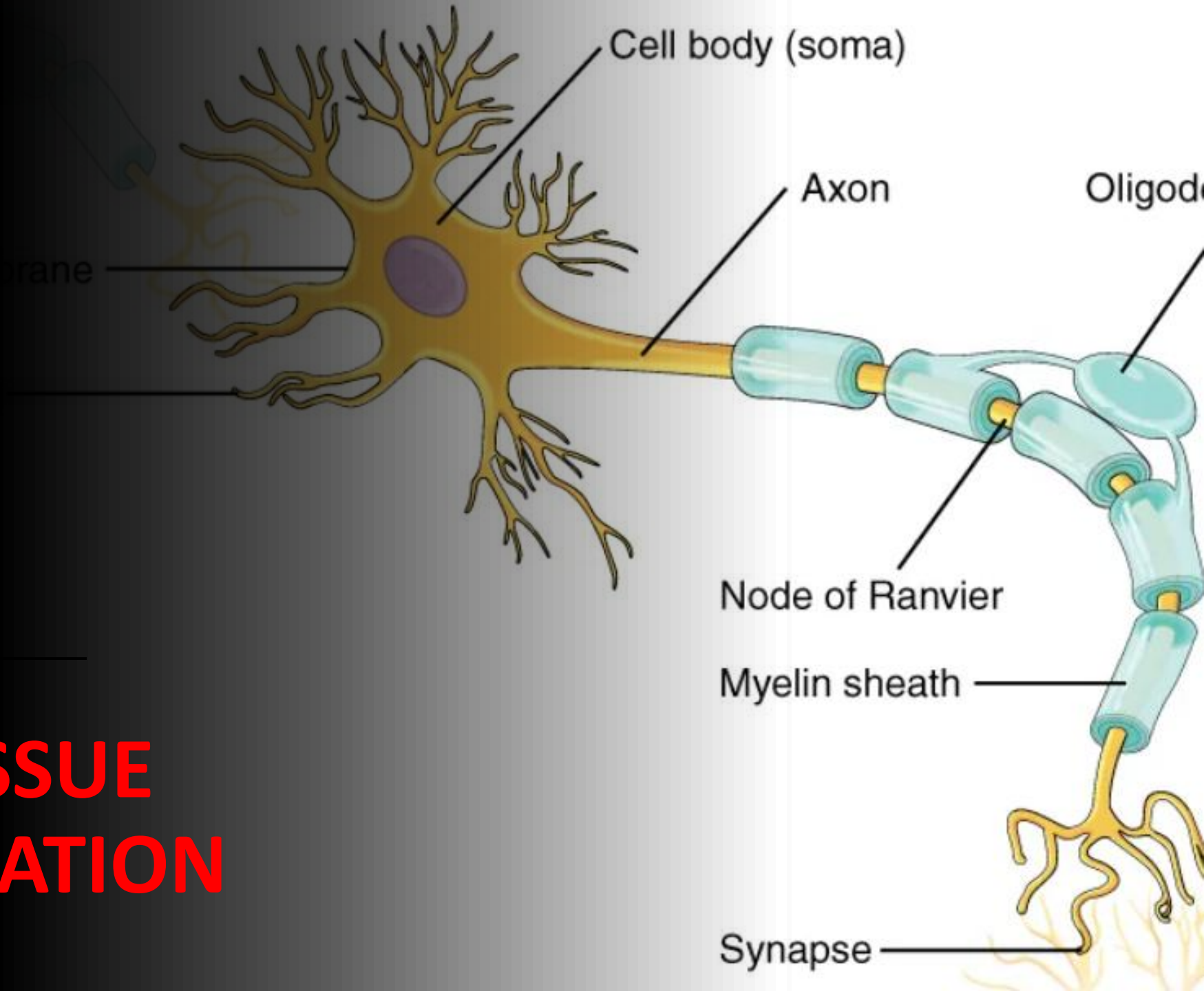
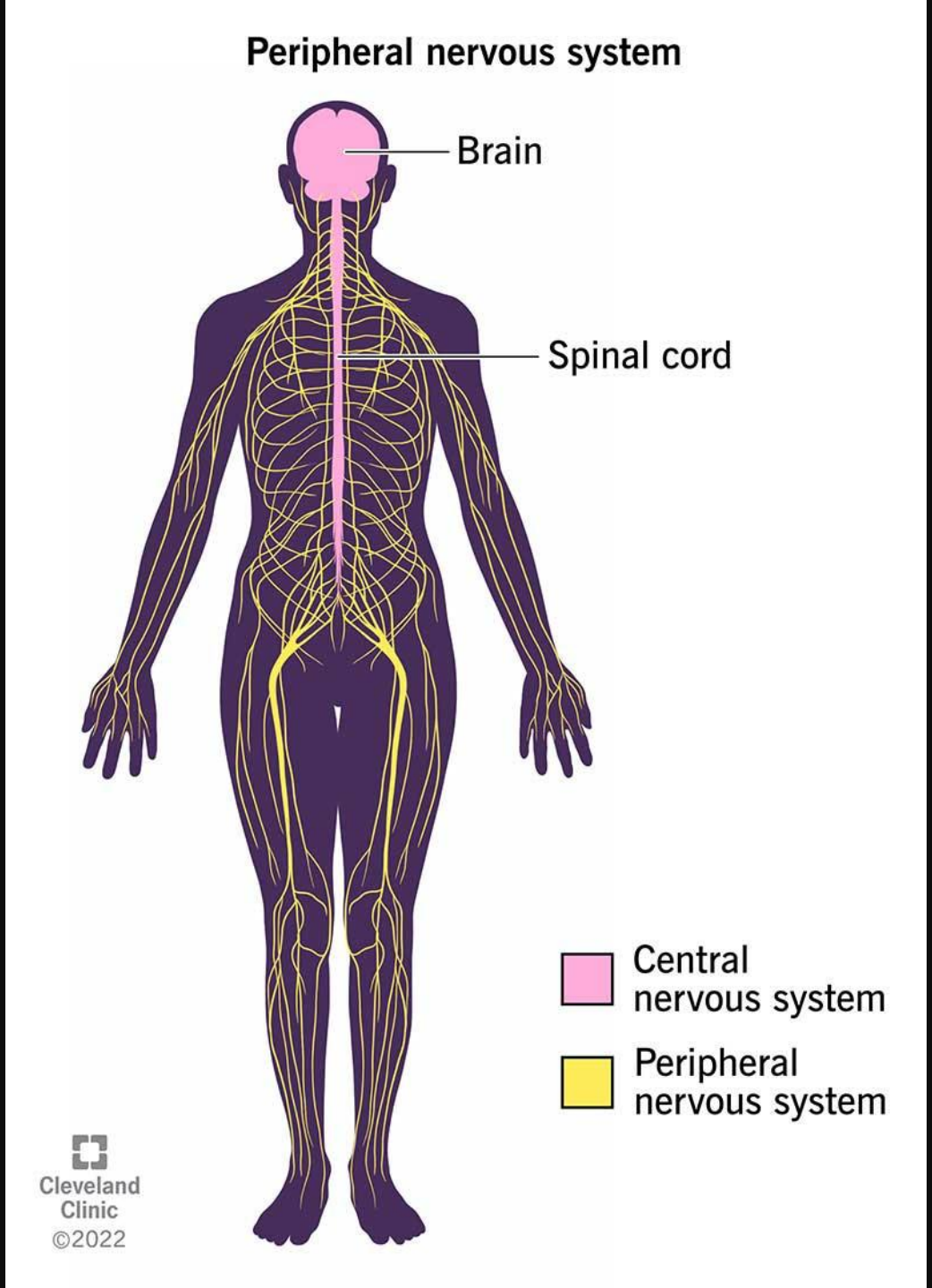
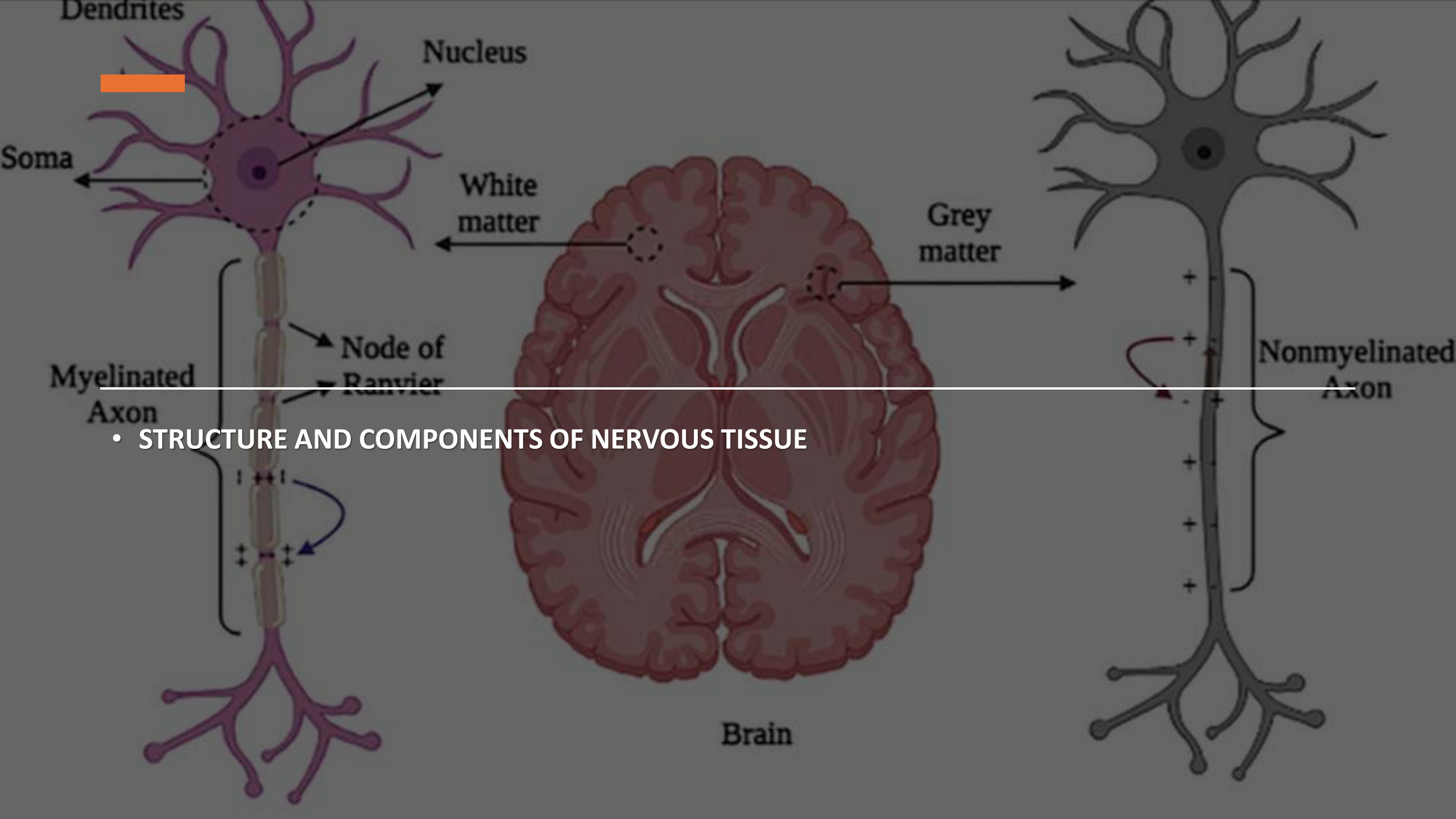
# NERVOUS TISSUE AND MYELINATION



- CENTRAL NERVOUS SYSTEM (CNS)

- PERIPHERAL NERVOUS SYSTEM (PNS)



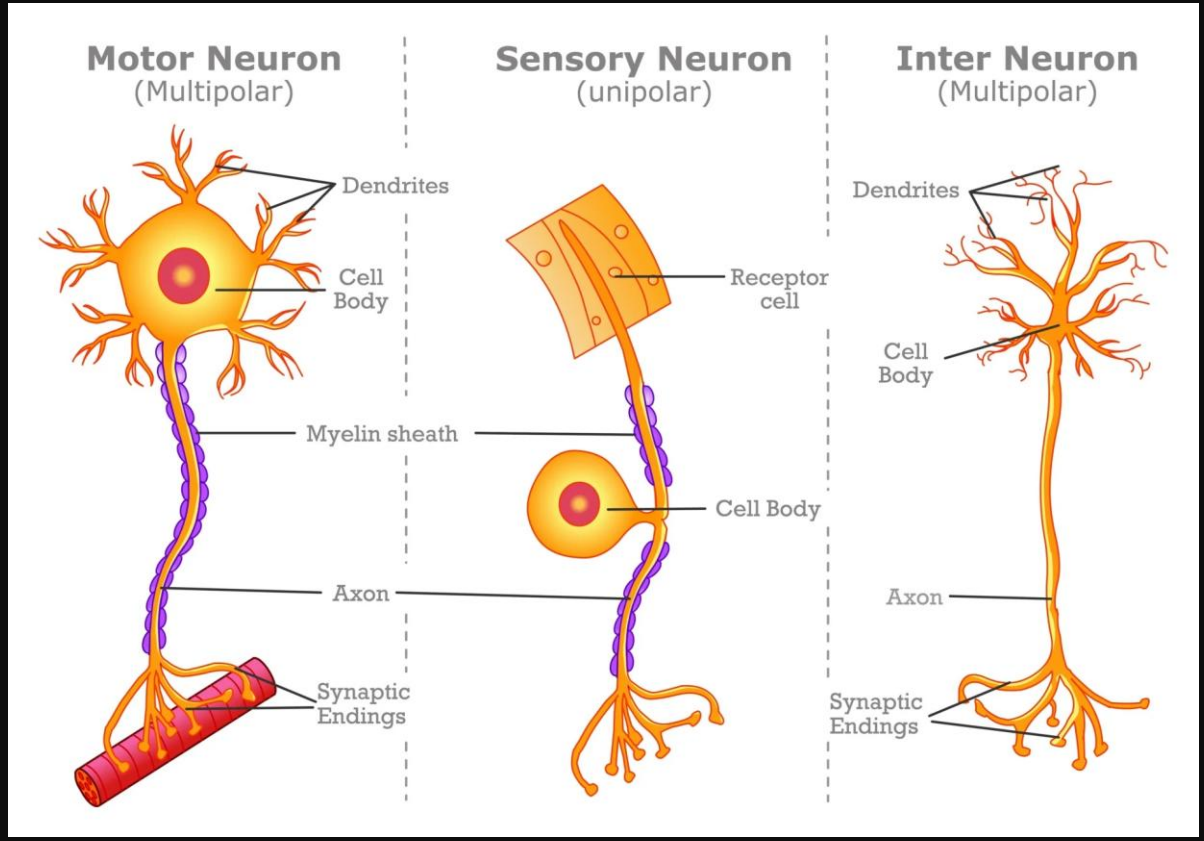



- **STRUCTURE AND COMPONENTS OF NERVOUS TISSUE**

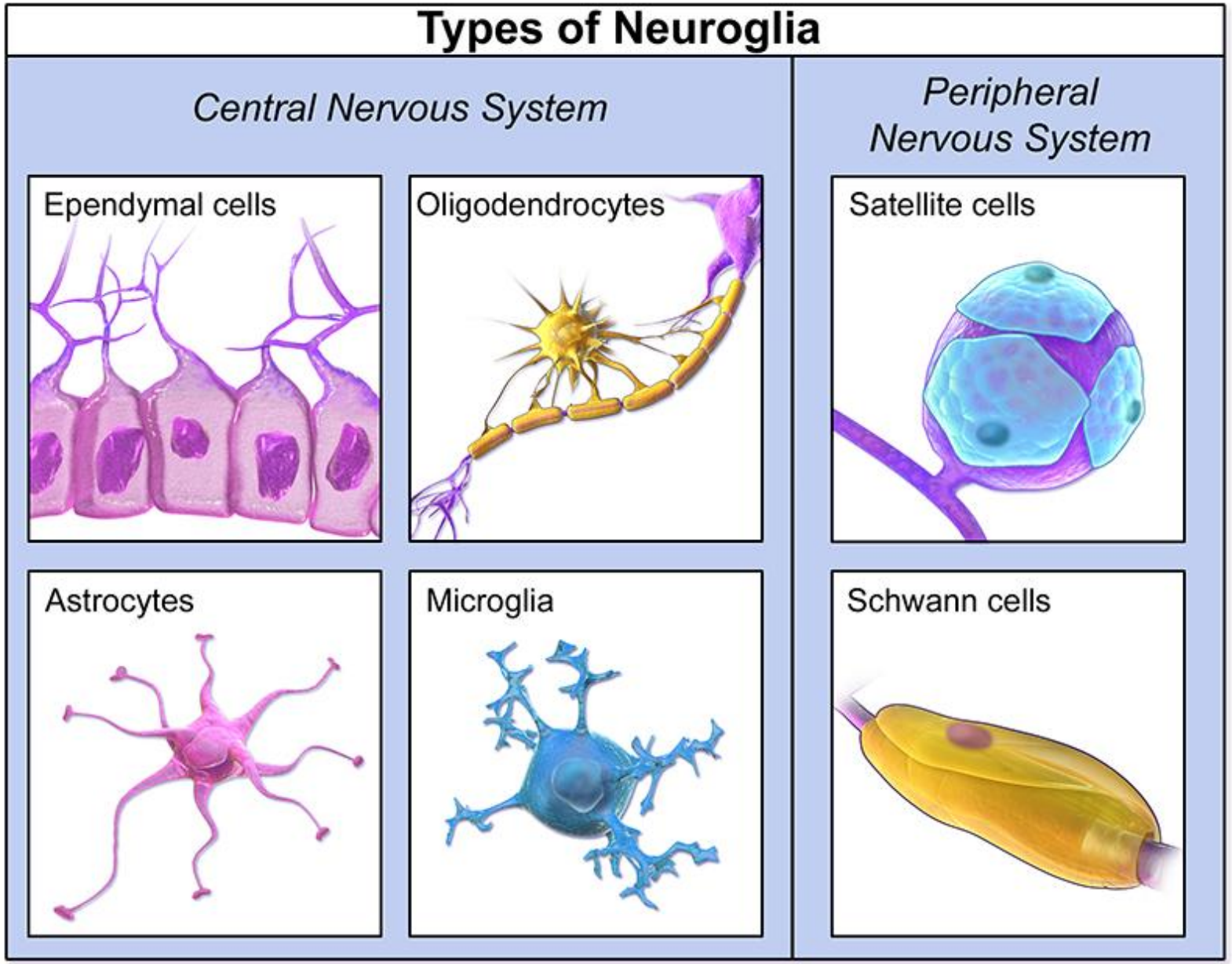
# THE NERVE CELL: NEURONS AND THEIR SPECIALIZATIONS

**Classification:**

- **Structural:** unipolar, bipolar, multipolar.
- **Functional:** sensory, motor, interneurons.

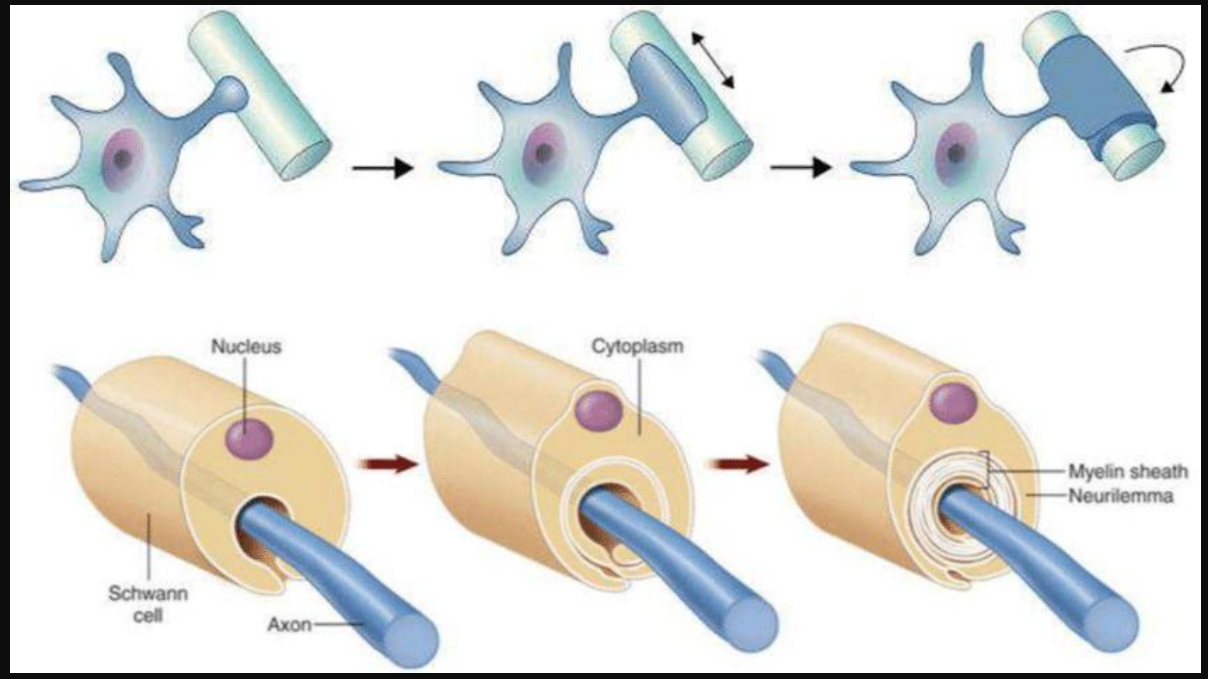


# GLIAL CELLS AND MYELINATION



# MYELINATION

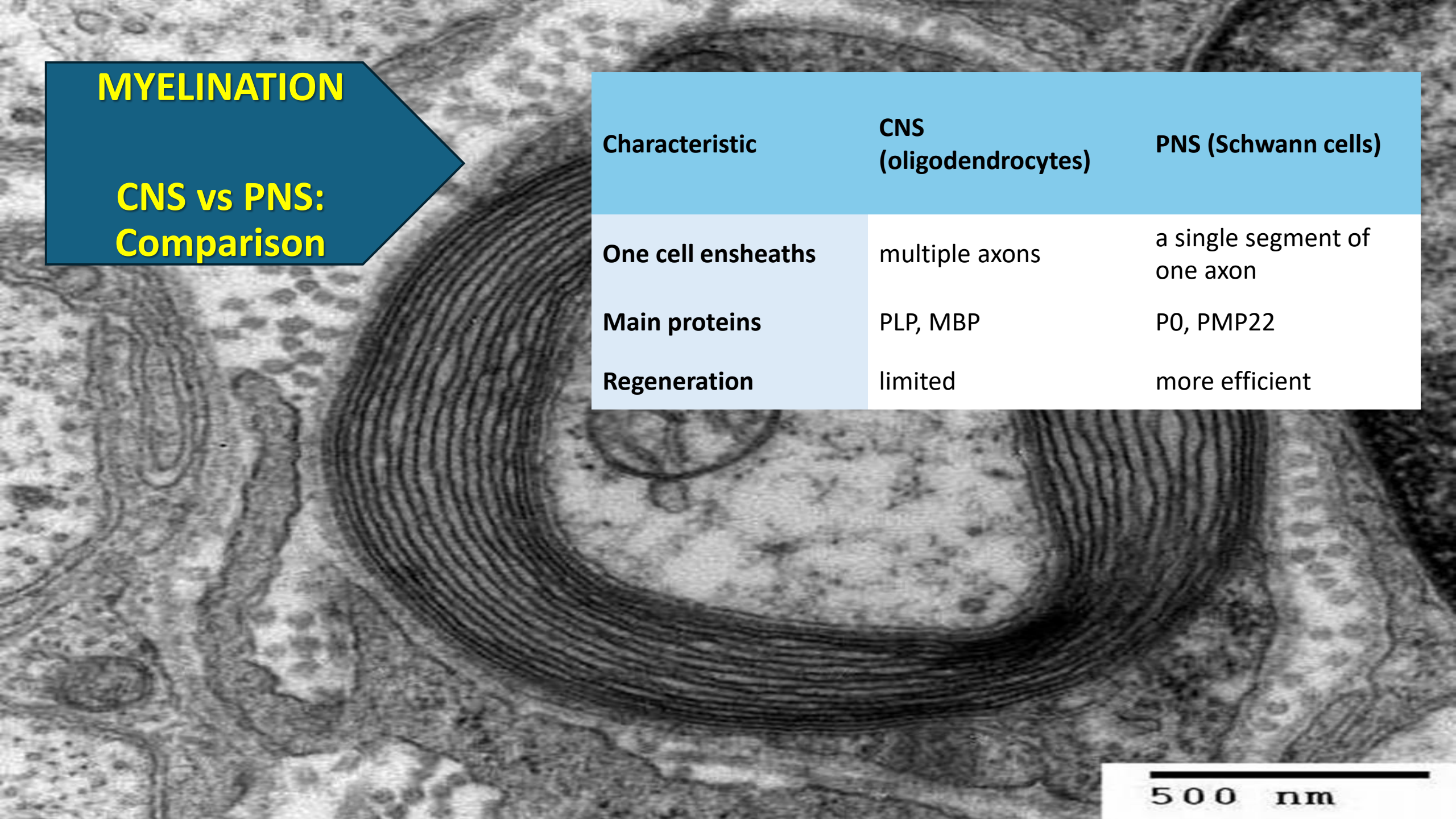
- Myelin is an insulating lipid sheath that surrounds axons, greatly increasing the speed of action potential conduction.

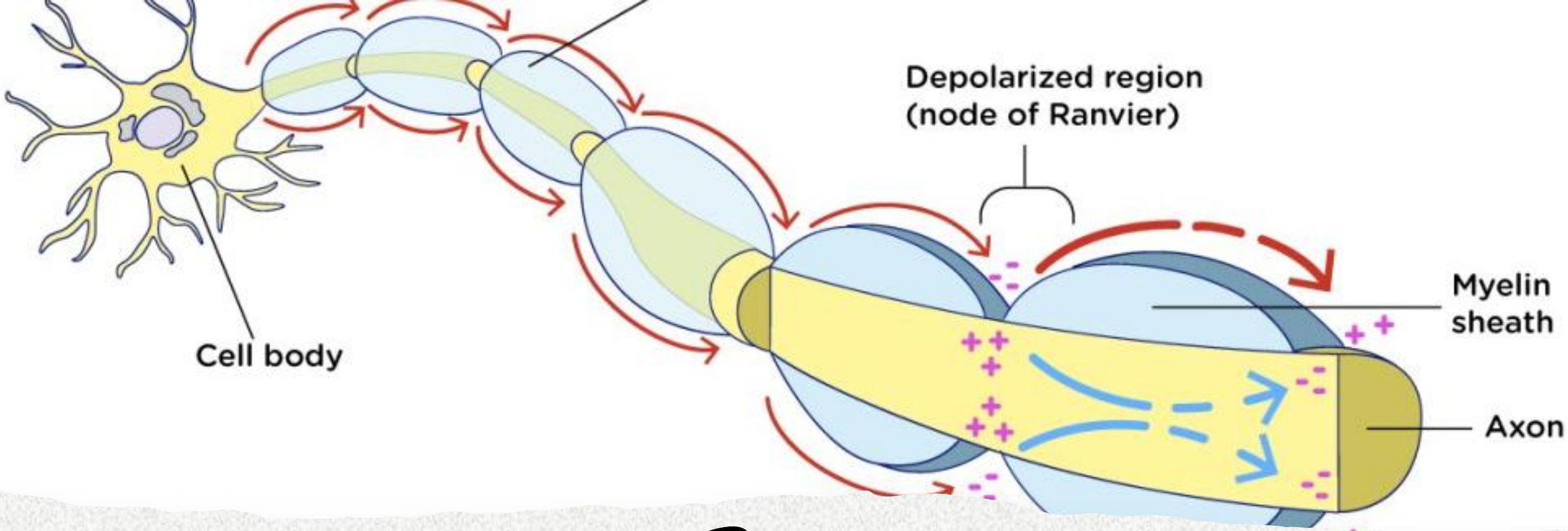


# MYELINATION

## CNS vs PNS: Comparison

| Characteristic | CNS (oligodendrocytes) | PNS (Schwann cells) |
|---|---|---|
| **One cell ensheaths** | multiple axons | a single segment of one axon |
| **Main proteins** | PLP, MBP | P0, PMP22 |
| **Regeneration** | limited | more efficient |






# NODE OF RANVIER AND SALTATORY

**Conduction Myelinated axons show regular interruptions called nodes of Ranvier, where the membrane is exposed.**

Myelinated axons have regular breaks called Ranvier nodes, where the membrane is exposed.

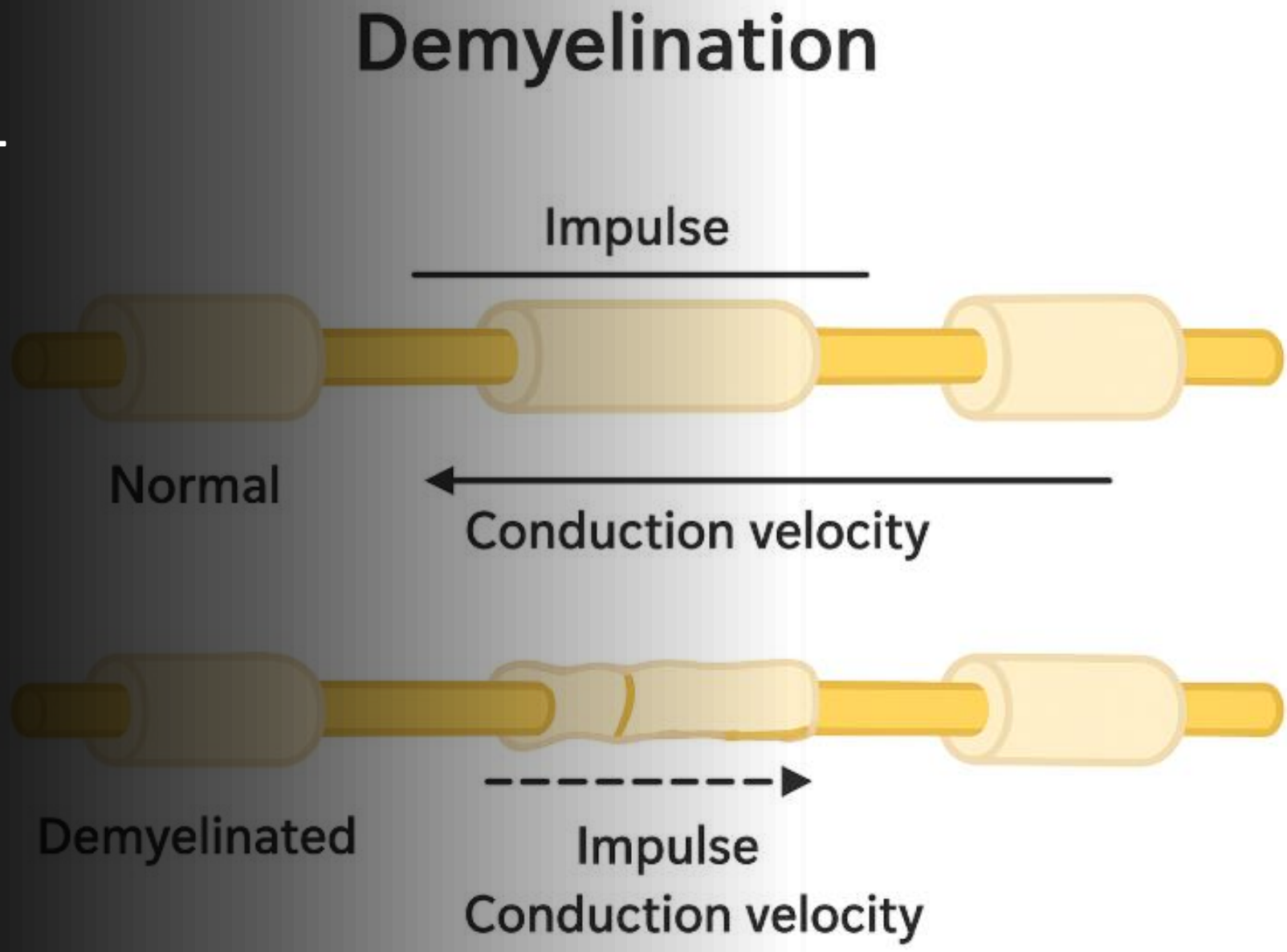
# FUNCTIONAL AND PATHOLOGICAL ASPECTS OF MYELIN

**Main functions of myelin:**

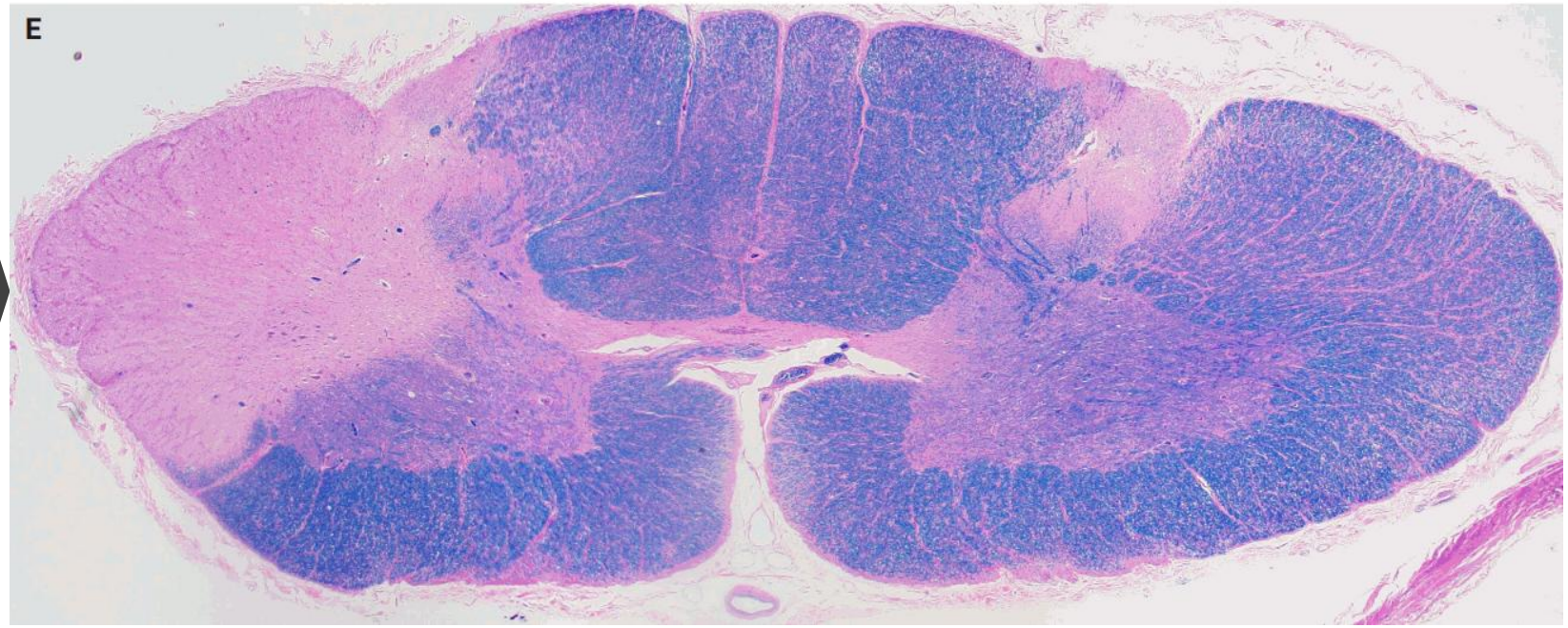
- **Electrical insulation** → reduced current leakage
- **Increased conduction velocity** → saltatory conduction
- **Energy saving** → reduced activity of the $Na^+/K^+$ pump

**Demyelination**

- **Normal:** high conduction velocity of the nerve impulse
- **Demyelinated:** reduced conduction velocity of the impulse



# SECTION OF HUMAN SPINAL CORD AFFECTED BY MULTIPLE SCLEROSIS



## CONCLUSION

Nervous tissue is an extraordinary example of cellular specialization..

Myelination is a key evolutionary process that has enabled the rapid and coordinated transmission of nerve signals.