

Primary Parts of a Neuron and Their Functions

1. Dendrites

Structure: Short, highly branched extensions projecting from the cell body.

Function: Receive chemical signals (neurotransmitters) from adjacent neurons or sensory receptors and convert them into electrical impulses directed toward the cell body.

2. Cell Body (Soma)

Structure: Contains the nucleus, cytoplasm, and key organelles such as mitochondria, Golgi apparatus, and Nissl granules (dense clusters of rough ER and free ribosomes).

Function: Integrates incoming signals from the dendrites, maintains metabolic health, and synthesizes proteins necessary for neuronal function.

3. Axon Hillock

Structure: The cone-shaped region where the cell body transitions into the axon.

Function: Acts as the trigger zone where incoming membrane potentials are summed. If the threshold voltage is reached, an action potential is generated here.

4. Axon

Structure: A single, long, cylindrical fiber extending away from the cell body.

Function: Conducts electrical action potentials away from the soma toward target cells over short or long distances.

5. Myelin Sheath

Structure: A protective, lipid-rich insulating layer wrapping around the axon. Formed by Schwann cells in the Peripheral Nervous System (PNS) and Oligodendrocytes in the Central Nervous System (CNS).

Function: Increases impulse transmission speed by preventing current leakage and enabling saltatory conduction (jumping of signals from node to node).

6. Nodes of Ranvier

Structure: Periodically spaced gaps in the myelin sheath along the axon containing a high density of voltage-gated sodium channels.

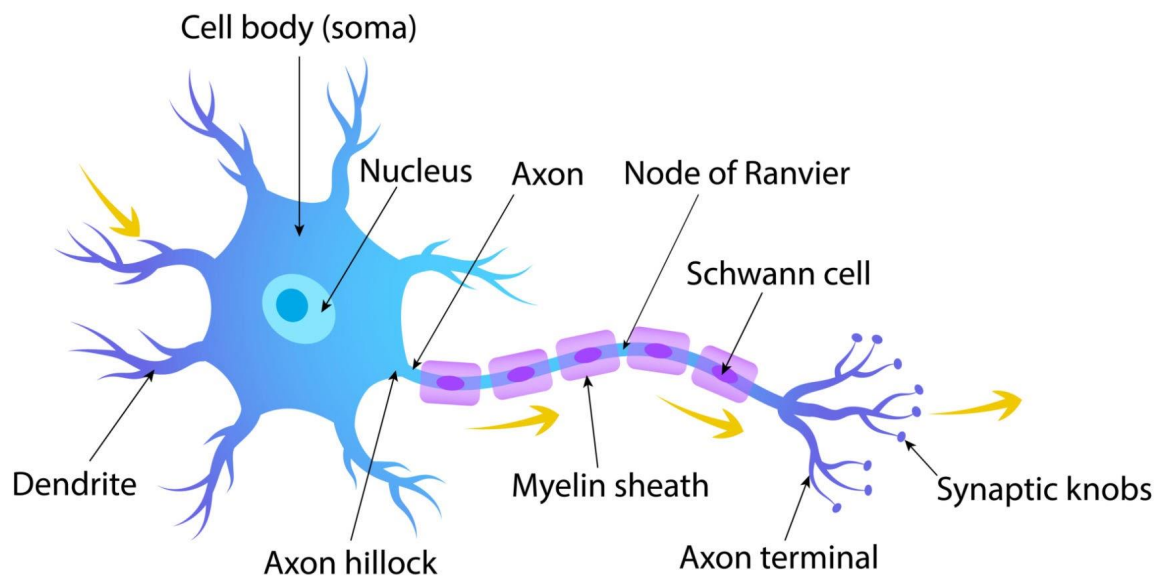
Function: Allows regeneration of the action potential, forcing the electrical signal to jump rapidly between nodes to accelerate transmission.

7. Axon Terminals (Synaptic Knobs)

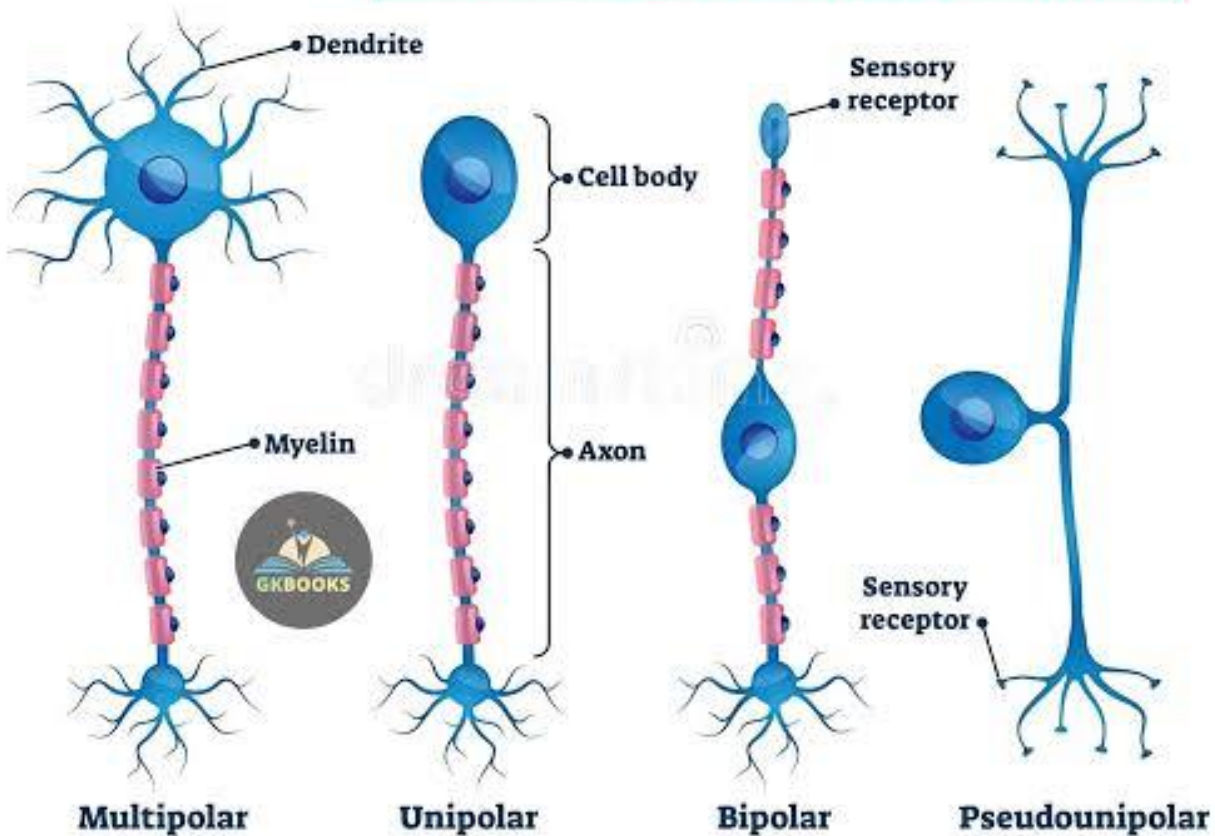
Structure: Specialized bulb-like endings at the distal branches of the axon containing synaptic vesicles loaded with neurotransmitters.

Function: Converts electrical action potentials into chemical signals by releasing neurotransmitters into the synaptic cleft to communicate with target neurons, muscle fibers, or glands.

Neuron structure



TYPES OF NEURONS



● Multipolar Neuron

- Most common type in CNS.
- One axon + multiple dendrites.
- **Functions:** Motor control, integration of information.

● Unipolar Neuron

- Single process emerging from cell body.
- Found in invertebrates.
- **Functions:** Simple reflexes, basic conduction.

● Bipolar Neuron

- One axon + one dendrite.
- Found in retina, olfactory system, inner ear.
- **Functions:** Special sense transmission.

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● Pseudounipolar Neuron

- Single process splits into two branches.
- Found in dorsal root ganglia.
- **Functions:** Sensory information from body to CNS.