and pain.
- **Nose:** Detects chemicals in the air (smell).
- **Tongue:** Detects chemicals in food (taste).