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## Lec.5

# Nervous System

Artificial kidney first stage

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# Nervous System

## Introduction:

The nervous system is one of the most vital systems in the human body. It regulates essential functions and coordinates between various organs to maintain the body's balance. It consists of a complex network of neurons that transmit and receive electrical and chemical signals.

## Divisions of the Nervous System:

### 1. Central Nervous System (CNS):

Composed of:

- **The Brain:** The main control center, consisting of the cerebrum, cerebellum, and brainstem.
- **The Spinal Cord:** Connects the brain to the rest of the body and acts as a hub for nerve signals.

### 2. Peripheral Nervous System (PNS):

Includes nerves extending from the brain and spinal cord to the limbs and organs:

- **Sensory Nerves:** Transmit information from the body to the CNS.
- **Motor Nerves:** Carry signals from the CNS to muscles.

### 3. Autonomic Nervous System (ANS):

Controls involuntary functions such as heartbeat, breathing, and digestion. It is divided into:

- **Sympathetic Nervous System:** Responsible for "fight or flight" responses.
- **Parasympathetic Nervous System:** Supports relaxation and balance.

## **Main Functions of the Nervous System:**

1. **Sensory Input:**  
Receiving information from the external and internal environment through sensory receptors.
2. **Integration:**  
Processing incoming information and making decisions.
3. **Motor Output:**  
Executing appropriate responses via nerve signals to muscles and glands.

## **Neurons:**

- The fundamental unit of the nervous system.
- Composed of:
  - **Cell Body:** Contains the nucleus.
  - **Dendrites:** Receive incoming signals.
  - **Axon:** Transmits signals to other cells.

## **Glial Cells:**

- Provide support and protection for neurons.
- Help nourish neurons and maintain their surrounding environment.

## **Diseases of the Nervous System:**

- **Cerebral Palsy:** Disorders affecting movement and coordination.
- **Alzheimer's Disease:** Progressive decline in cognitive functions.
- **Multiple Sclerosis:** Degeneration of the myelin sheath covering nerves.
- **Epilepsy:** Abnormal electrical activity in the brain.

### **Advancements in Nervous System Science:**

- **Stem Cell Therapy:** Repairing damaged neural tissues.
- **Smart Prosthetics:** Controlled using neural signals.
- **Artificial Intelligence:** Analyzing brain signals and supporting neurological treatments.

### **Conclusion:**

The nervous system is the primary driver of human life and daily activities. Advances in neuroscience have significantly enhanced our understanding of its functions and disorders, paving the way for innovative treatments and technologies.