SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr. M.G.R Medical University, Chennai

DEPARTMENT OF OPERATION THEATRE AND ANESTHESIA TECHNOLOGY

COURSE NAME : 1131 - BASIC SCIENCES - ANATOMY

UNIT : 1 BASICS OF ANATOMY

TOPICS : NERVOUS TISSUES

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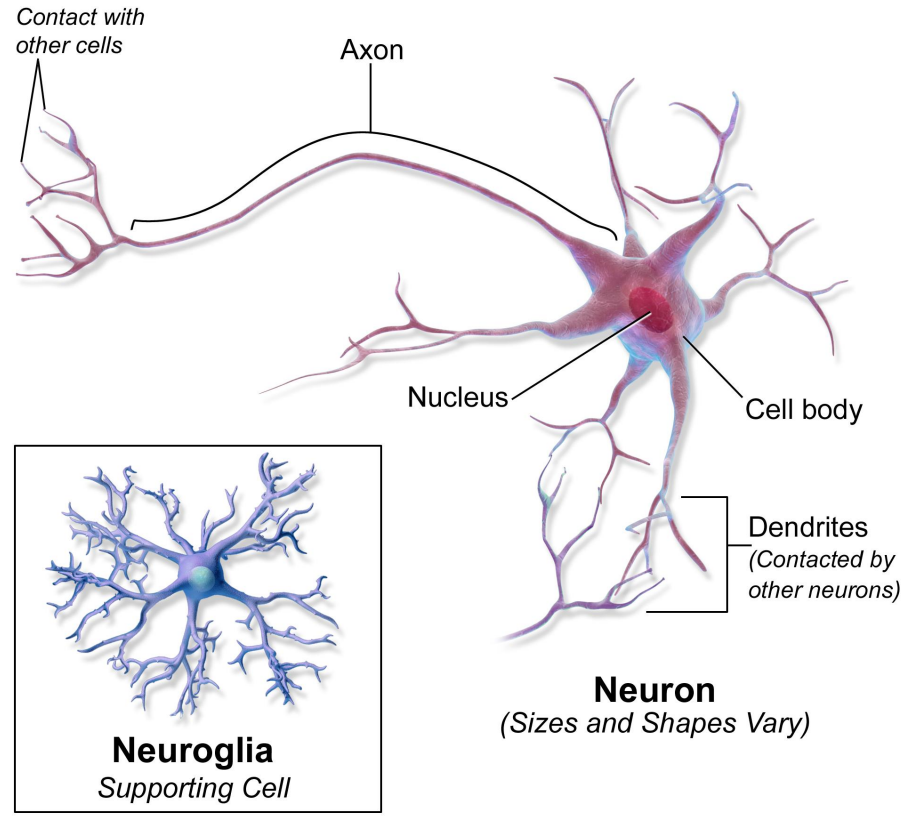
INTRODUCTION (Define)

- Nervous tissue is the main tissue of the **nervous system** (brain, spinal cord, and peripheral nerves).
- Responsible for **rapid communication, control, and coordination** of all body functions.
- Consists of two major cell types: **neurons** (conduct signals) and **neuroglia** (supporting cells).



CHARACTERISTICS

- **High excitability** – Quickly responds to stimuli by generating electrical impulses.
- **Conductivity** – Rapidly transmits impulses over long distances.
- **Extreme longevity** – Neurons usually live for the entire lifespan of the individual.
- **Amitotic nature** – Mature neurons cannot divide (permanent cell cycle arrest).
- **Very high metabolic rate** – Requires constant supply of oxygen and glucose.

FUNCTIONS

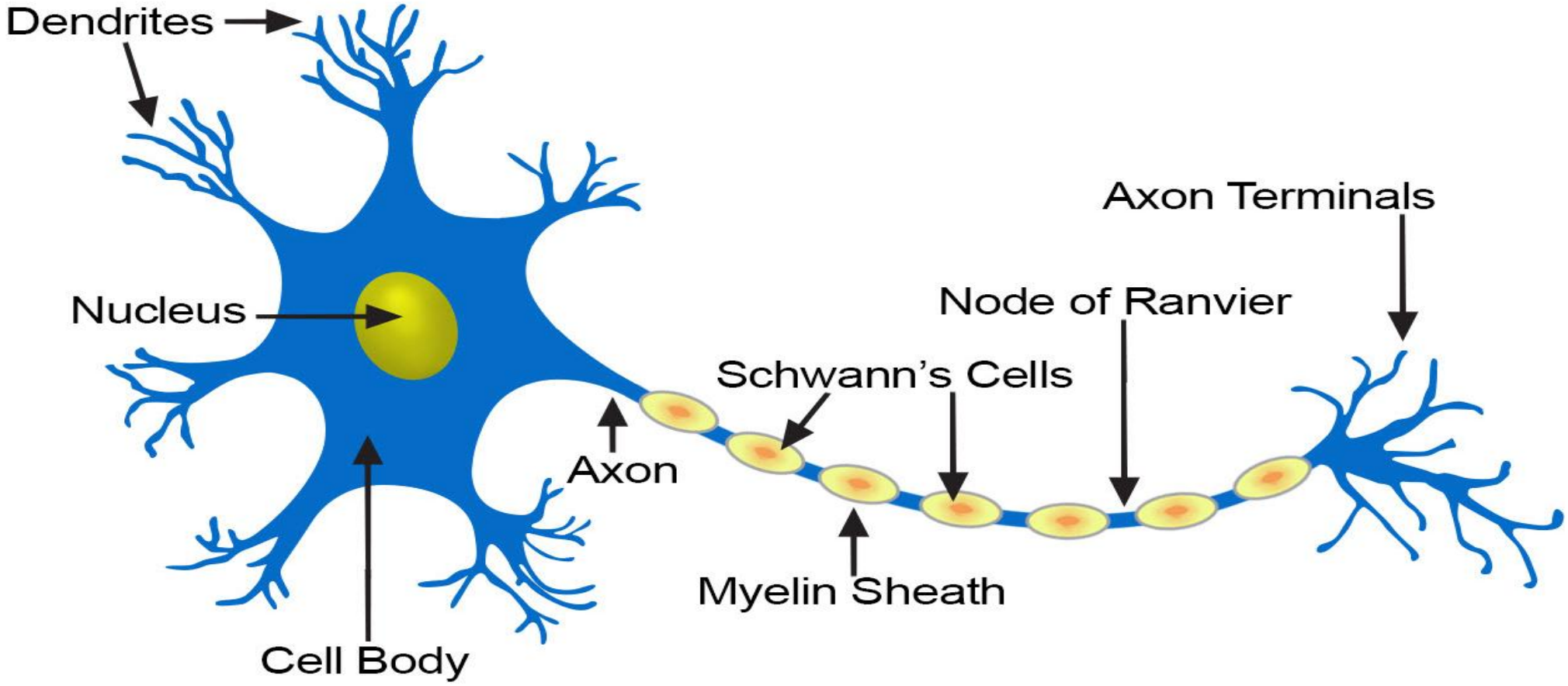
- **Sensory input** – Detects changes inside and outside the body.
- **Integration** – Processes and interprets sensory information.
- **Motor output** – Sends commands to muscles and glands.
- **Coordination** – Regulates and coordinates all body activities.
- **Homeostasis** – Maintains stable internal environment.
- **Higher mental functions** – Learning, memory, intelligence, emotions, and consciousness.
- **Rapid communication** – Fastest signaling system in the body using electrical and chemical signals.

STRUCTURE

1. NEURON (Functional unit)

- **Cell body (soma)** → contains nucleus and Nissl substance (rough ER)
- **Dendrites** → receive incoming signals
- **Axon** → conducts impulse away from cell body
- **Axon terminals** → release neurotransmitters
- **Myelin sheath** → insulating layer (speeds conduction)
- **Nodes of Ranvier** → gaps in myelin for saltatory conduction

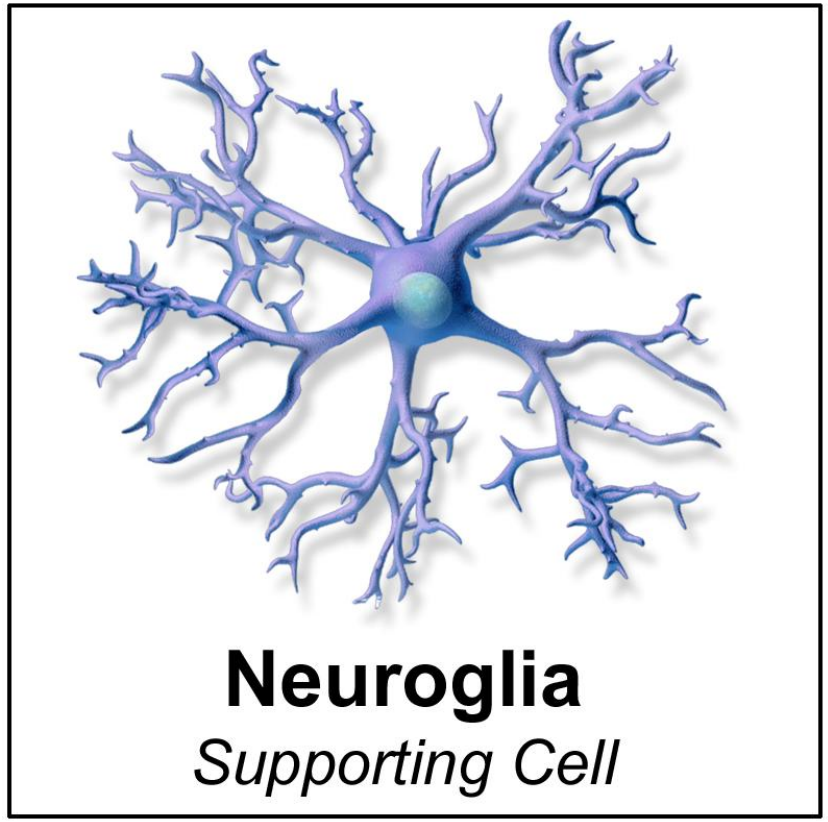
INTRODUCTION (Define)



STRUCTURE - NEUROGLIA

2. NEUROGLIA (Supporting Cells)

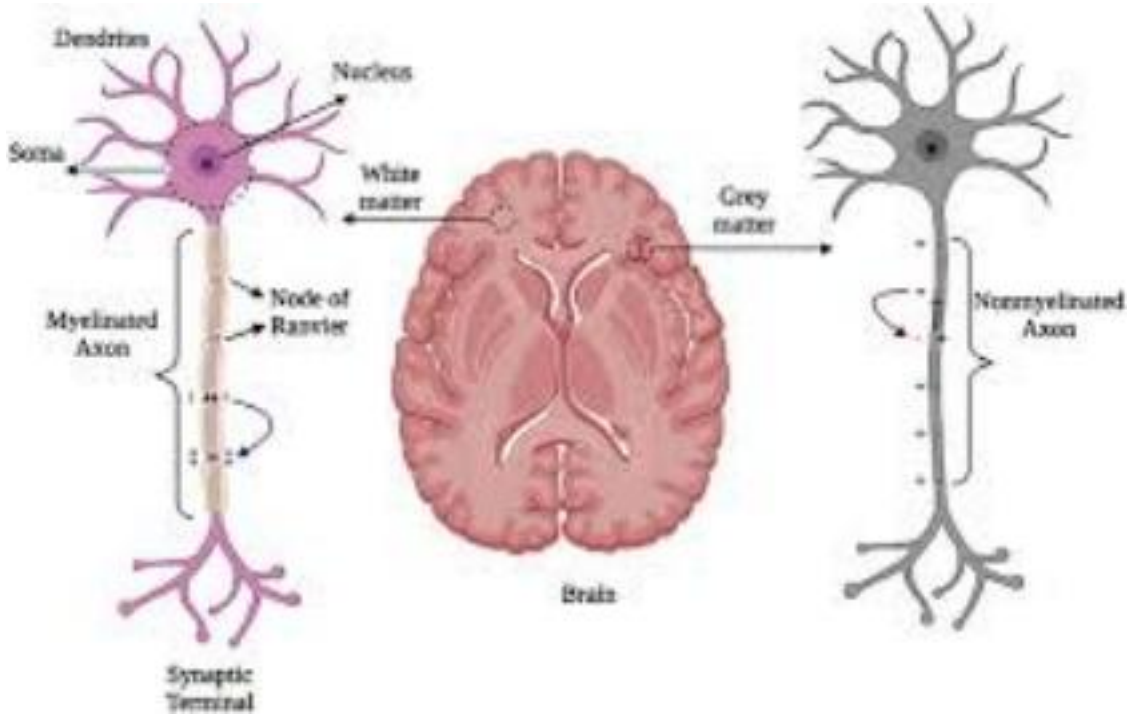
- **CNS**: Astrocytes, Oligodendrocytes, Microglia, Ependymal cells
- **PNS**: Schwann cells, Satellite cells



STRUCTURE - NEUROGLIA

3. Gray Matter → cell bodies, dendrites, synapses (appears gray)

4. White Matter → myelinated axons (appears white due to lipid content)



SUMMARY

- Main tissue of **brain, spinal cord and nerves.**
- **Two types of cells**: Neurons (carry messages) + Neuroglia (help and protect neurons).
- Neurons **can't divide**, live very long, and need constant oxygen + glucose.
- **Jobs**: Feel things → think/decide → move muscles or control glands.
- **Structure**: Neuron has cell body, dendrites (receive), axon (send), myelin cover; brain has gray matter (cell bodies) and white matter (wires/axons).

REFERENCE

Books

- Waugh, A., & Grant, A. (2018). Ross and Wilson Anatomy and Physiology in Health and Illness (13th ed.). Elsevier.
- Krishna Garg (2020). BD Chaurasia's Human Anatomy – Vol. 3 (Head, Neck & Neuroanatomy) (9th ed.). CBS Publishers.

Websites

- https://www.kenhub.com/en/library/anatomy/nervous-tissue
- https://www.ncbi.nlm.nih.gov/books/NBK557545/

THANK YOU