Nervous Coordination in Mammals

Nervous coordination in mammals involves the nervous system, which controls and integrates body activities
through electrical signals. It is divided into the central nervous system (CNS) and peripheral nervous system (PNS).

1. **Structure of the Nervous System**:
   - **Central Nervous System (CNS)**: Composed of the brain and spinal cord.
     - The **brain** is the control center for all voluntary and involuntary activities. It has regions like:
       - **Cerebrum**: Controls thinking, memory, and voluntary actions.
       - **Cerebellum**: Responsible for coordination and balance.
       - **Medulla Oblongata**: Controls involuntary actions like breathing and heartbeat.
     - The **spinal cord** connects the brain to the rest of the body and coordinates reflexes.
   - **Peripheral Nervous System (PNS)**: Connects the CNS to limbs and organs.
       - Divided into the **somatic nervous system** (controls voluntary actions) and **autonomic nervous system**
       (controls involuntary actions). The autonomic system has two parts:
       - **Sympathetic Nervous System**: Prepares the body for "fight or flight" responses.
       - **Parasympathetic Nervous System**: Promotes "rest and digest" activities.

2. **Neurons**:
   - Neurons are the functional units of the nervous system.
   - A neuron has:
     - **Cell Body**: Contains the nucleus and organelles.
     - **Dendrites**: Receive signals from other neurons.

- **Axon**: Transmits signals to other neurons or muscles.

- **Synapse**: The junction where neurons communicate via chemical neurotransmitters.

3. **Types of Neurons**:

- **Sensory Neurons**: Carry signals from sensory organs to the CNS.

- **Motor Neurons**: Transmit signals from the CNS to muscles and glands.

- **Interneurons**: Connect sensory and motor neurons within the CNS.

4. **Nerve Impulses**:

- A nerve impulse is an electrical signal that travels along a neuron.

- It involves a change in the electrical charge across the neuron's membrane, called an **action potential**.

5. **Reflex Action**:

- Reflexes are automatic and rapid responses to stimuli.

- They involve a **reflex arc**, which bypasses the brain for quicker responses.

- Example: Pulling your hand away from a hot surface.

6. **Nervous Disorders**:

- Examples include Parkinson's disease, Alzheimer's disease, and multiple sclerosis, which affect nervous system functions.

7. **Comparison with Hormonal Coordination**:

- Nervous coordination is fast and short-lived, while hormonal coordination (via endocrine glands) is slower but longer-lasting.

Understanding this system helps in appreciating how mammals detect and respond to changes in

their environment, ensuring survival.