

HUMAN ANATOMY AND PHYSIOLOGY

UNIT – 1

Nervous System:

Organization of Nervous System:

- The nervous system is divided into the central nervous system (CNS) and the peripheral nervous system (PNS).
- The PNS includes sensory and motor neurons.
- The CNS includes the brain and spinal cord.

Neurons:

- Neurons are the functional units of the nervous system.
- They consist of a cell body (soma), dendrites, and an axon.
- Dendrites receive signals, while axons transmit signals.

Neuroglia:

- Neuroglia, or glial cells, are support cells of the nervous system.
- They include astrocytes, oligodendrocytes, microglia, and ependymal cells.

Classification of Nerve Fibers:

- Nerve fibers are classified based on size and myelination.
- Types include A fibers (myelinated and fast), B fibers (lightly myelinated), and C fibers (unmyelinated and slow).

Electrophysiology:

- Electrophysiology is the study of electrical properties of cells.
- Neurons generate and transmit electrical signals.

Action Potential:

- Action potential is a rapid, transient change in membrane potential.
- It is the basis for nerve impulse conduction.

Nerve Impulse:

- Nerve impulses are electrochemical signals that travel along neurons.
- They result from action potentials and enable communication within the nervous system.

Receptors:

- Receptors are specialized structures that detect and respond to stimuli.

- They convert external signals into electrical impulses.

Synapse:

- A synapse is a junction between neurons.
- It allows communication by the release of neurotransmitters.

Neurotransmitters:

- Neurotransmitters are chemical messengers released at synapses.
- They transmit signals from one neuron to another or to other target cells.

Central Nervous System (CNS):

- The CNS is protected by meninges, including the dura mater, arachnoid mater, and pia mater.
- The ventricles of the brain are fluid-filled spaces that produce and circulate cerebrospinal fluid (CSF).

Structure and Functions of the Brain:

- **Cerebrum:** The largest part of the brain responsible for higher cognitive functions, sensation, and voluntary muscle activity.
- **Brain Stem:** Includes the medulla, pons, and midbrain, controlling vital functions like breathing and heart rate.
- **Cerebellum:** Coordinates motor movements and maintains balance.

Spinal Cord:

- The spinal cord transmits signals between the brain and the body.
- Afferent nerve tracts carry sensory information to the brain.
- Efferent nerve tracts carry motor commands from the brain to muscles and glands.
- Reflex activity allows rapid, involuntary responses to stimuli.

Understanding the organization and functioning of the nervous system is crucial for grasping how the body communicates, processes information, and coordinates various functions and responses. These notes cover the foundational concepts related to the nervous system.