

# **NERVOUS TISSUE**

- 1. Embryogenesis of nerve tissue**
- 2. Nerve tissue structural components**
- 3. Nerve cells**
- 4. Glial cells**
- 5. Nerve fibers**
- 6. Nerve endings**

# **Embryogenesis of nervous tissue**

**Nervous tissue is originated from dorsal ectoderm during neurulation**

**Stages**

- 1. Nerve plate**
- 2. Nerve groove**
- 3. Neural tube (ependymal, mantle and marginal layer)**

**Ganglionic plate and nervous crests  
lie up to nerve tube**

**Nervous tissue =  
nerve cells + glial cells +  
derivatives (fibers and  
endings)**

## **Nerve cells types**

A. 1. Unipolar

2. Bipolar

3. Pseudounipolar

4. Multipolar

B. 1. Sensory (afferent)

2. Associative

3. Motor (efferent)

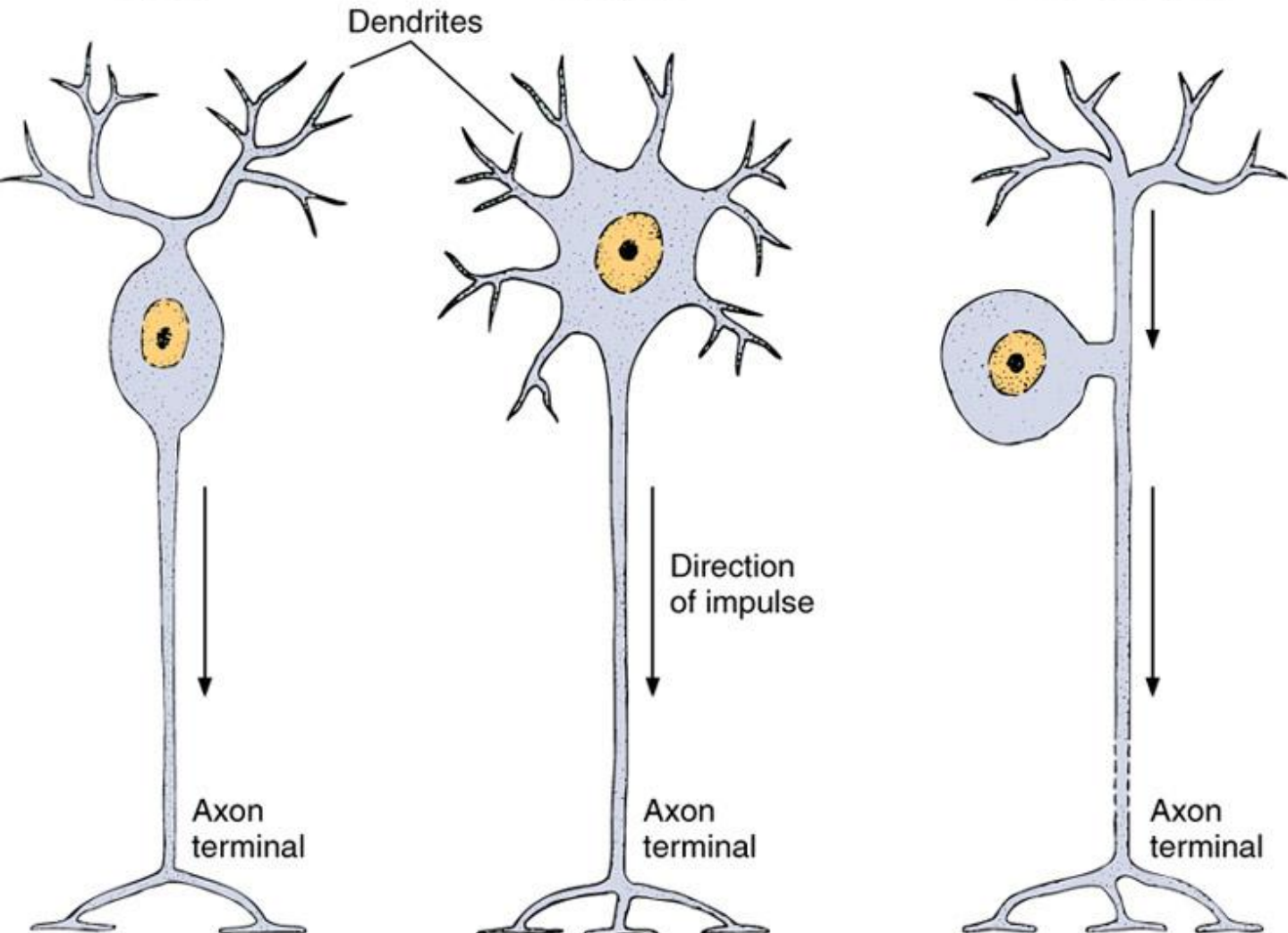
# Neuron = perikaryon + axon + dendrite(s)

## Main types of neurons

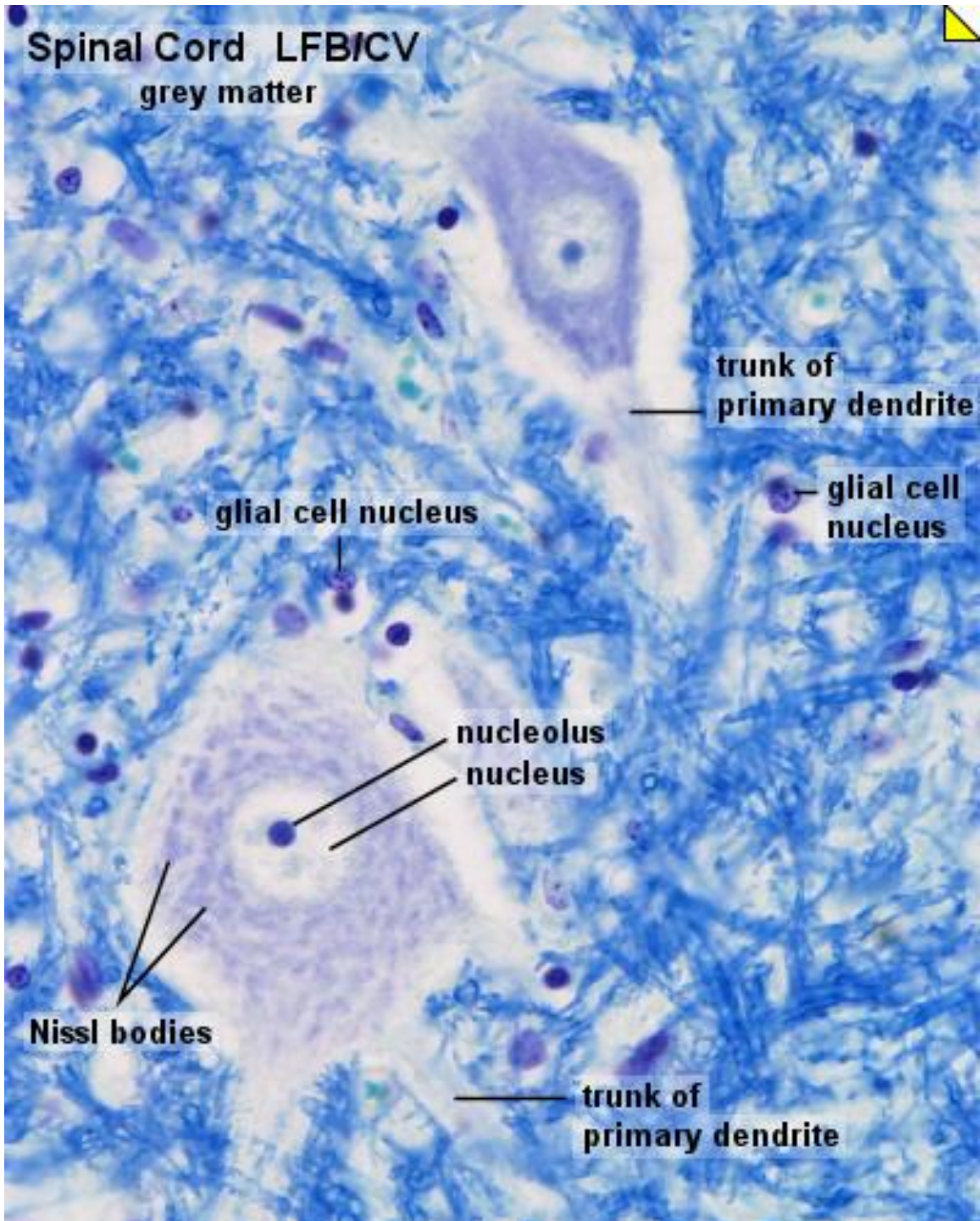
Bipolar

Multipolar

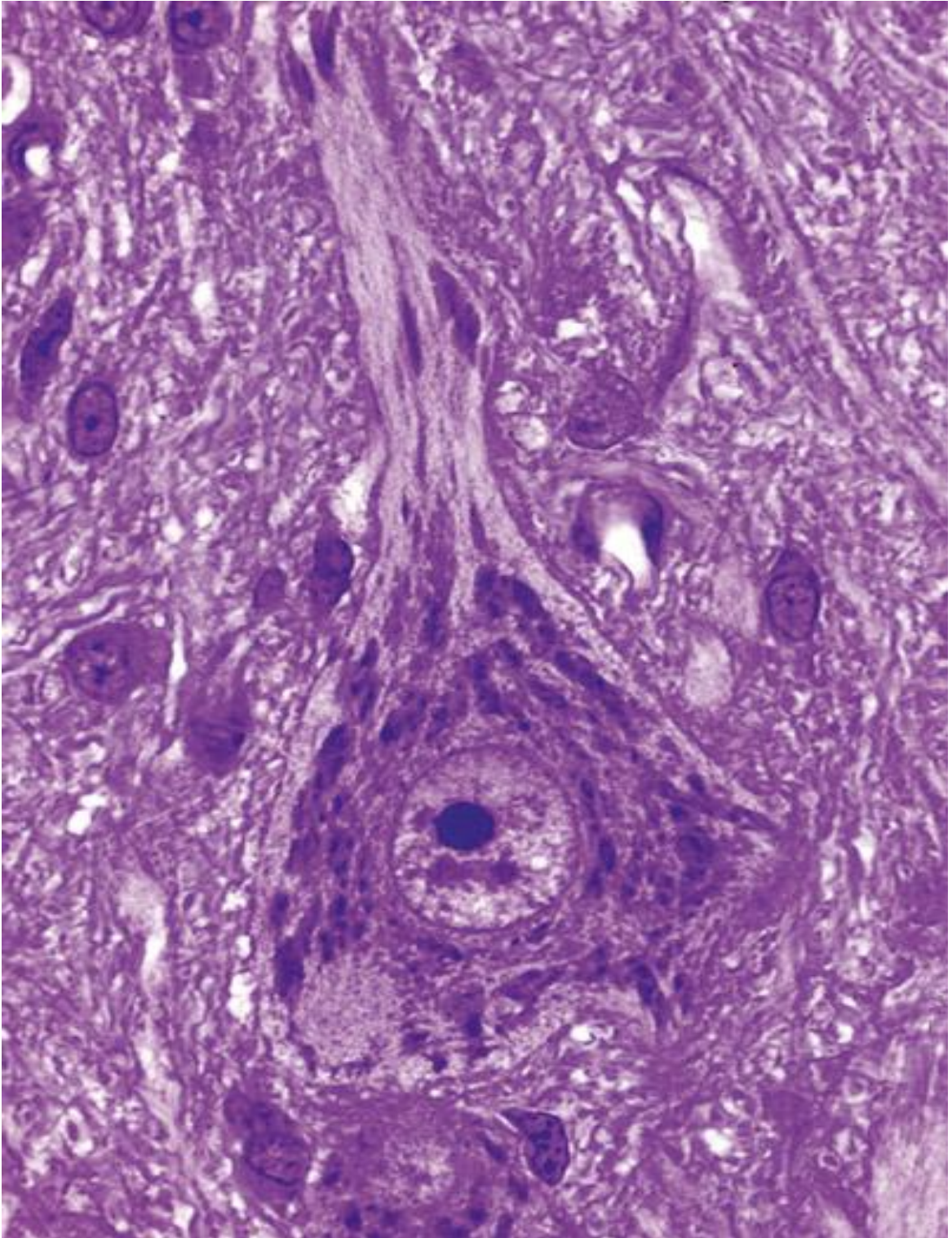
Pseudounipolar



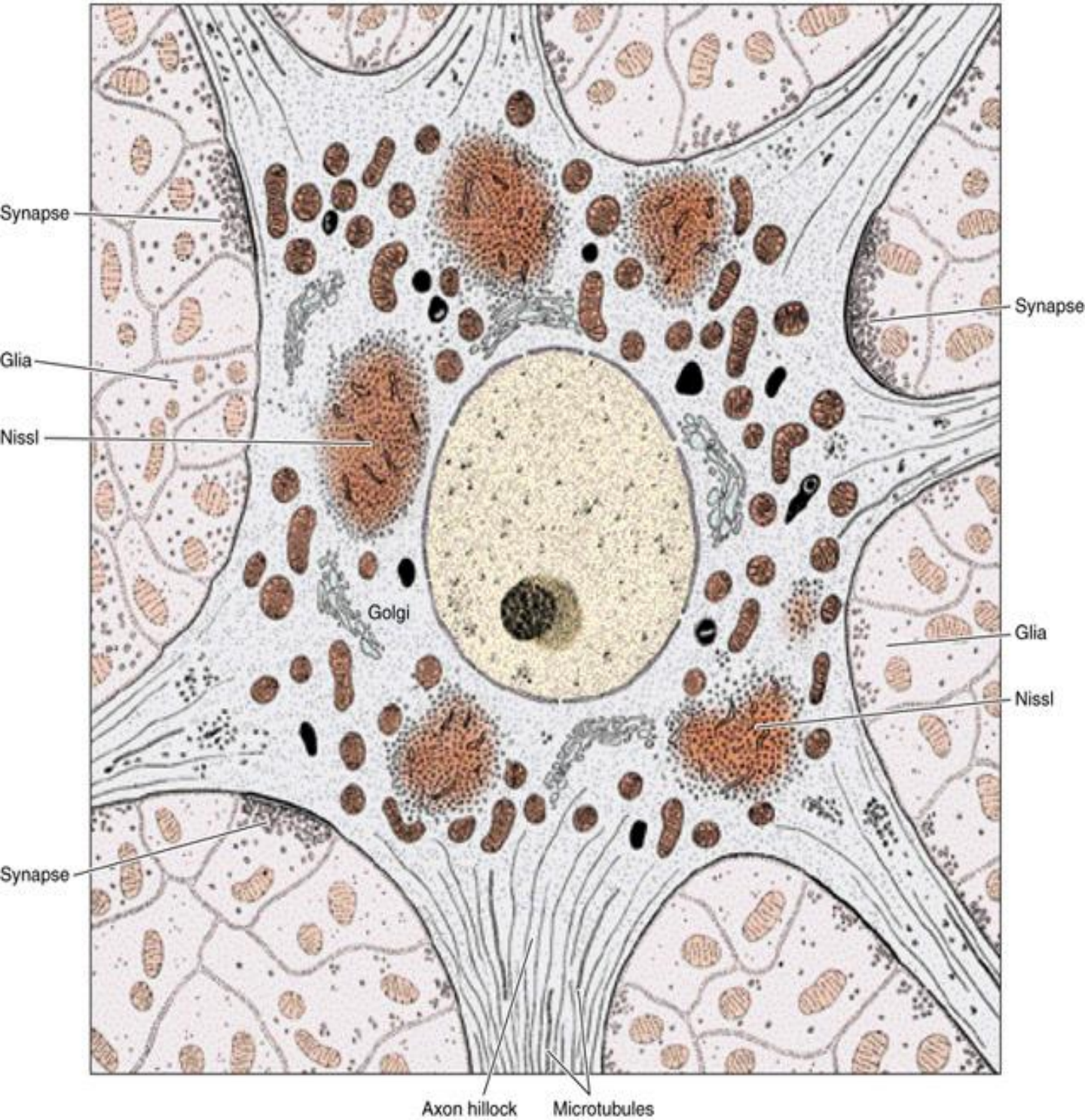
# Nissls' bodies



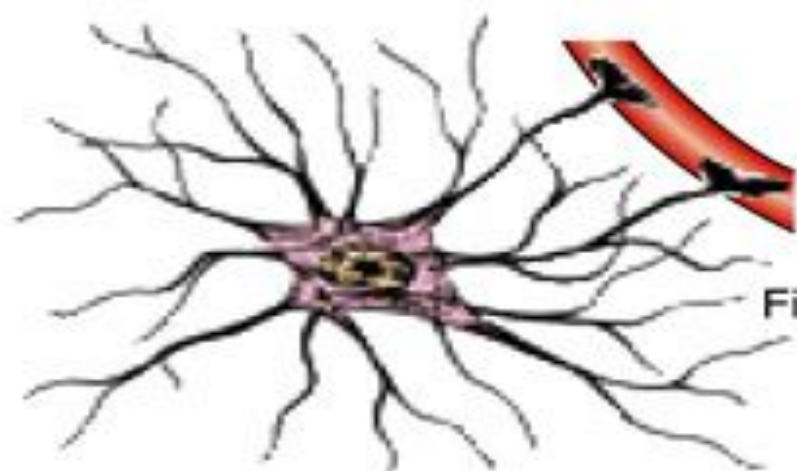
# Nissls' bodies



# Nerve cell ultrastructure

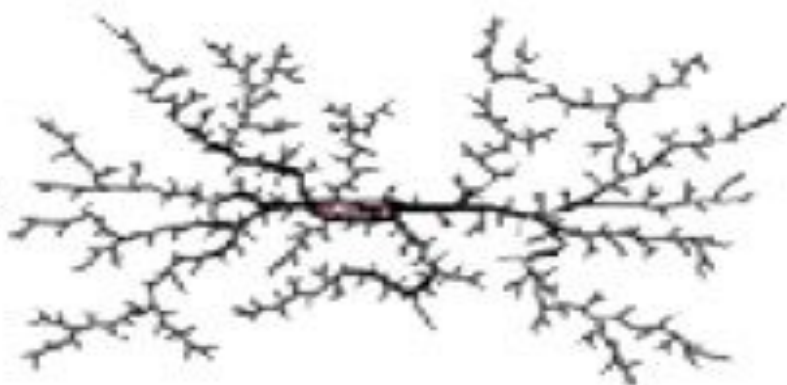


Protoplasmic astrocyte



Fibrous astrocyte

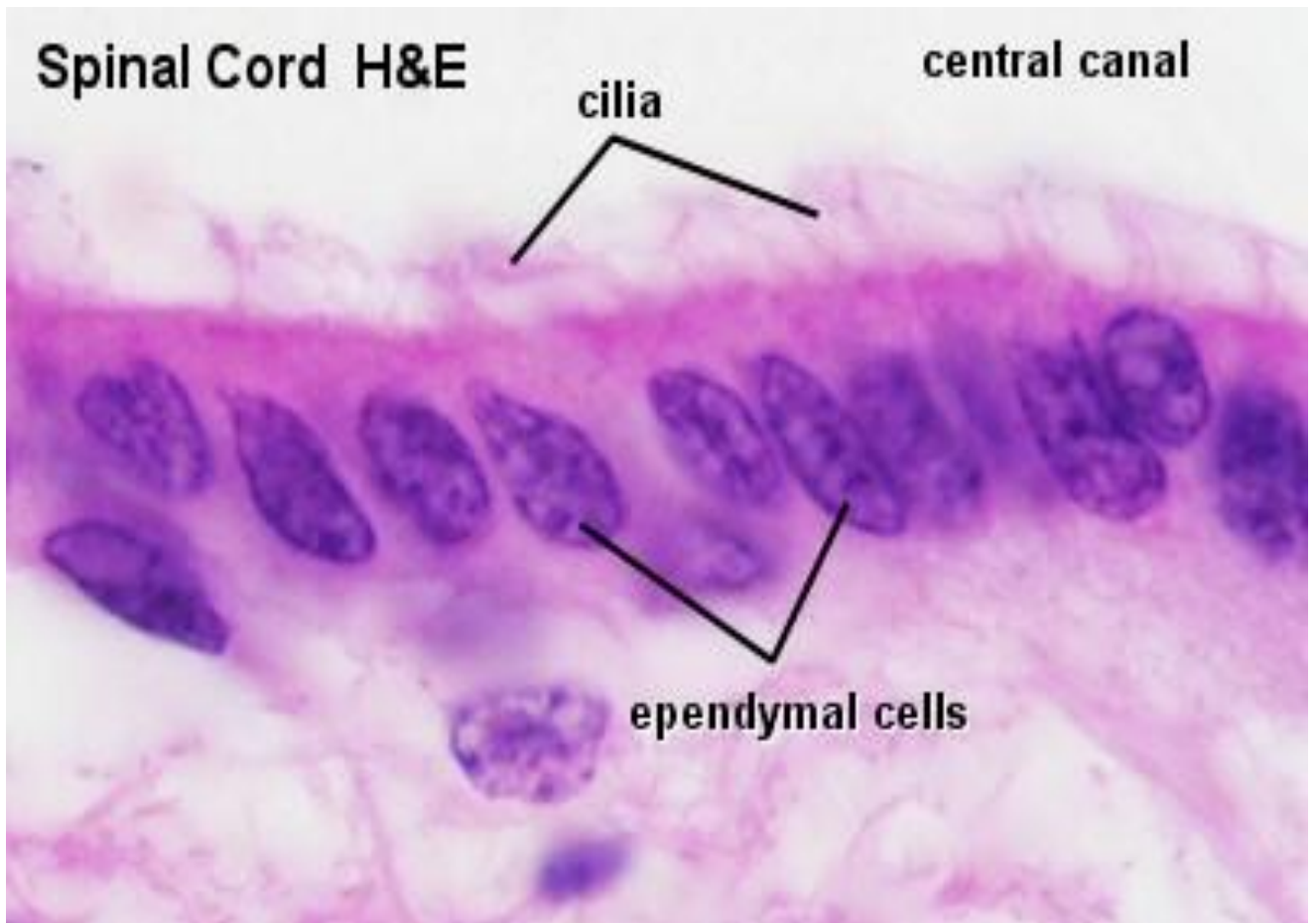
Microglia

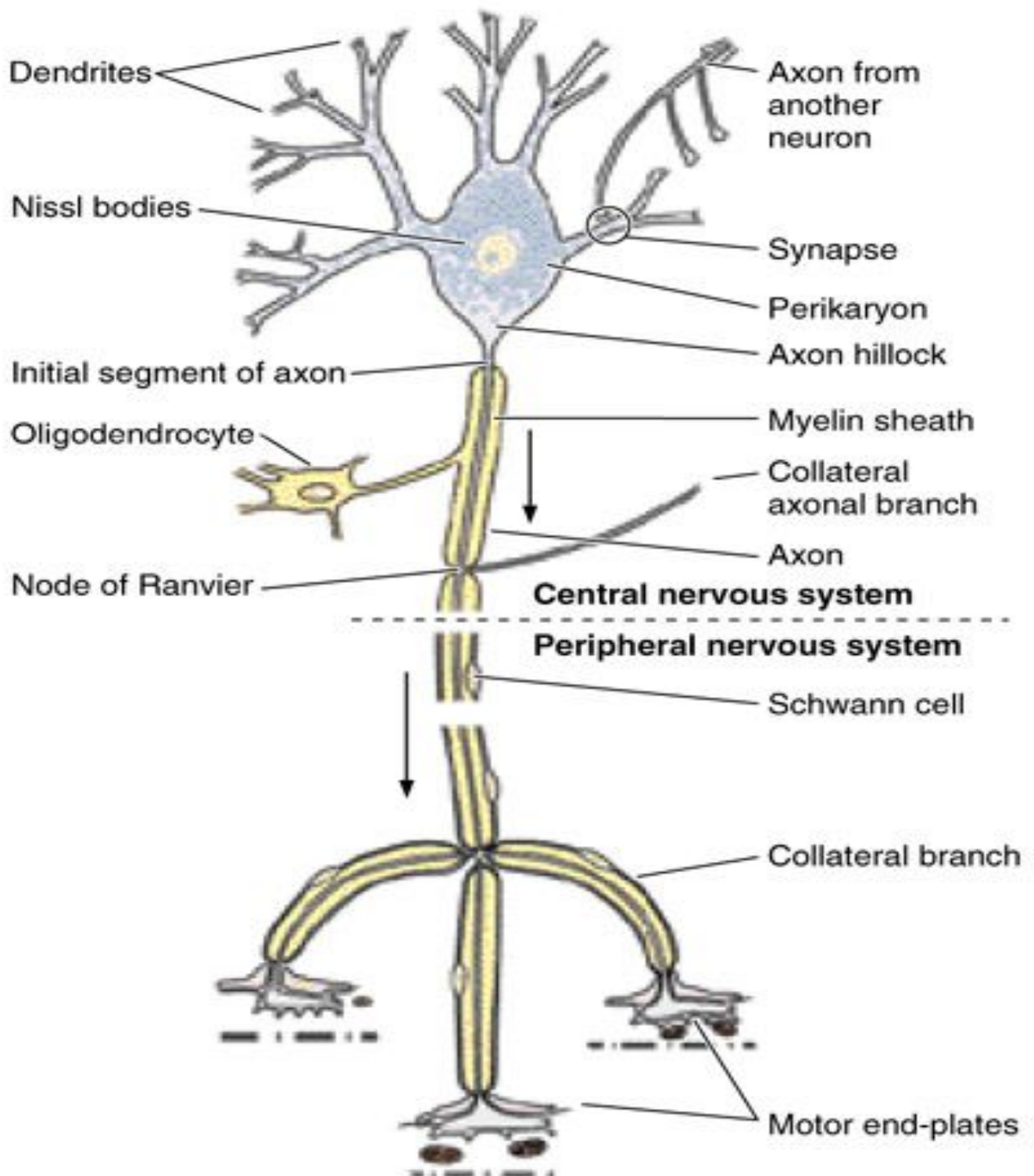


Oligodendrocytes



# Ependymal cells





# Glial cells

## Macroglial cells

1. Ependymal cells: ciliated, tanicytes
2. Astrocytes: protoplasmic, fibrous
3. Oligodendrocytes: in CNS and in PNS (mantial and Schwann cells)

## Microglial cells

Glial macrophages

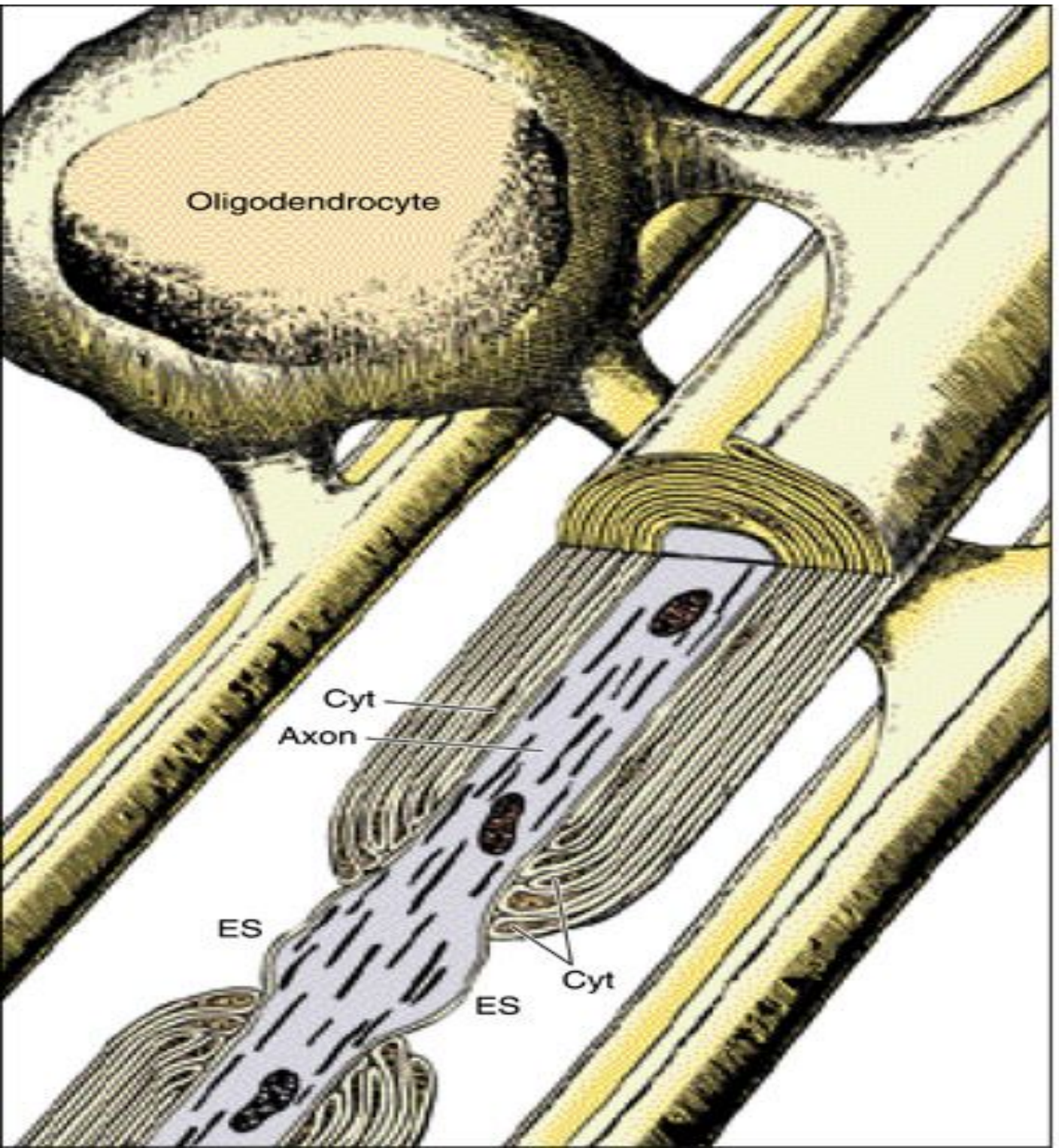
# **NERVE FIBERS**

Nerve cell process +  
Schwann cells +  
Basement membrane

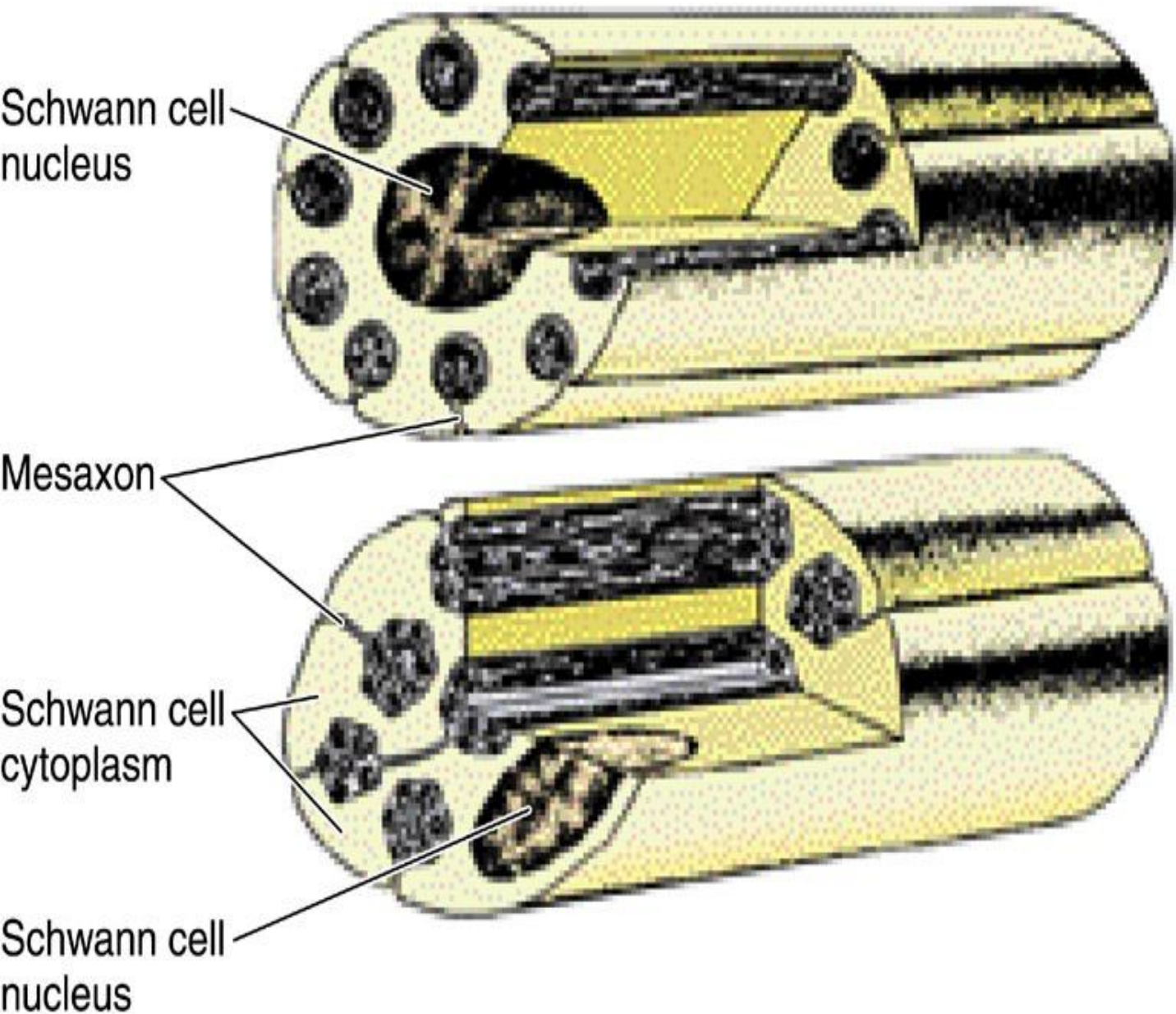
## **Type of nerve fibers**

1. Myelinated
2. Unmyelinated

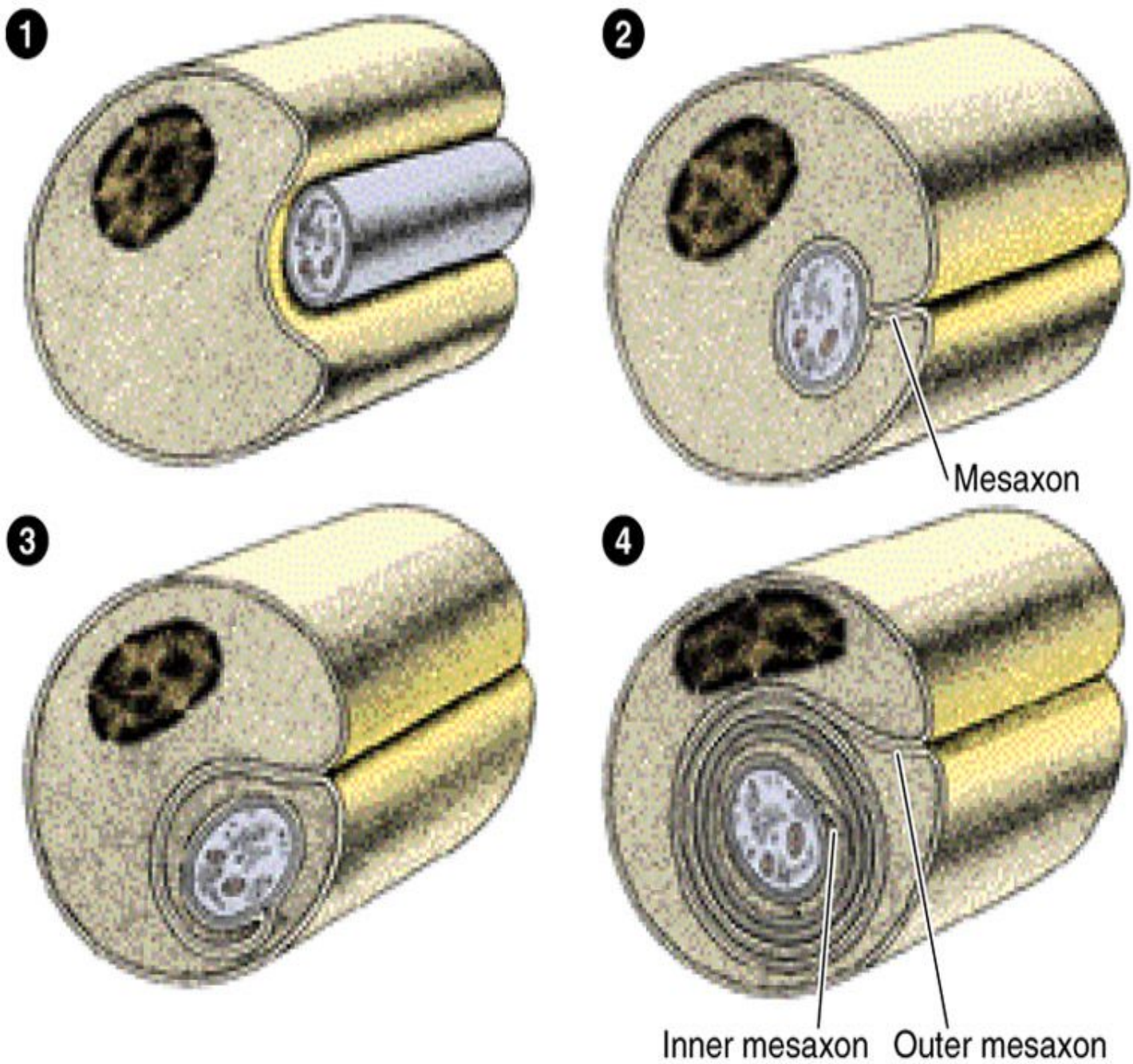
# OLIGODENDROCYTE



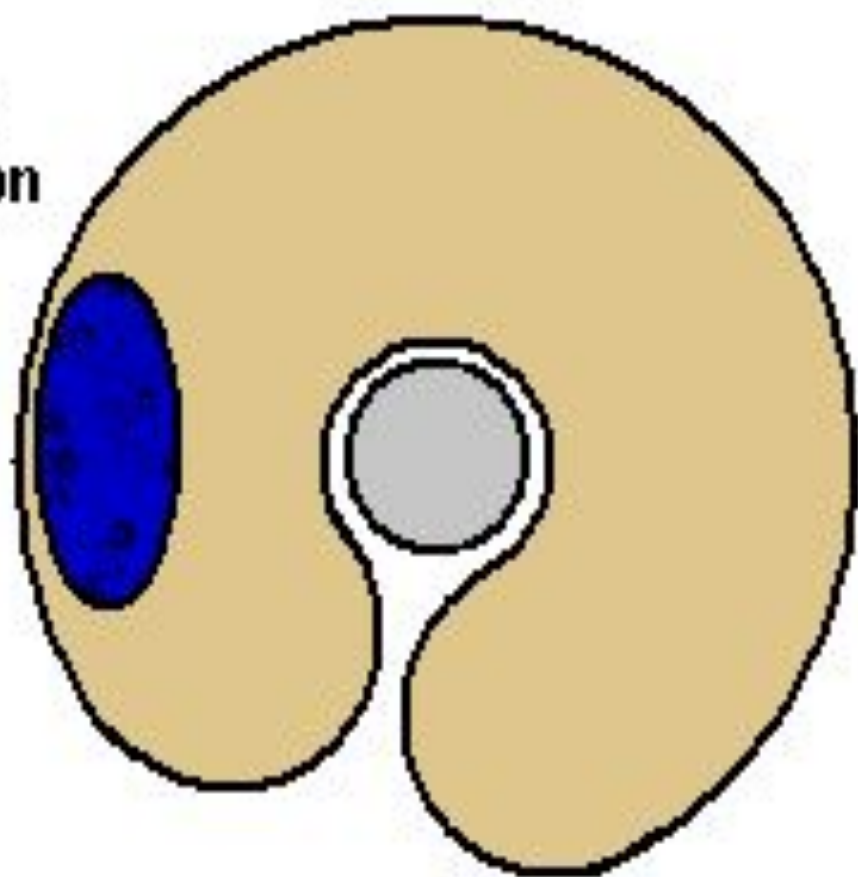
# UNMYOLINATED FIBER



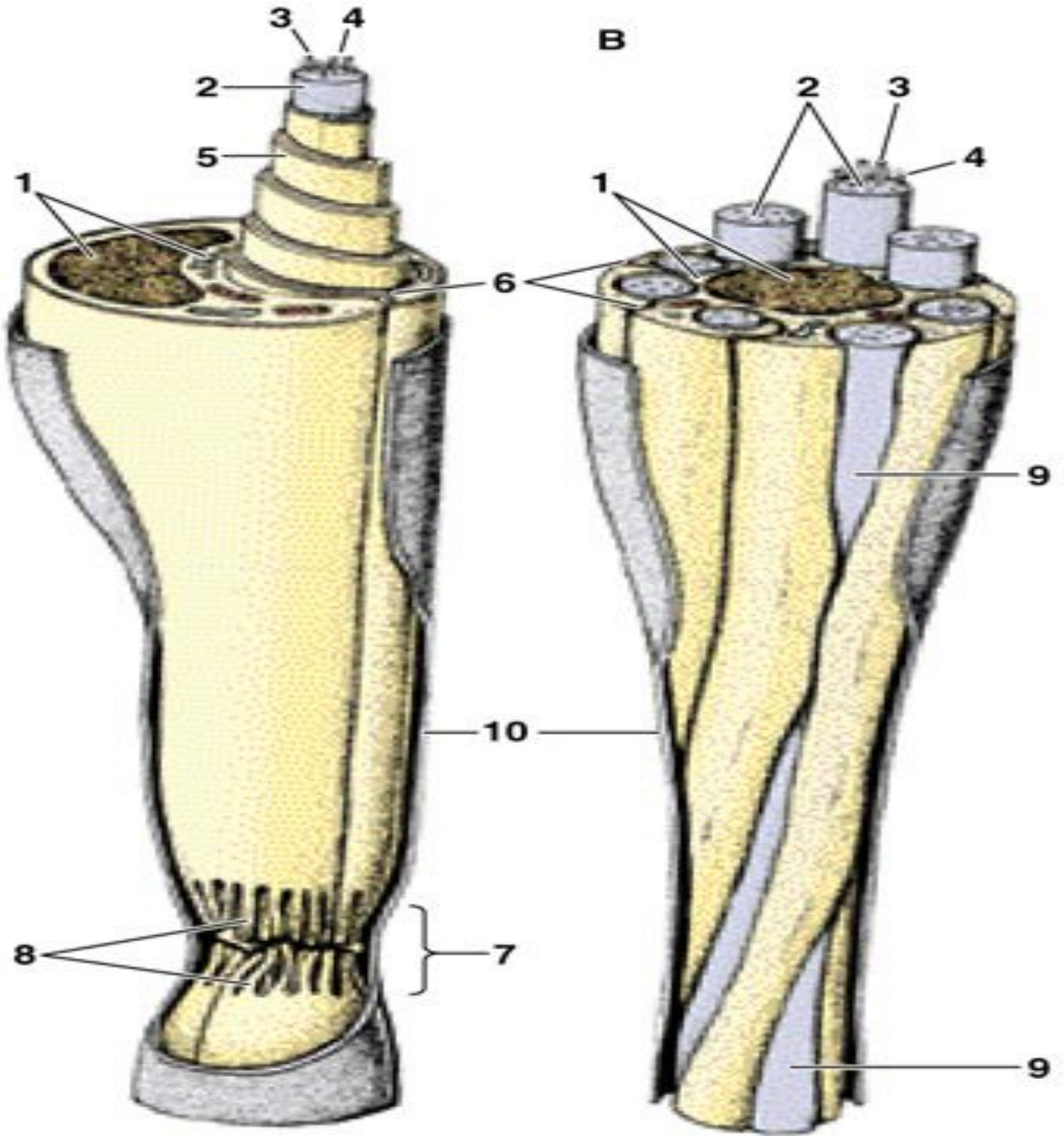
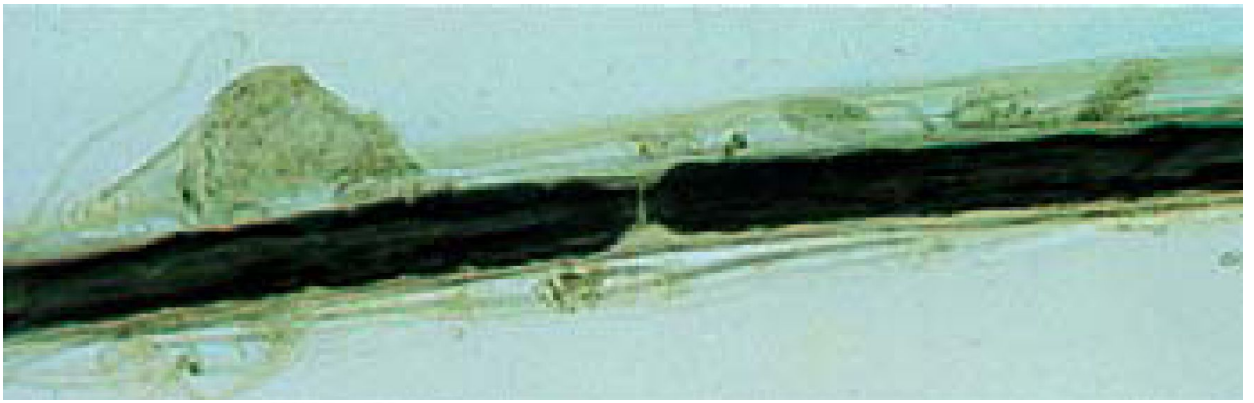
# MYELINIZATION



**Myelination of  
a peripheral axon**



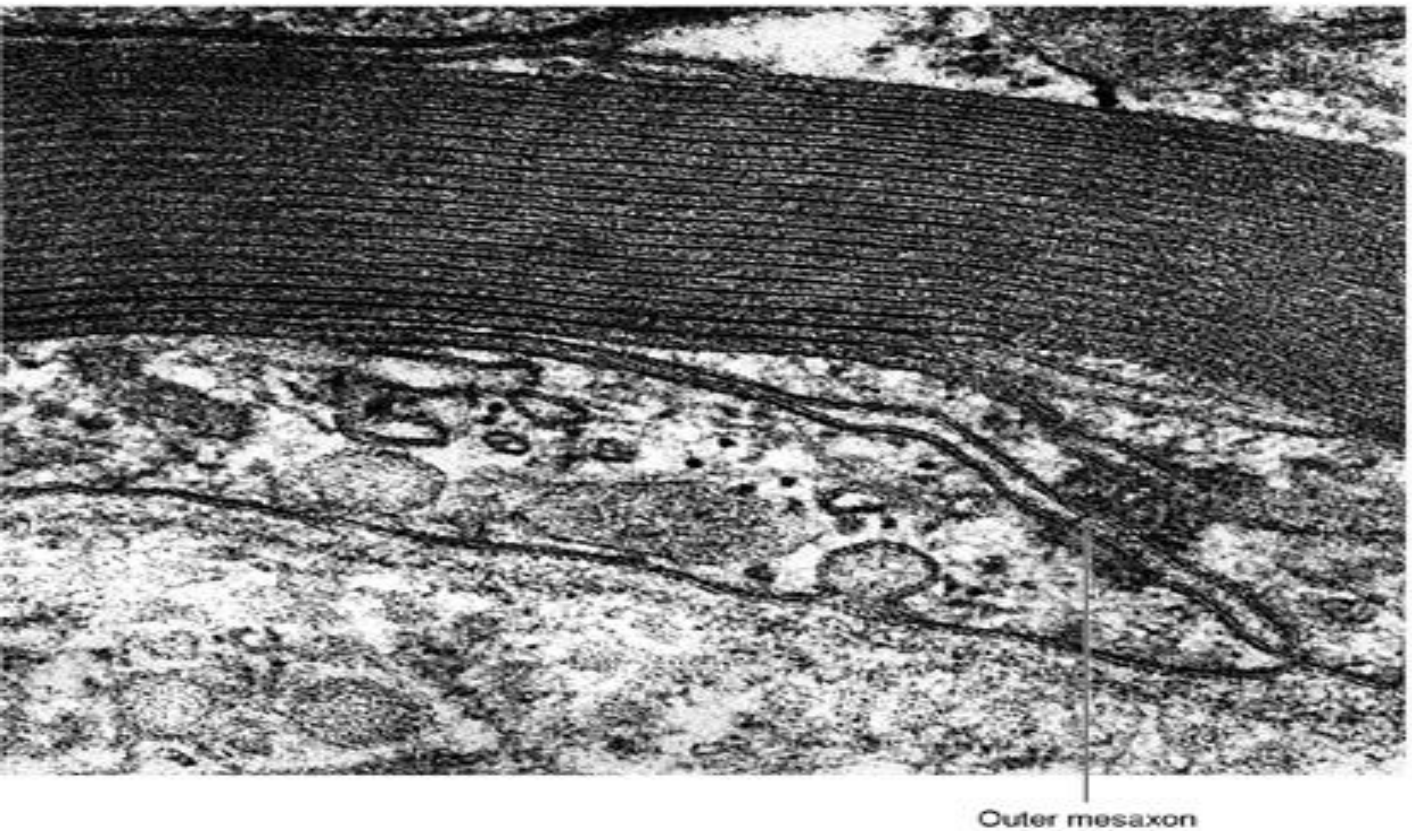
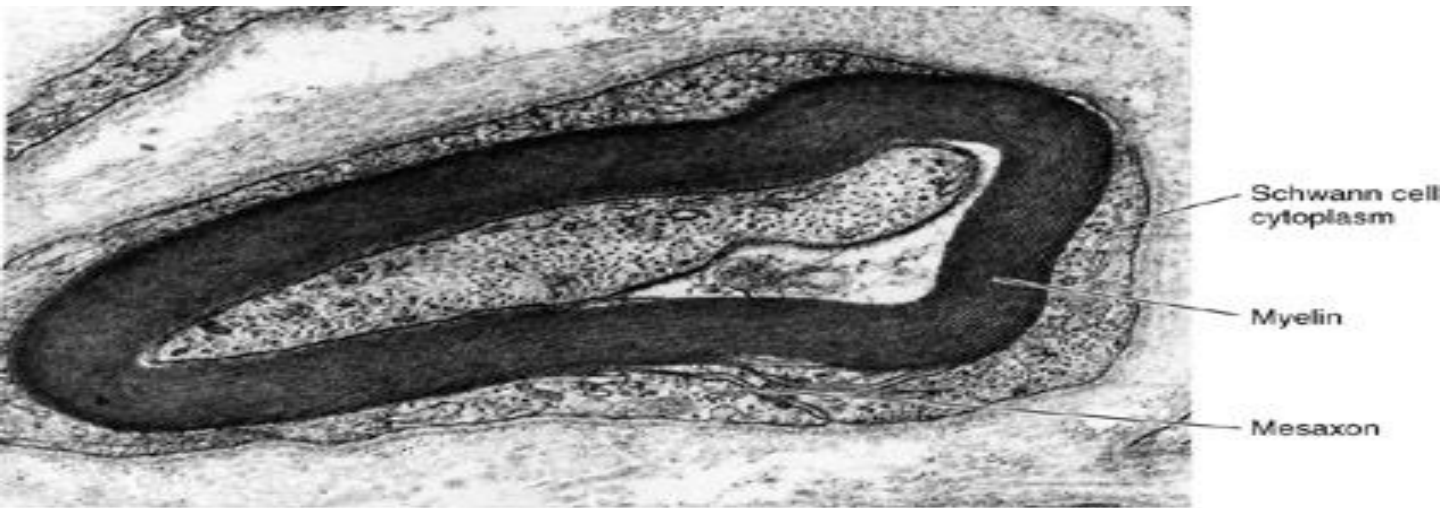




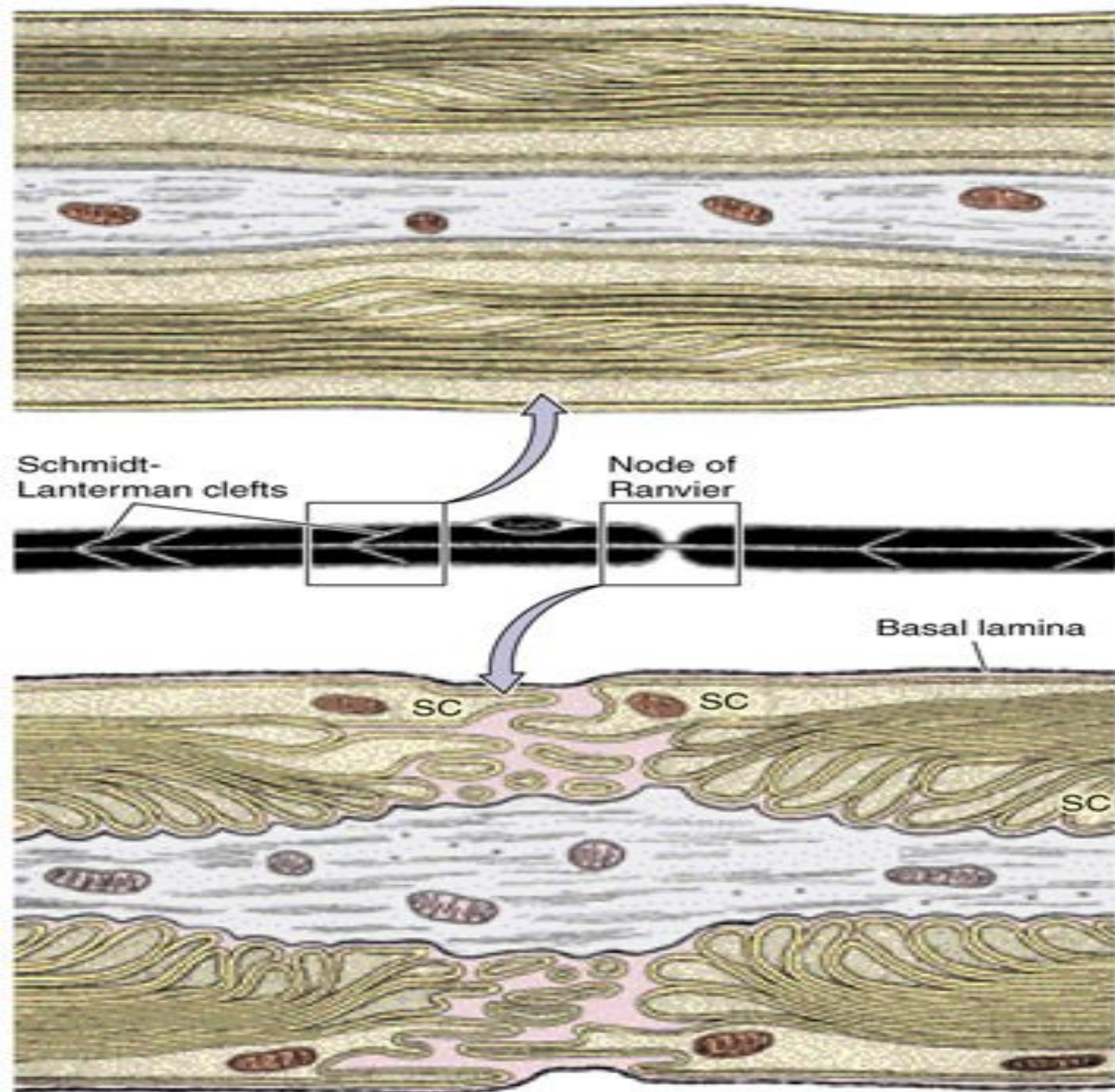
# Myelinated (M) and unmyelinated (U) nerve fibers in peripheral nerve



# Myelin sheath



# NODE OF RANVIER



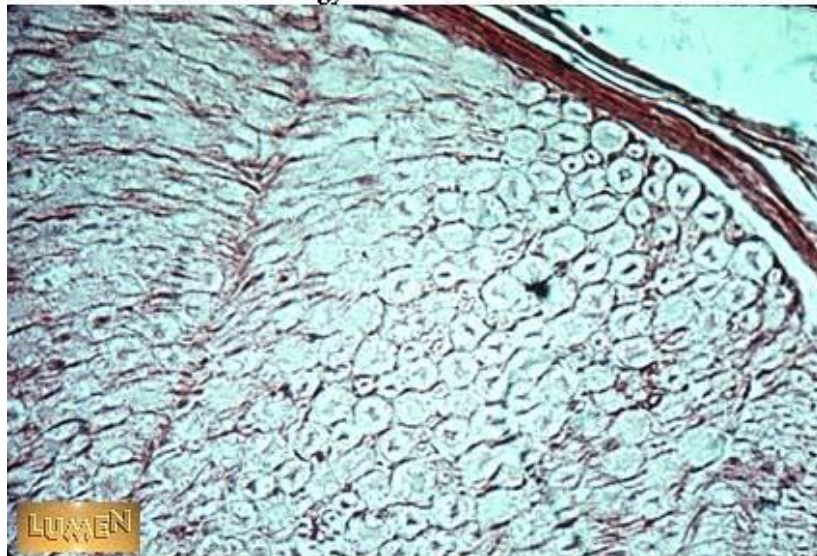
Histology Lab Part 6: Slide 14



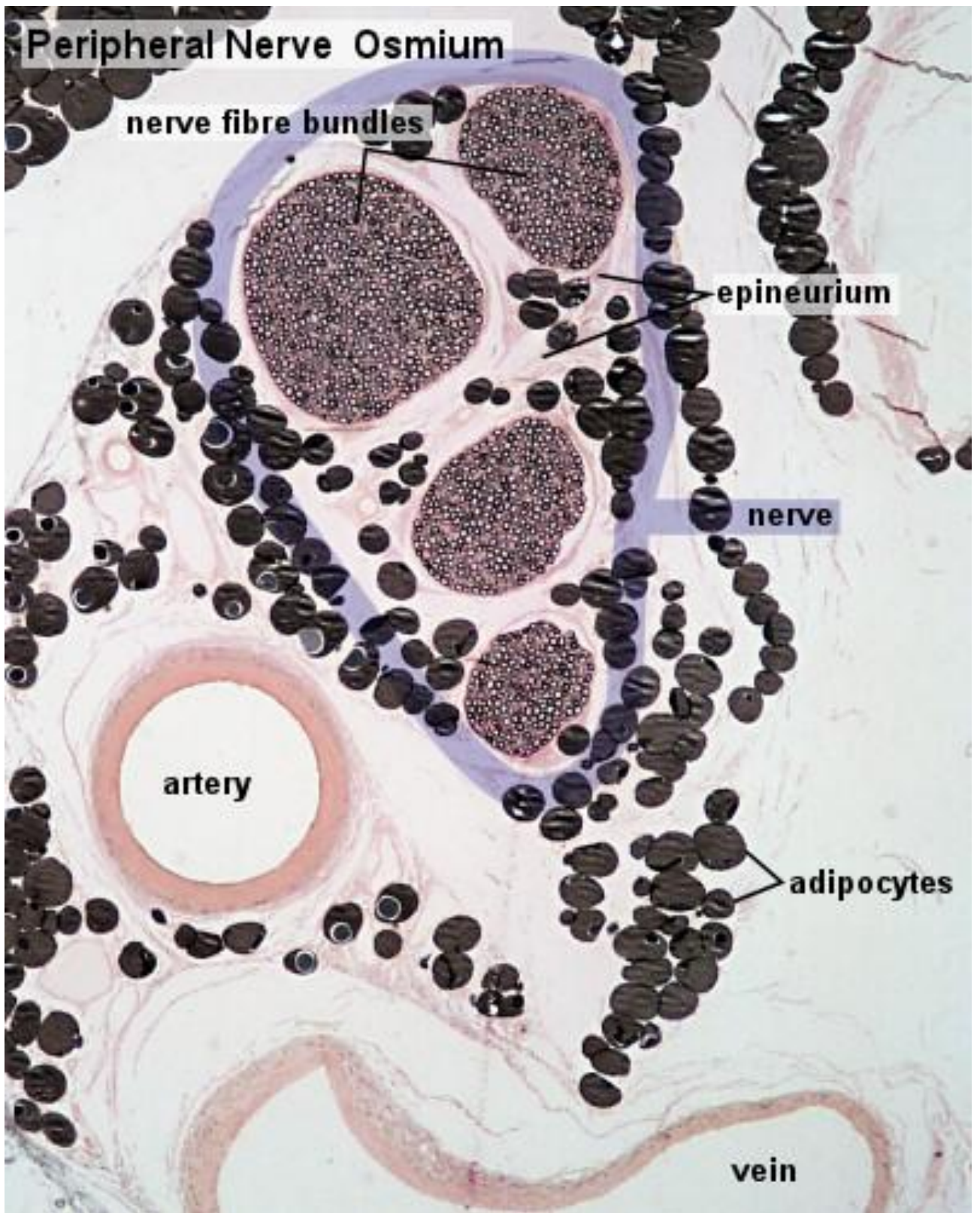
Histology Lab Part 6: Slide 12



Histology Lab Part 6: Slide 13



# Peripheral Nerve Osmium



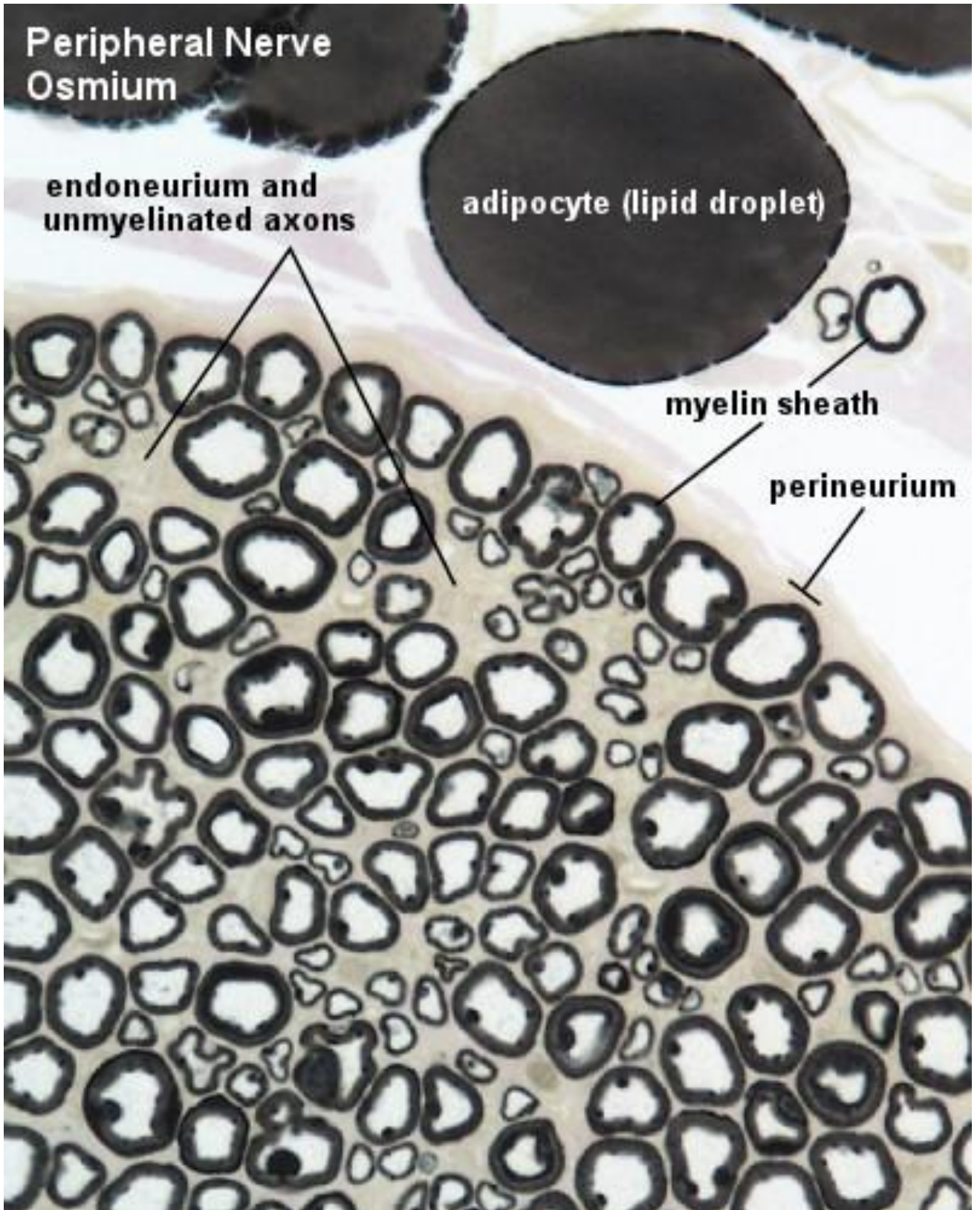
**Peripheral Nerve  
Osmium**

**endoneurium and  
unmyelinated axons**

**adipocyte (lipid droplet)**

**myelin sheath**

**perineurium**



# NERVE ENDINGS

## I SENSORY (receptors)

- A. Location: 1. Interoceptors
  - 2. Proprioceptors
  - 3. Exteroceptors
- B. Feelings: 1. Pain
  - 2. Pressure
  - 3. Temperature
- C. Structure: 1. Simple (free)
  - 2. Compound (nonfree):  
encapsulated, noncapsulated

## II SYNAPSES (chemical and electric)

- Structure
- Functions: excitatory, inhibiting
- Mediator: acetylcholine, adrenalin, bombesin ...

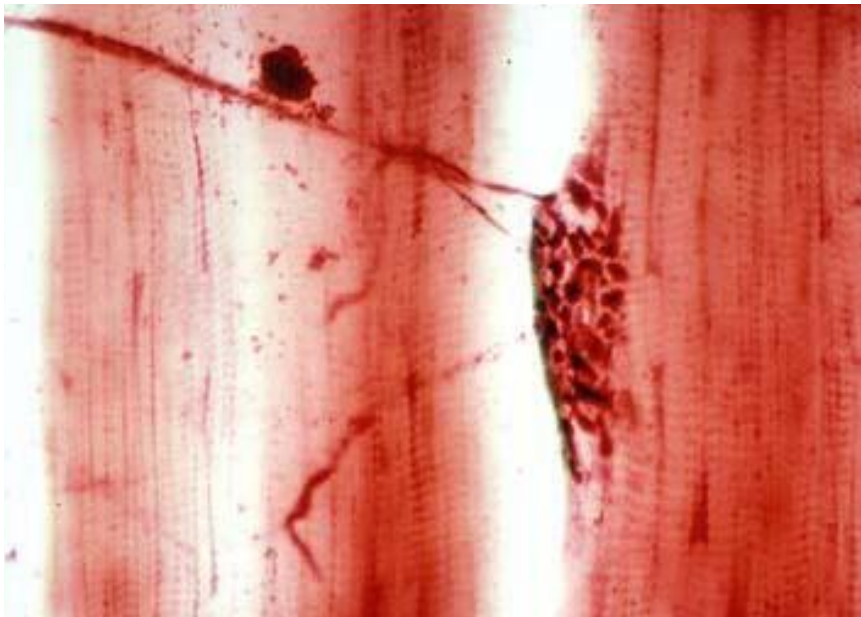
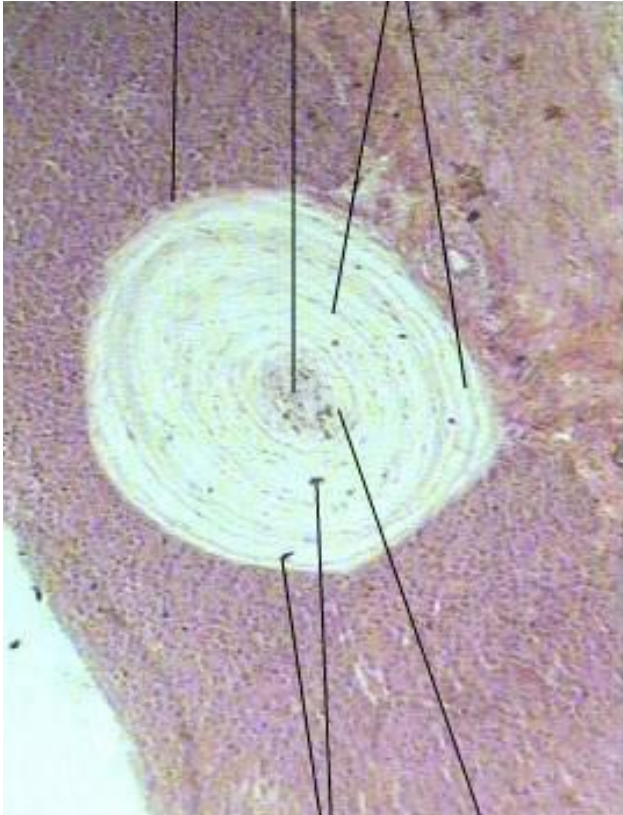
## III. EFFECTORY (effectors)

Motor

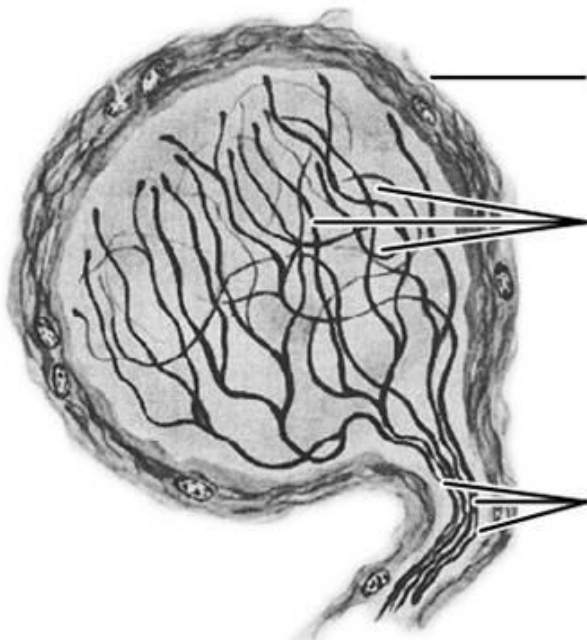
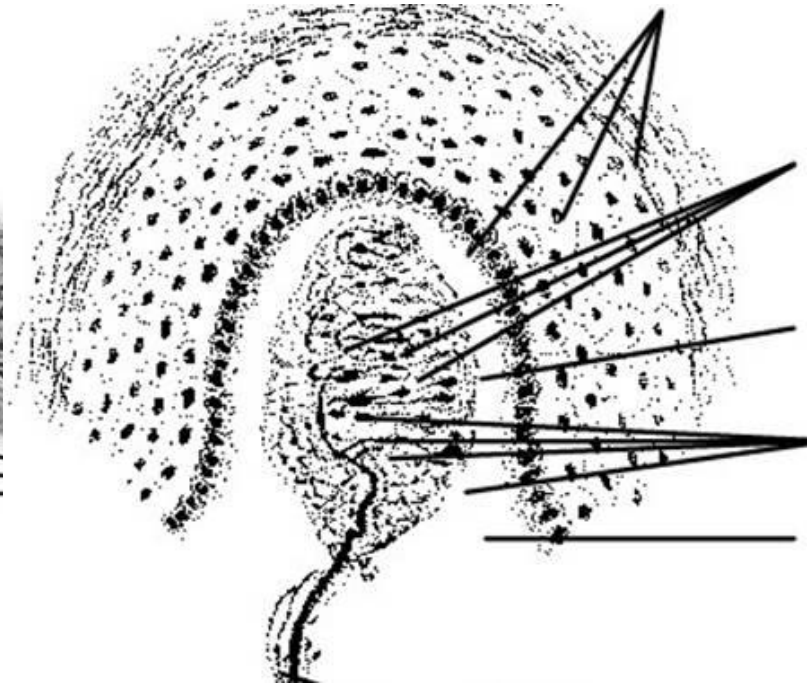
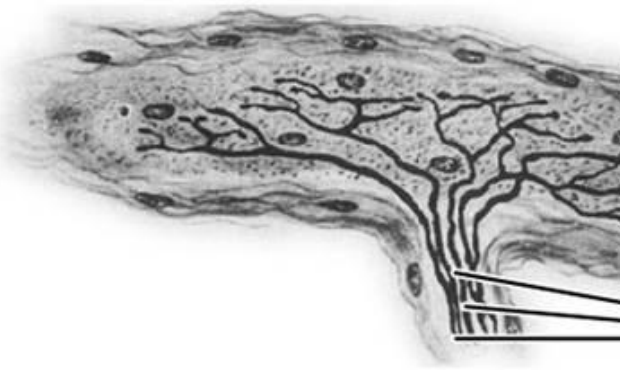
Secretory



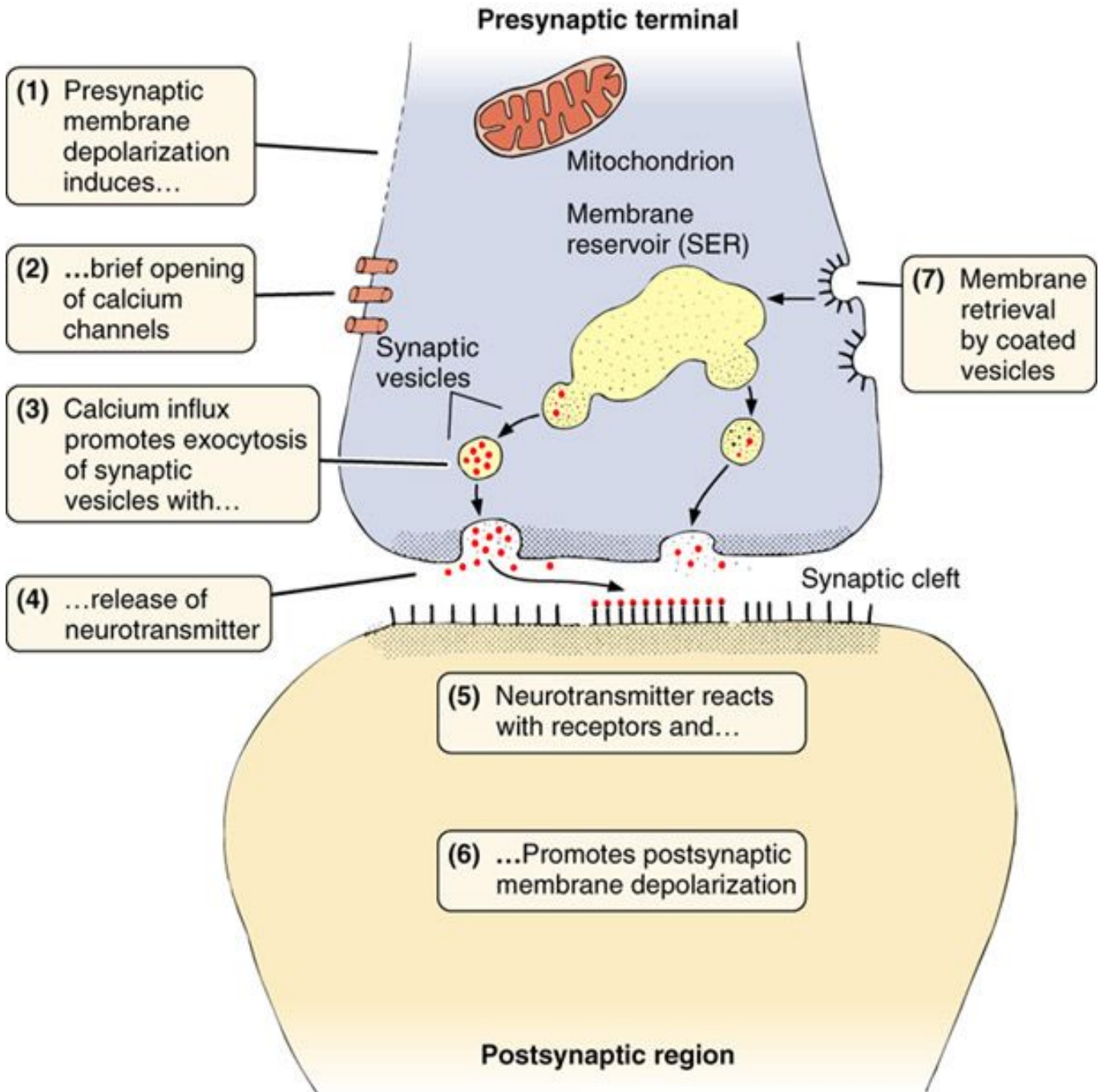
# Nerve endings



# Nerve endings



# SYNAPSES



# **TYPES OF SYNAPSES**

- 1. Electrical**
- 2. Chemical**

## **Functional types**

- 1. Excitatory**
- 2. Inhibiting**

# SYNAPTIC COMMUNICATION

- The synapse is responsible for the unidirectional transmission of nerve impulses. Synapses are the sites where contact occurs between neurons or between neurons and other effector cells (e.g., muscle and gland cells).

# STRUCTURAL TYPES OF SYNAPSES

