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, mantial and marginal layer)**

Ganglionic plate and nervous crests lye up to nerve tube

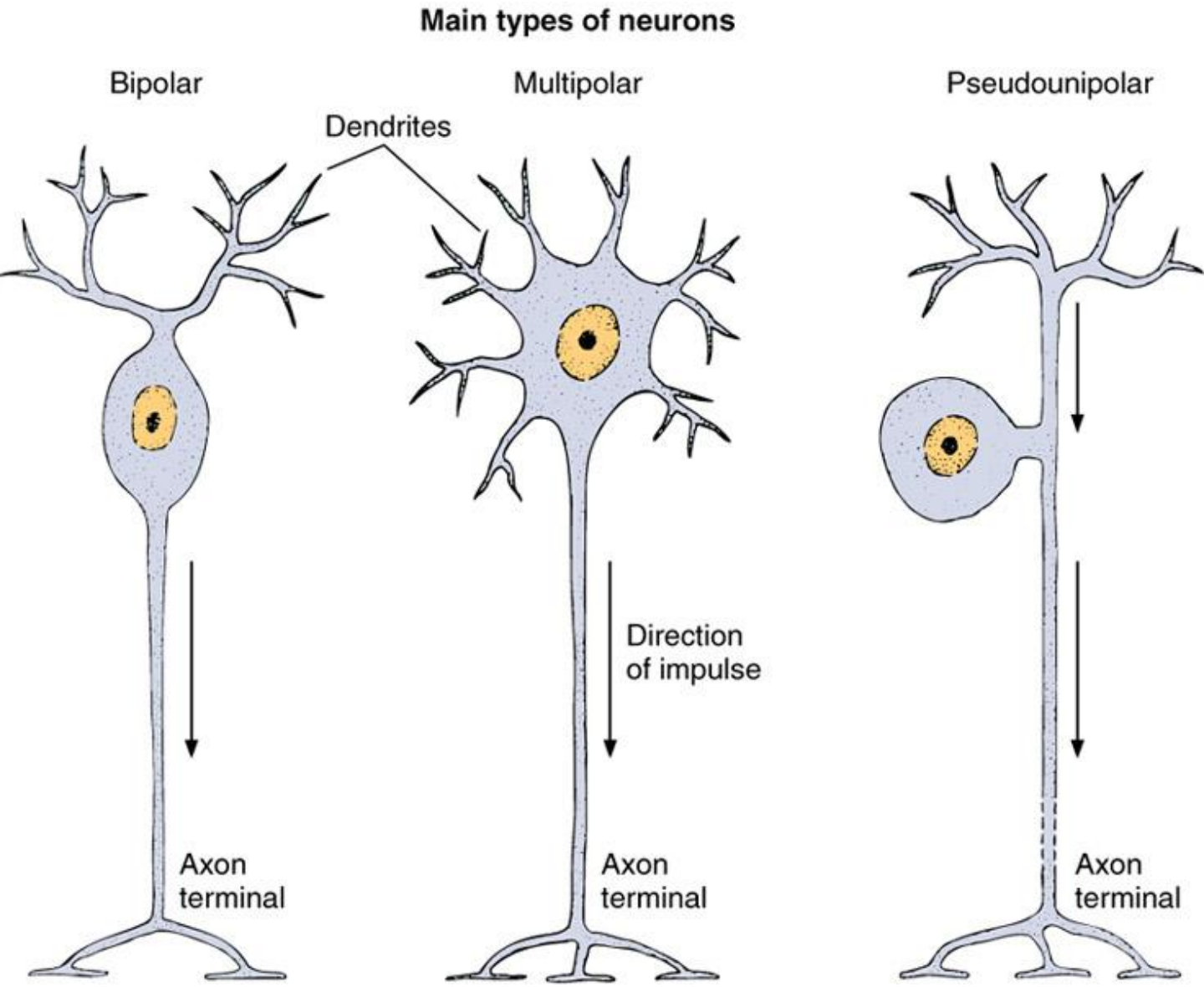
Nervous tissue = nerve cells + glial cells + derivatives (fibers and endings)

Nerve cells types

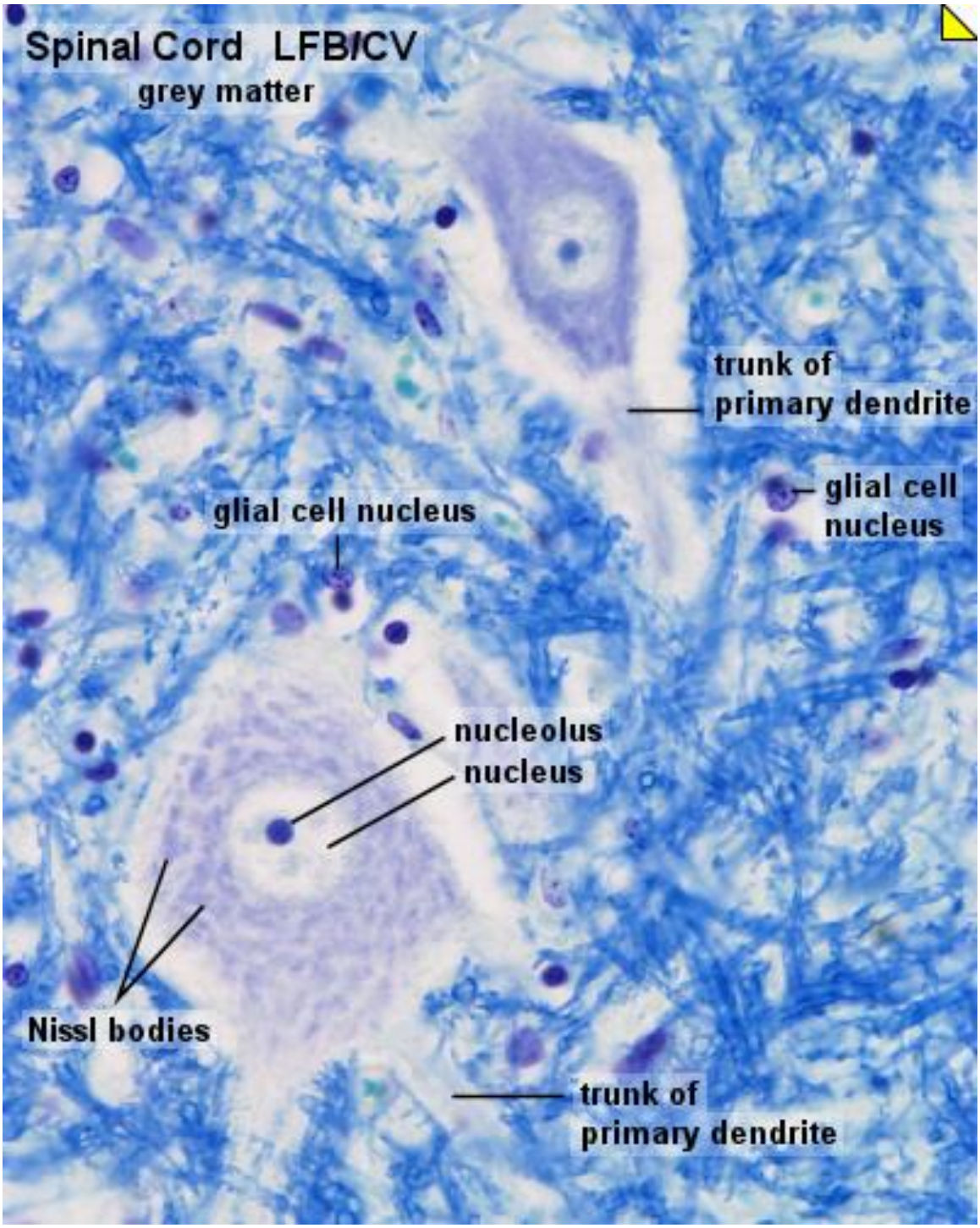
A. 1. Unipolar
   2. Bipolar
   3. Pseudounipolar
   4. Multipolar

B. 1. Sensory (afferent)
   2. Associative
   3. Motor (efferent)

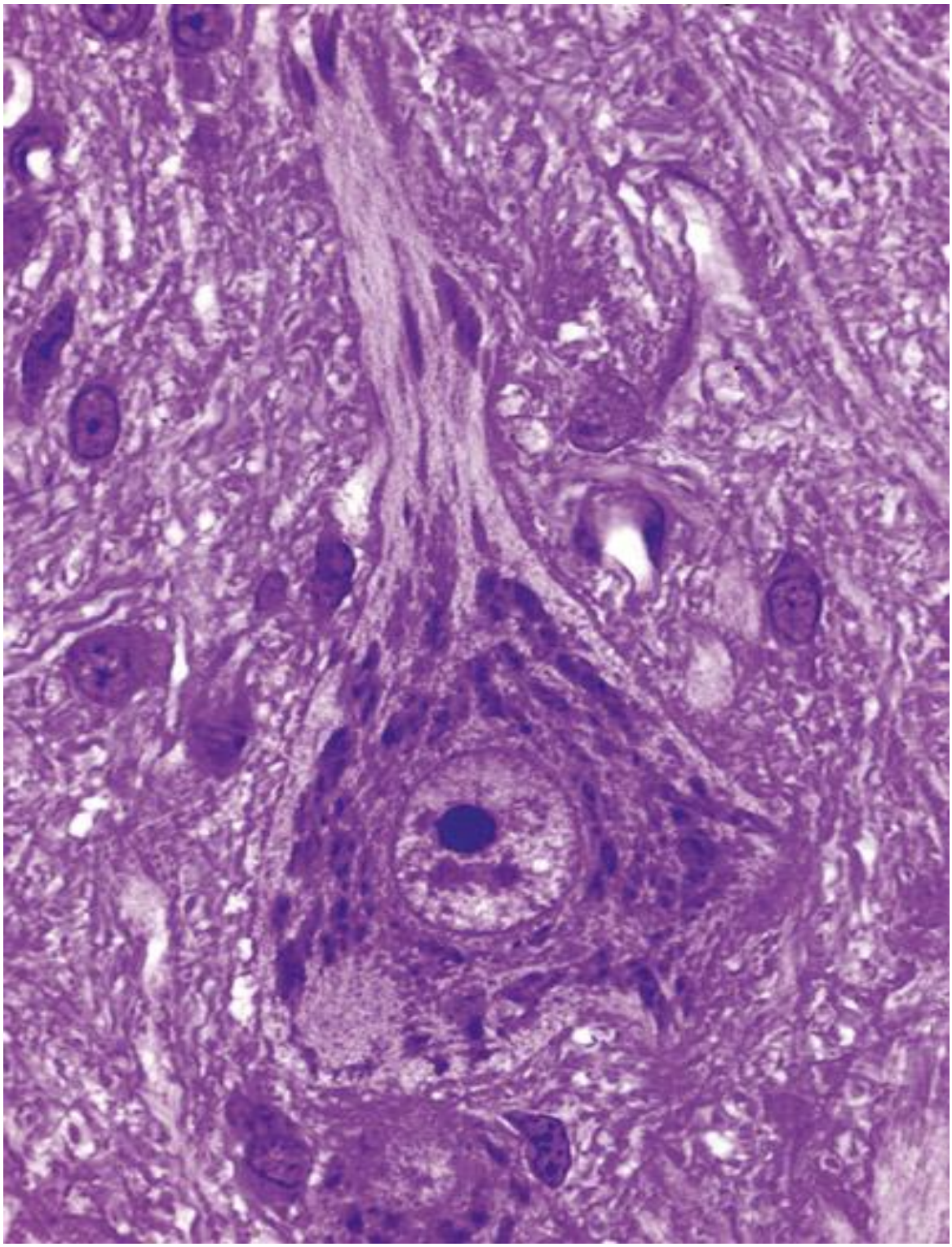
Neuron = perikaryon + axon + dendrite(s)



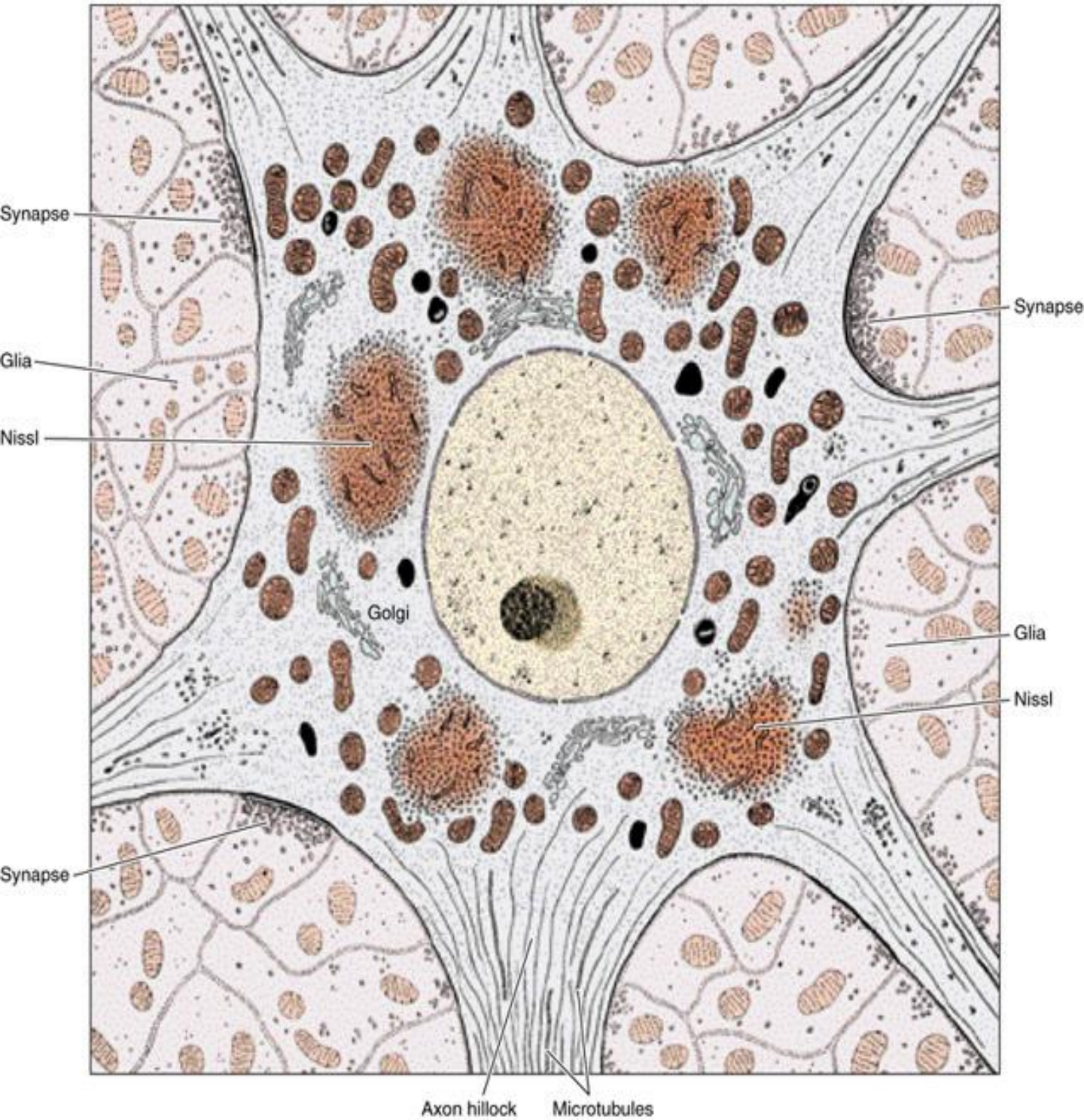
Nissls' bodies

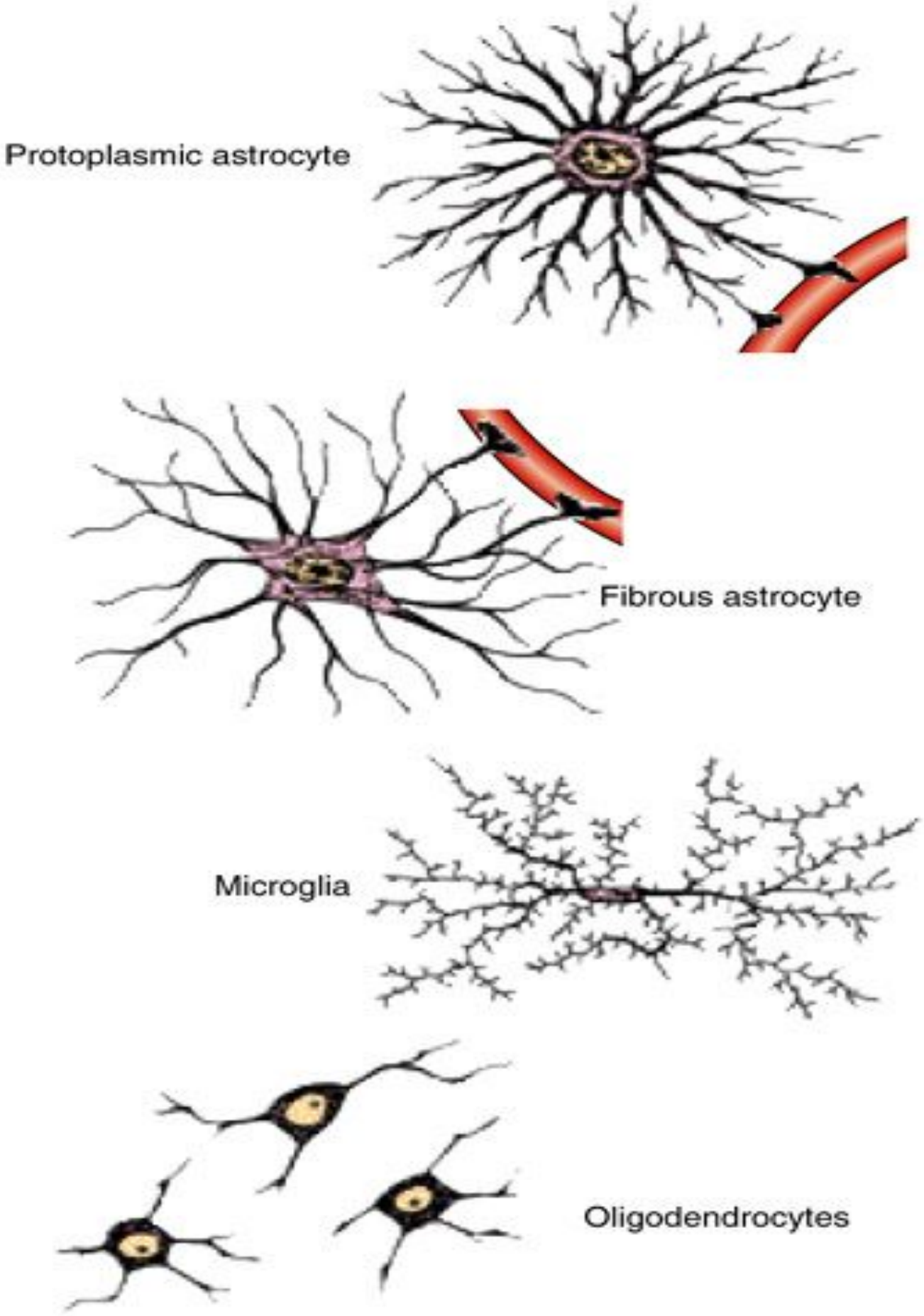


Nissls' bodies

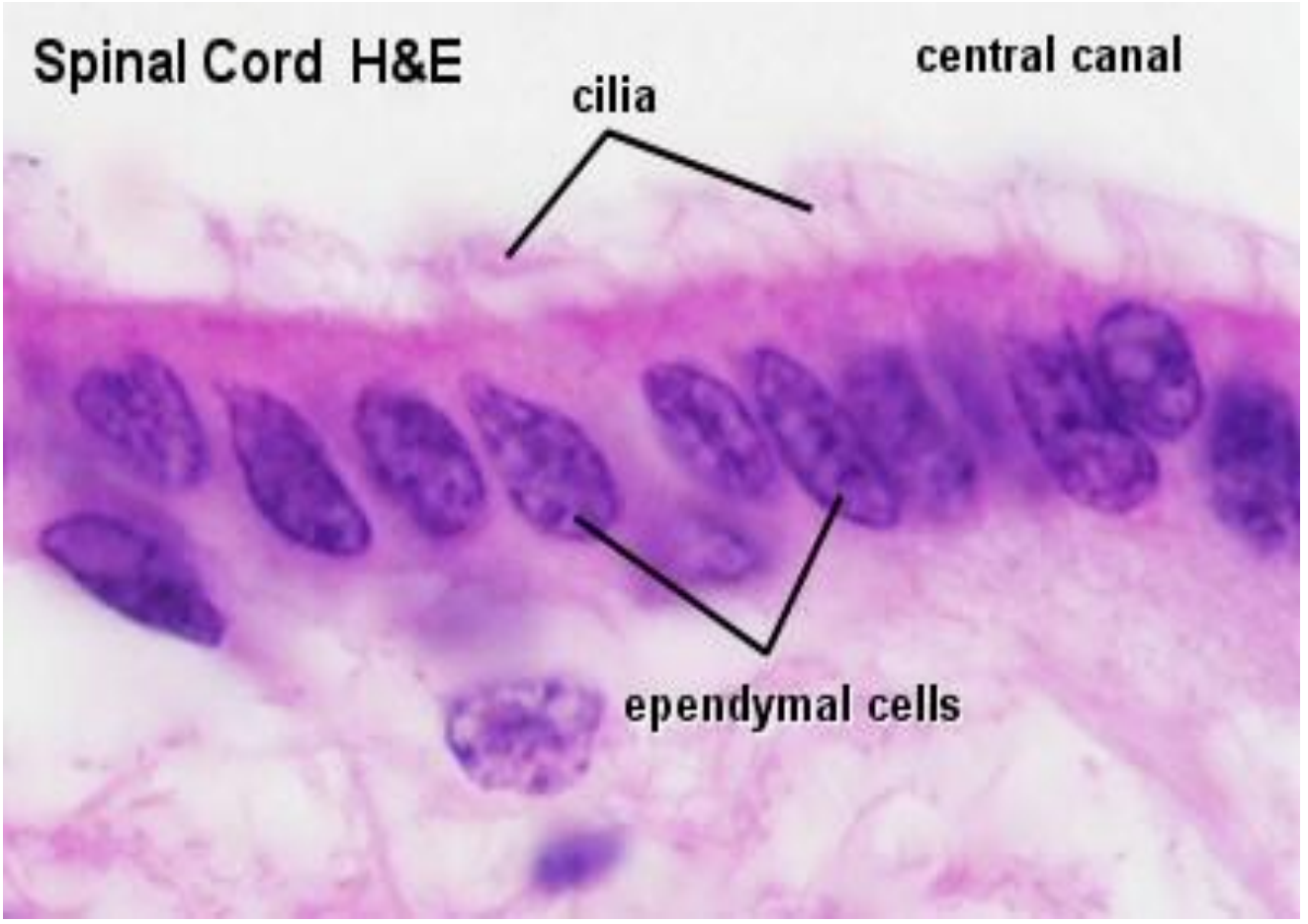


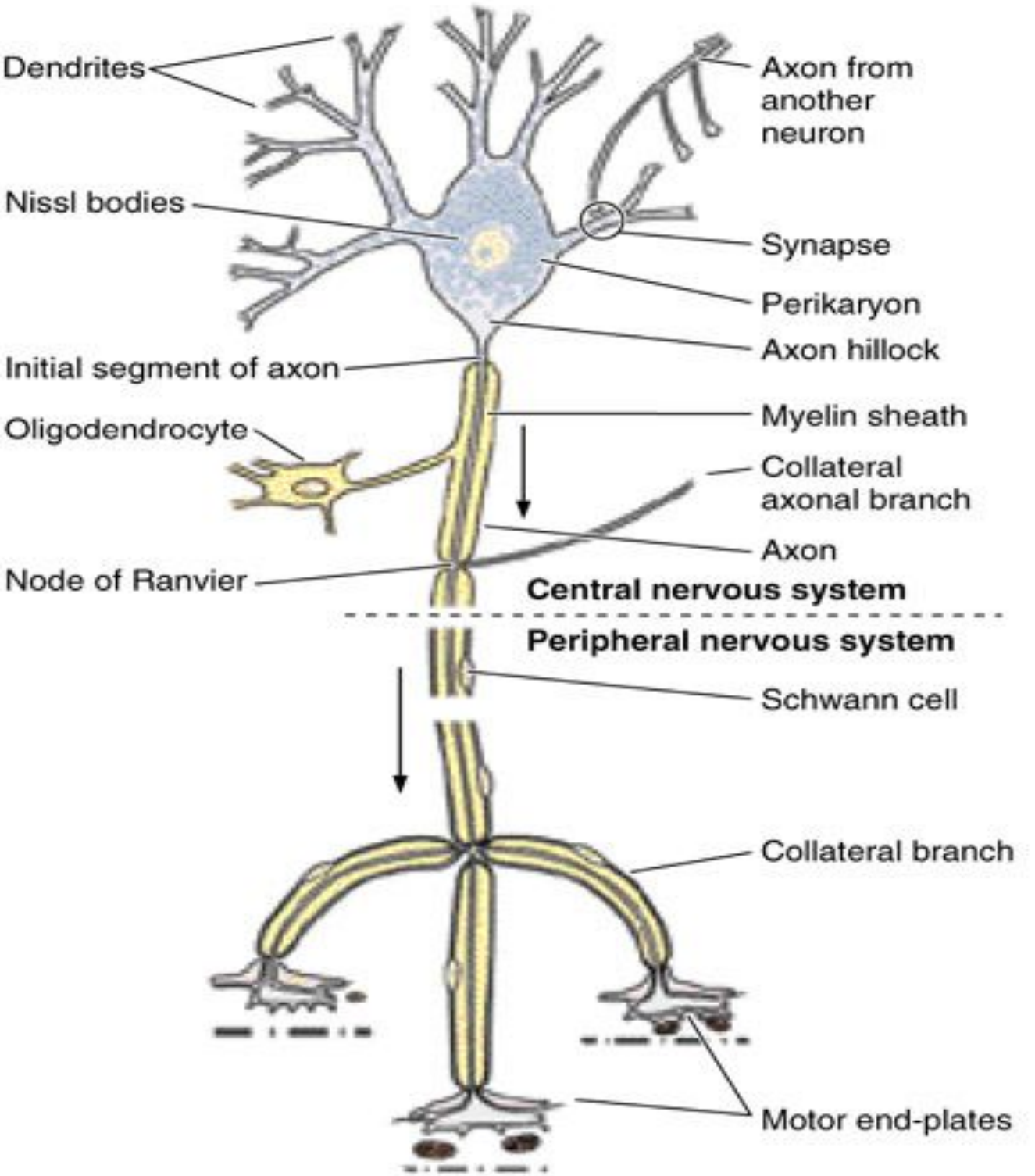
Nerve cell ultrastructure




Protoplasmic astrocyte
Fibrous astrocyte
Microglia
Oligodendrocytes

Ependymal cells




Dendrites
Axon from another neuron
Nissl bodies
Synapse
Perikaryon
Axon hillock
Initial segment of axon
Myelin sheath
Oligodendrocyte
Collateral axonal branch
Axon
Node of Ranvier
Central nervous system
Peripheral nervous system
Schwann cell
Collateral branch
Motor end-plates

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

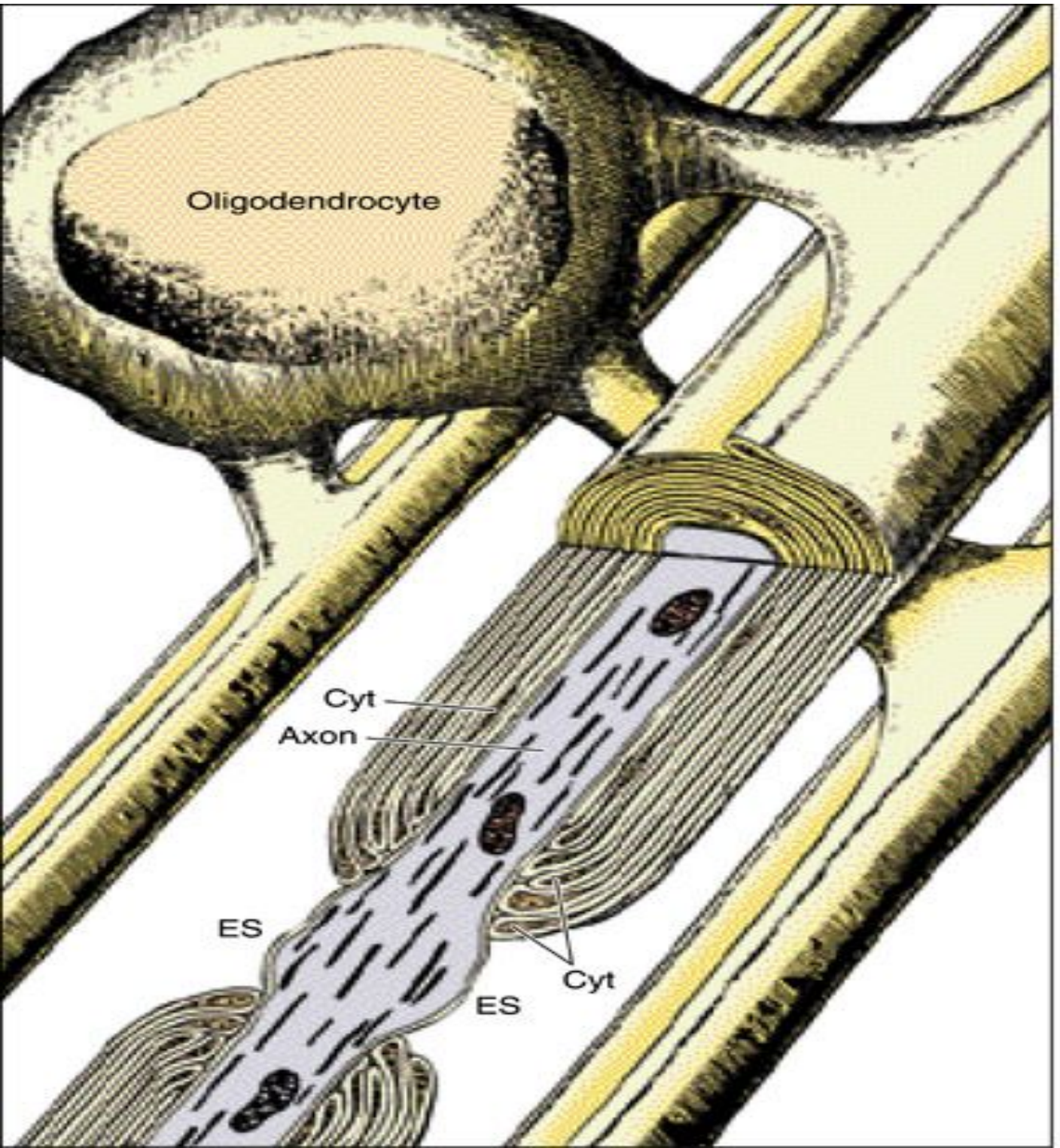
NERVE FIBERS

Nerve cell process +
Shwann cells +
Basement membrane

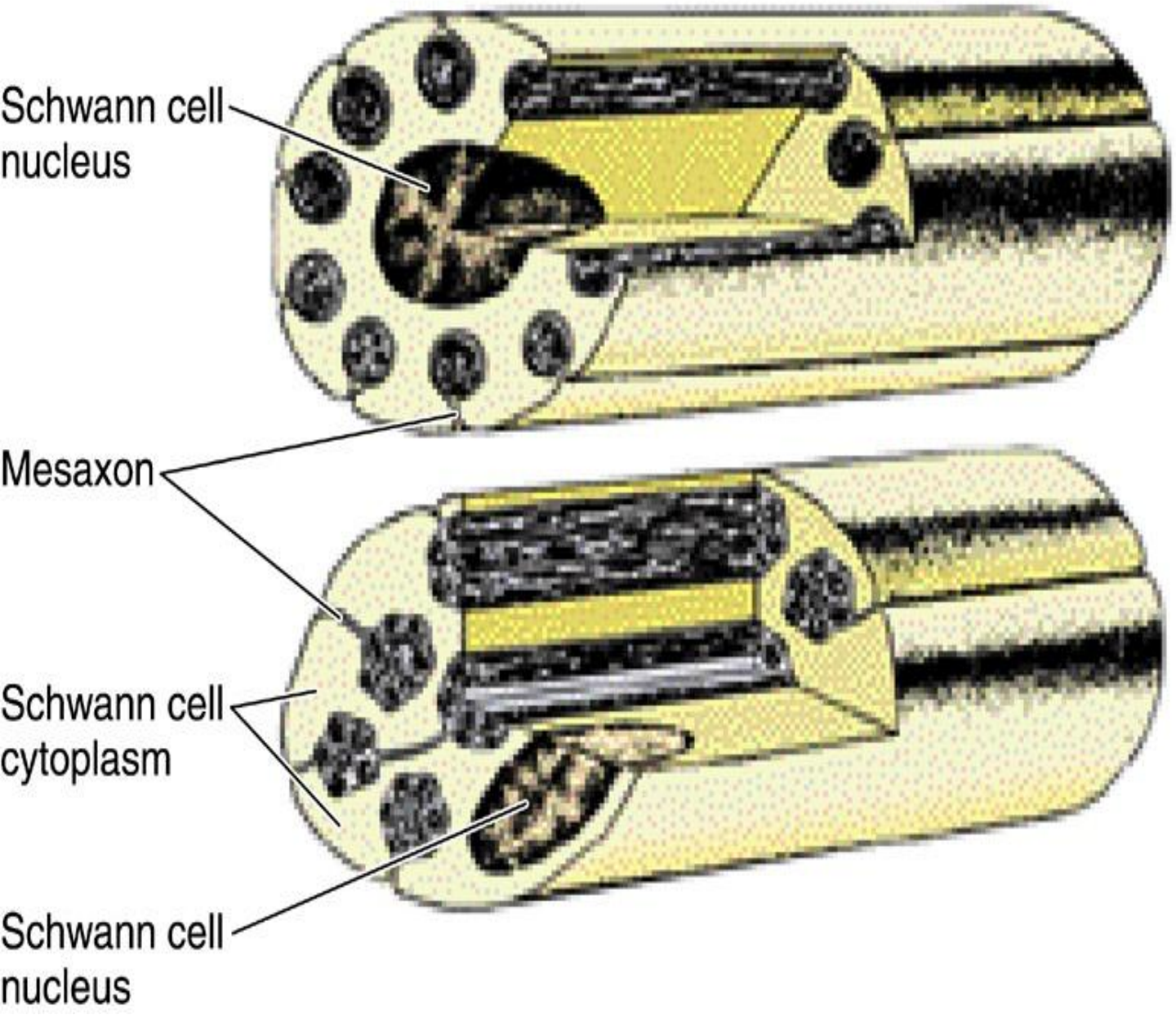
Type of nerve fibers

1. Myelinated
2. Unmyelinated

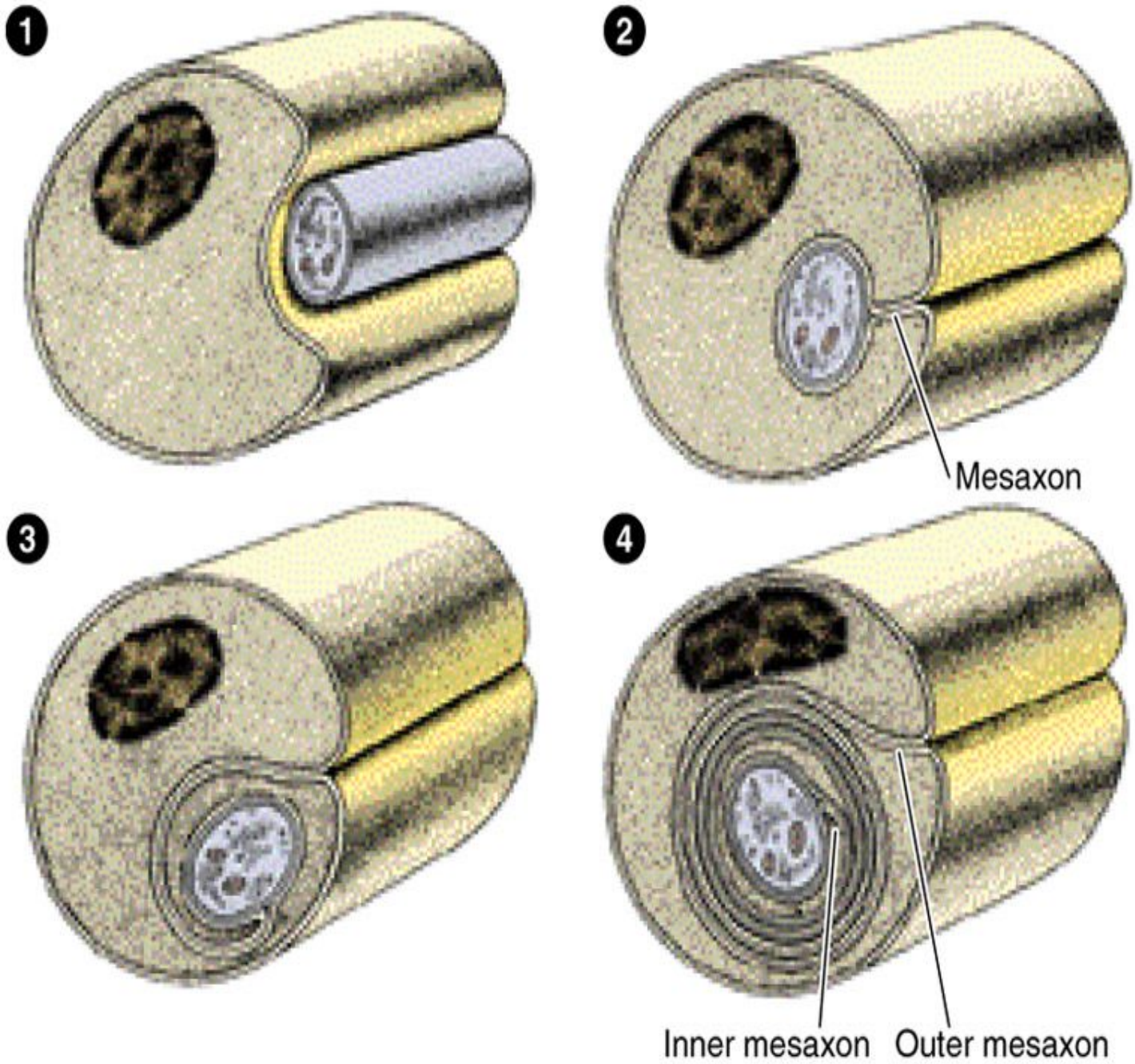
OLIGODENDROCYTE



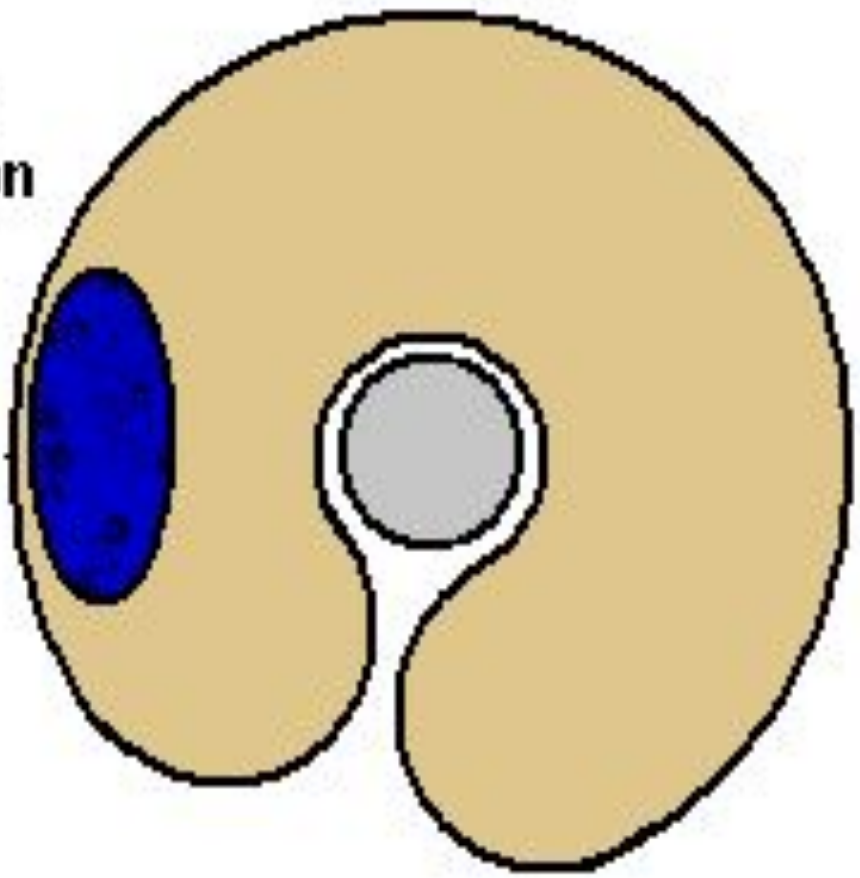
UNMYOLINATED FIBER

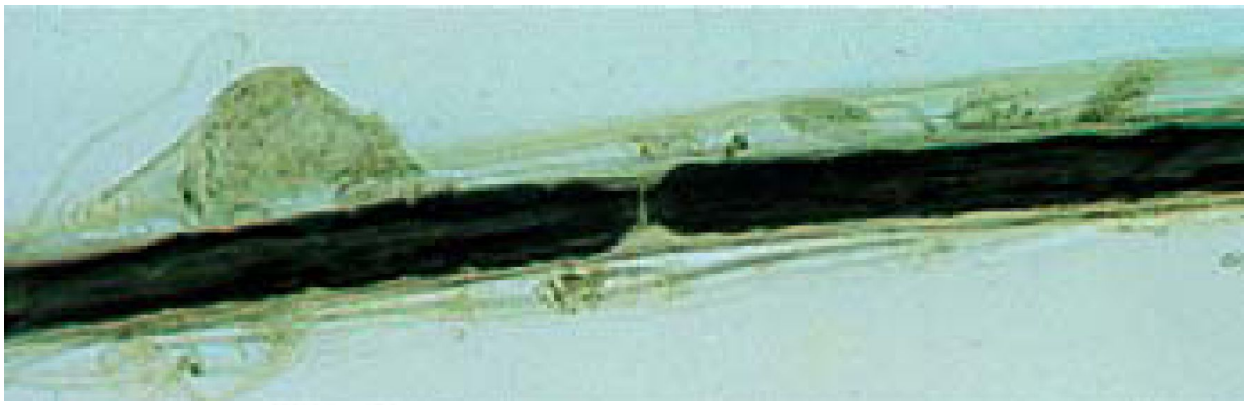


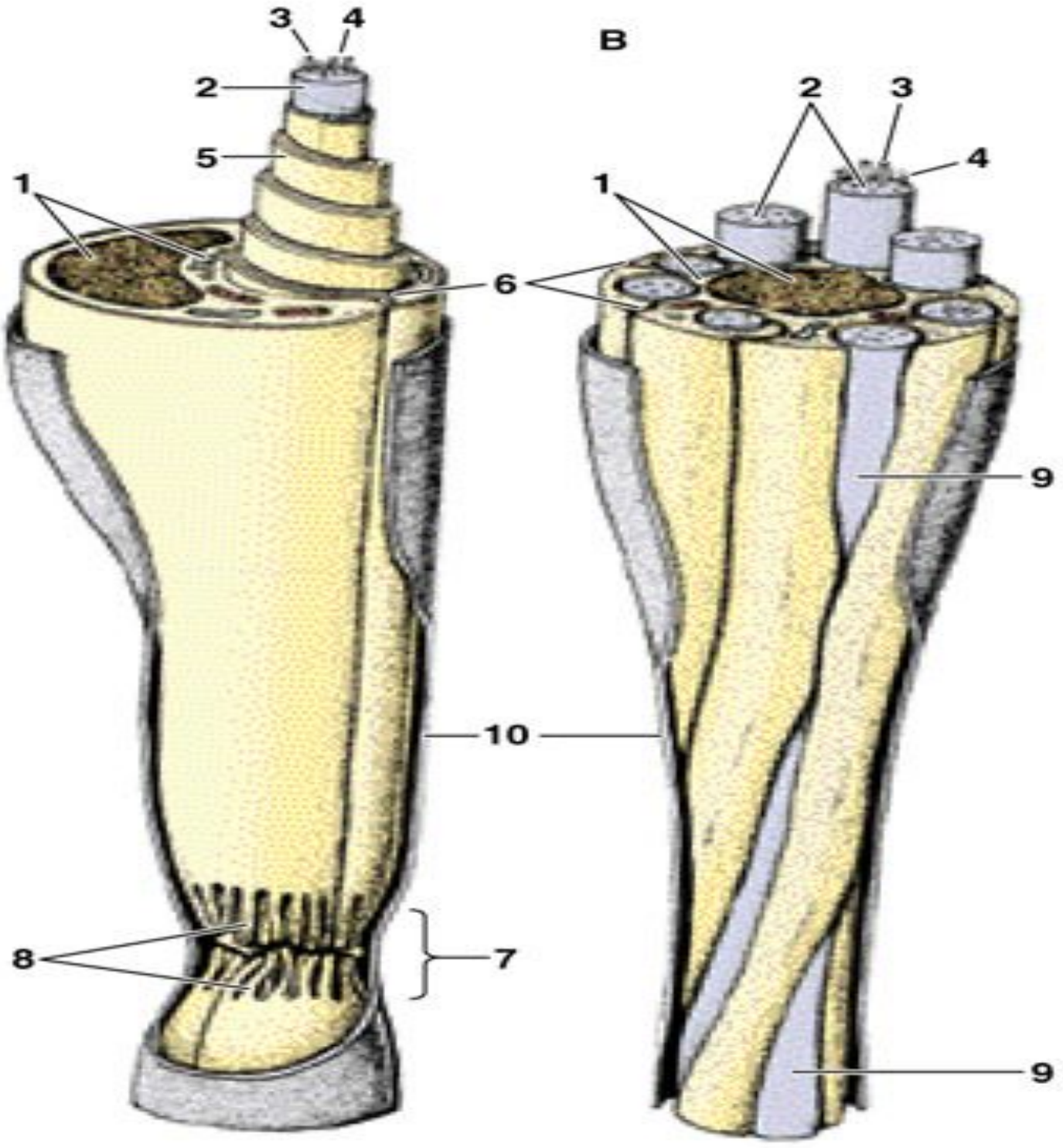
MYELINIZATION



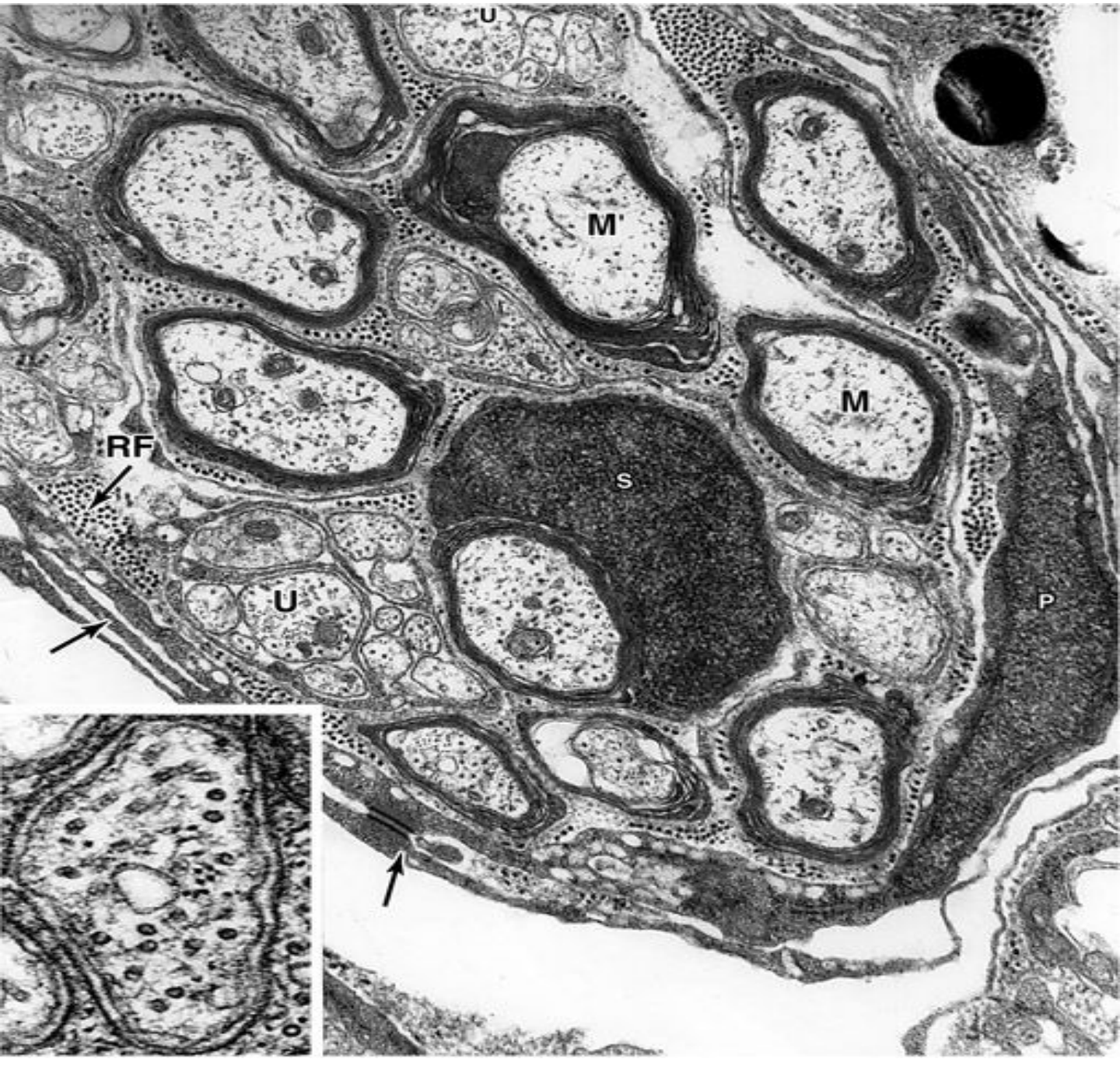
Myelination of
a peripheral axon



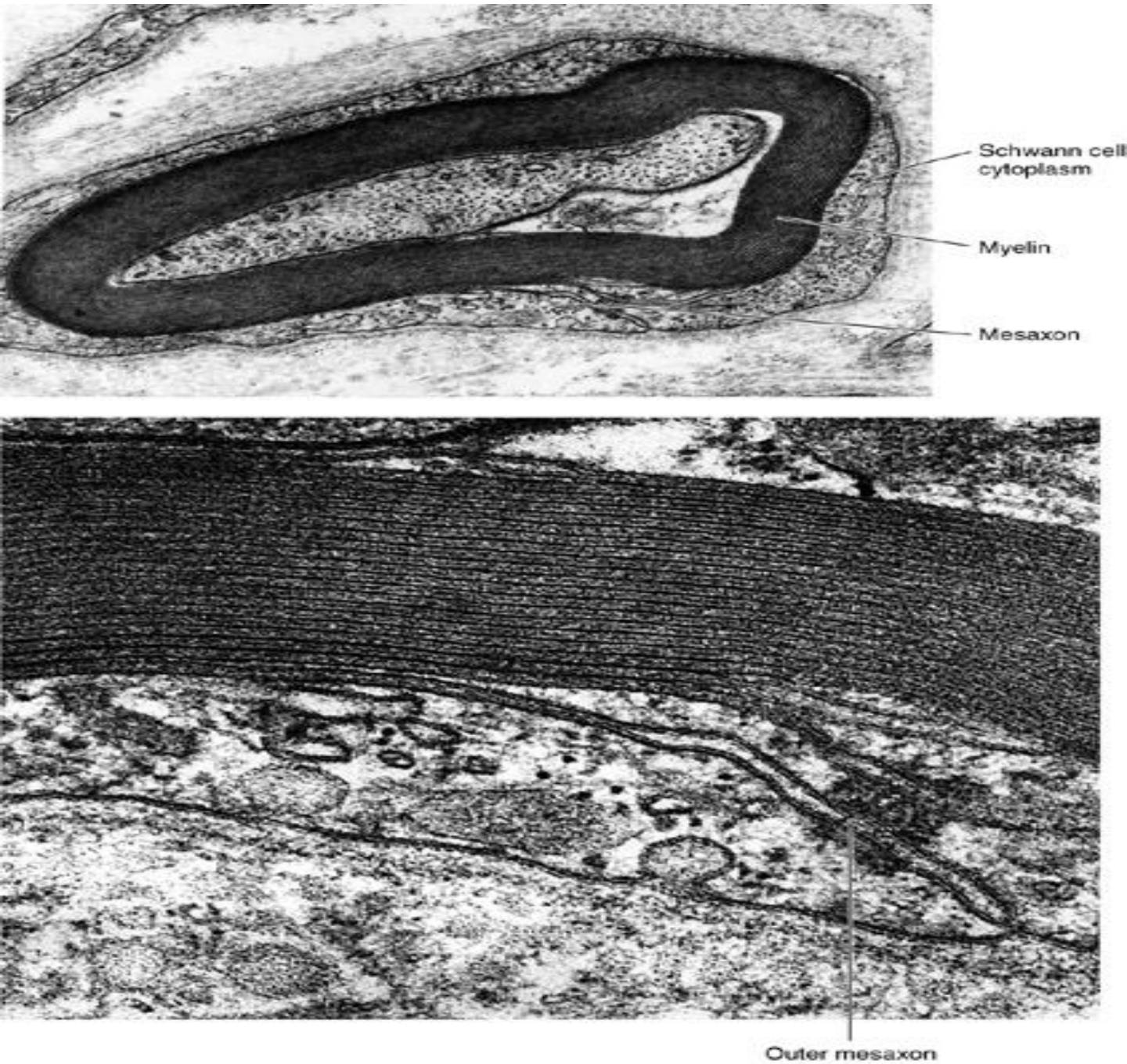



3
4
2
5
1
6
10
8
7
B
2
3
4
1
9
9

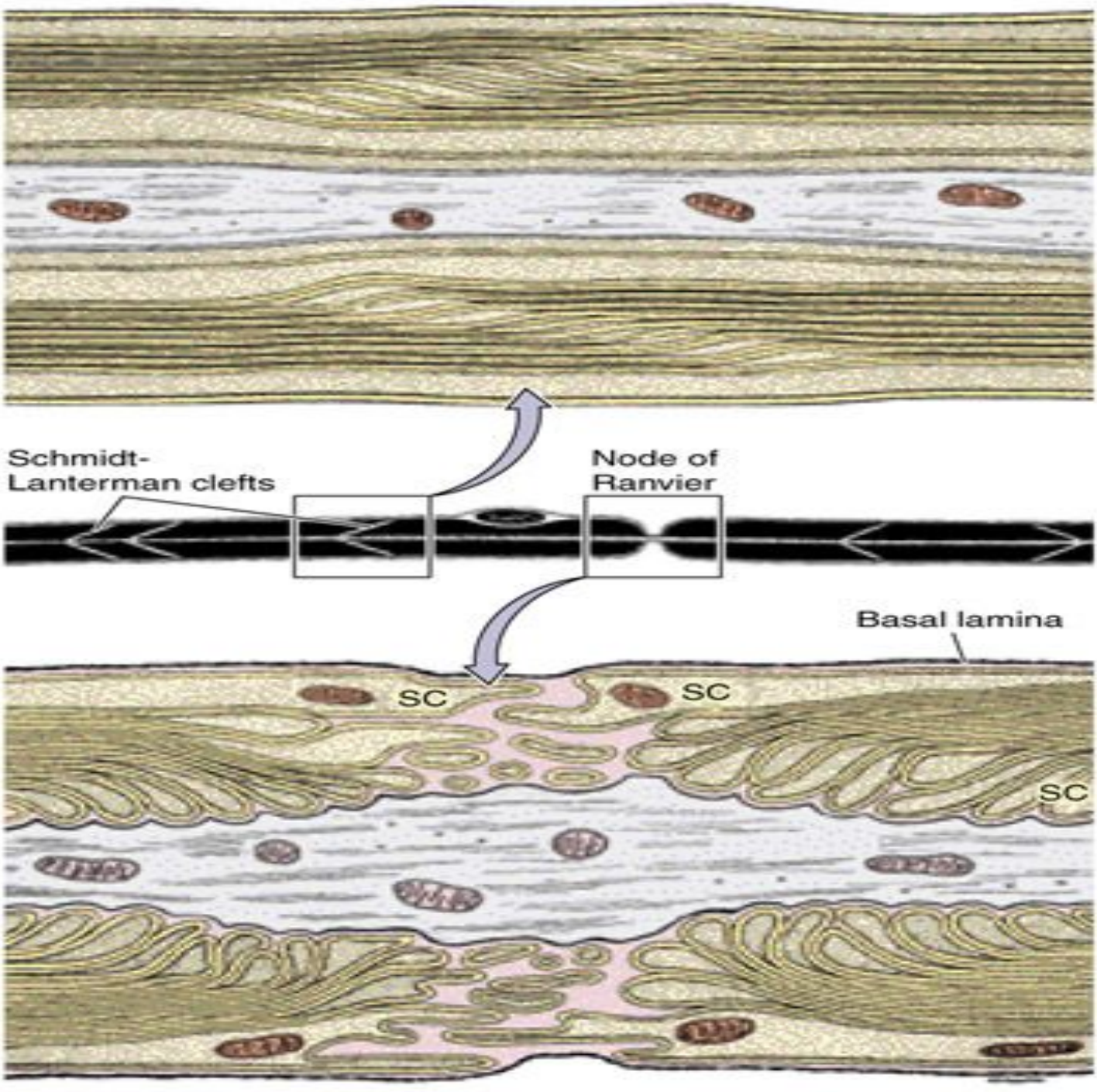
Myelinated (M) and unmyelinated (U) nerve fibers in peripheral nerve



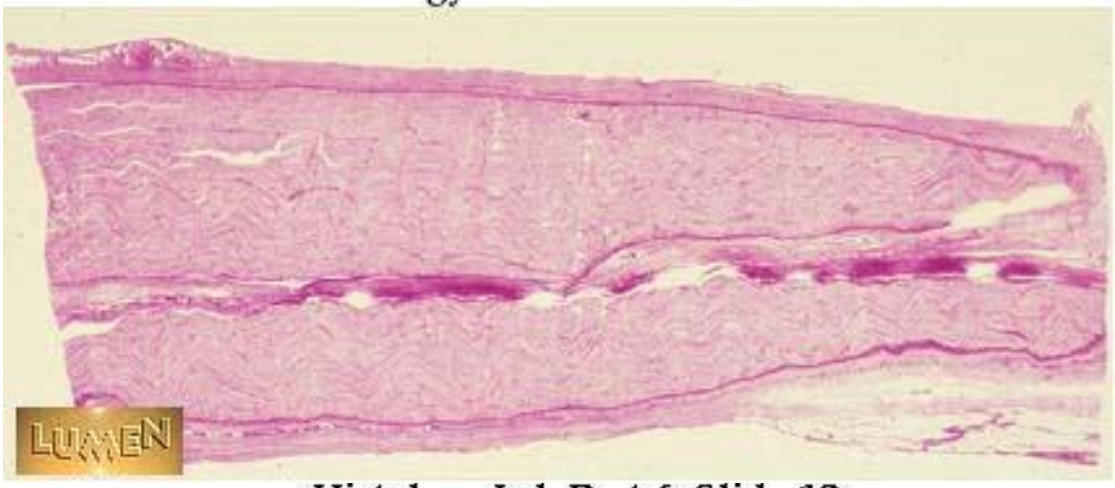
Myelin sheath



NODE OF RANVIER

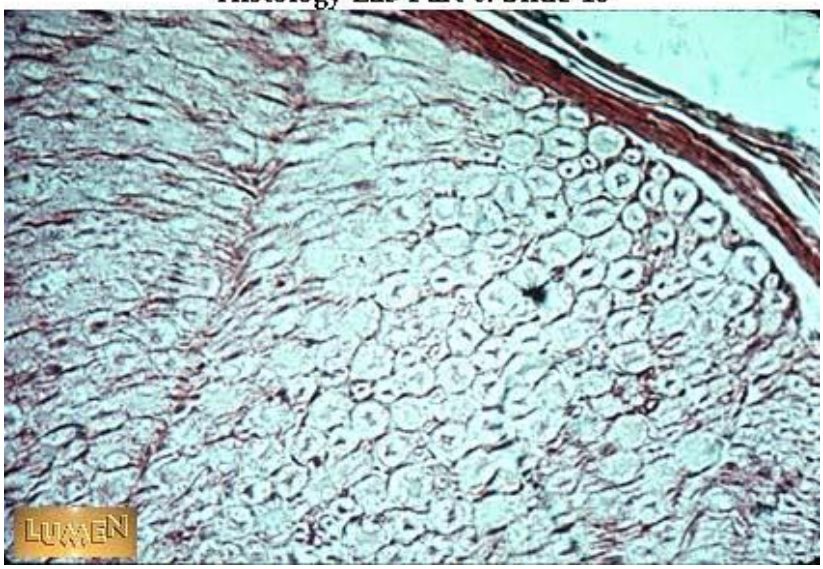


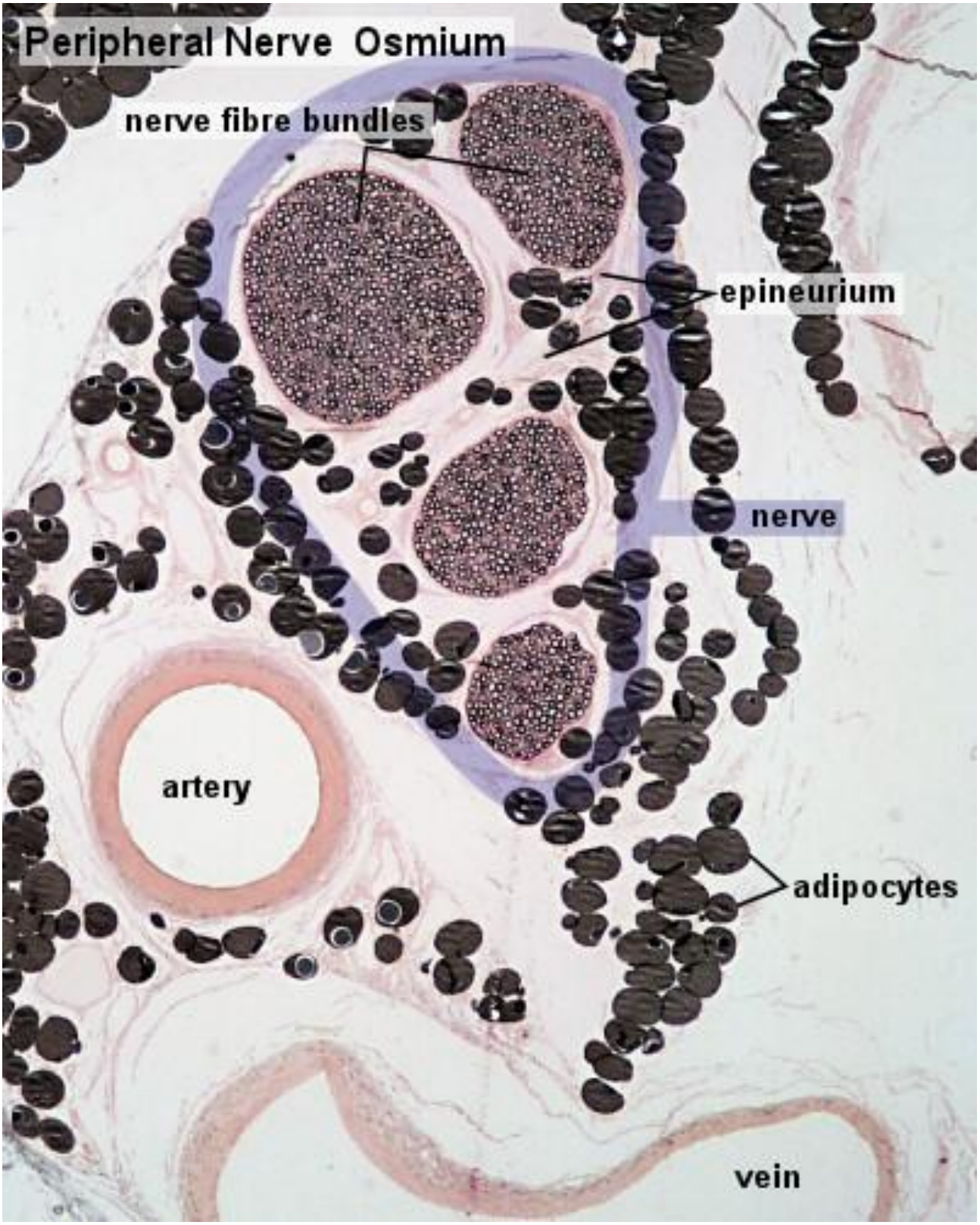
Histology Lab Part 6: Slide 14

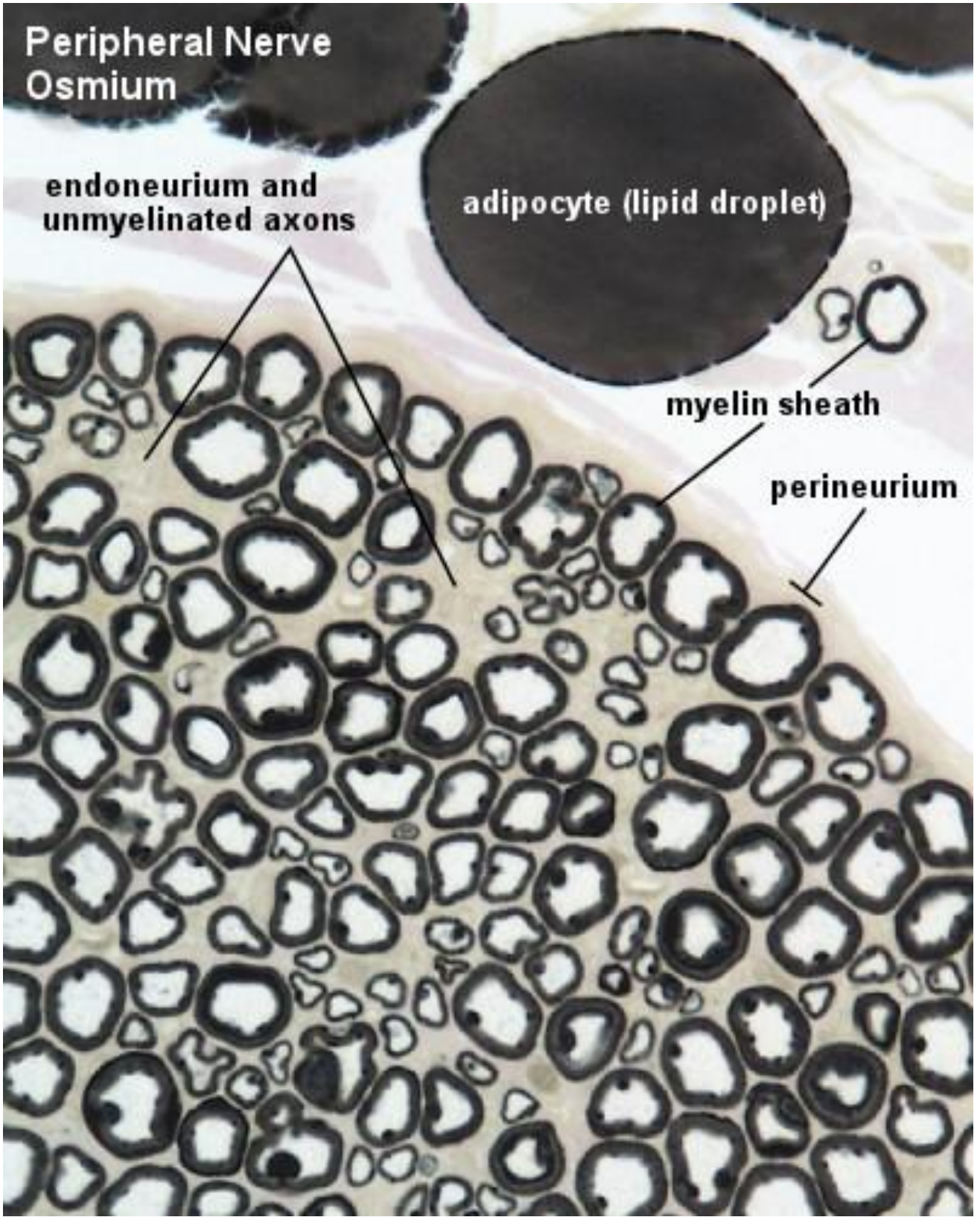


Histology Lab Part 6: Slide 12

Histology Lab Part 6: Slide 13




Peripheral Nerve Osmium
nerve fibre bundles
epineurium
nerve
artery
adipocytes
vein


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)

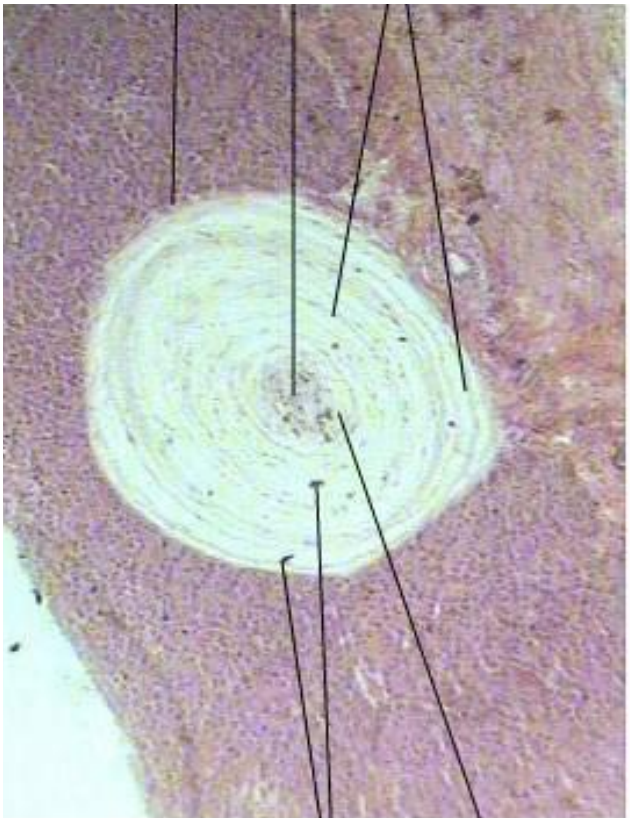
- **Structure**
- **Functions: excitatory, inhibiting**
- **Mediator: acetylcholine, adrenalin, bombesin …**

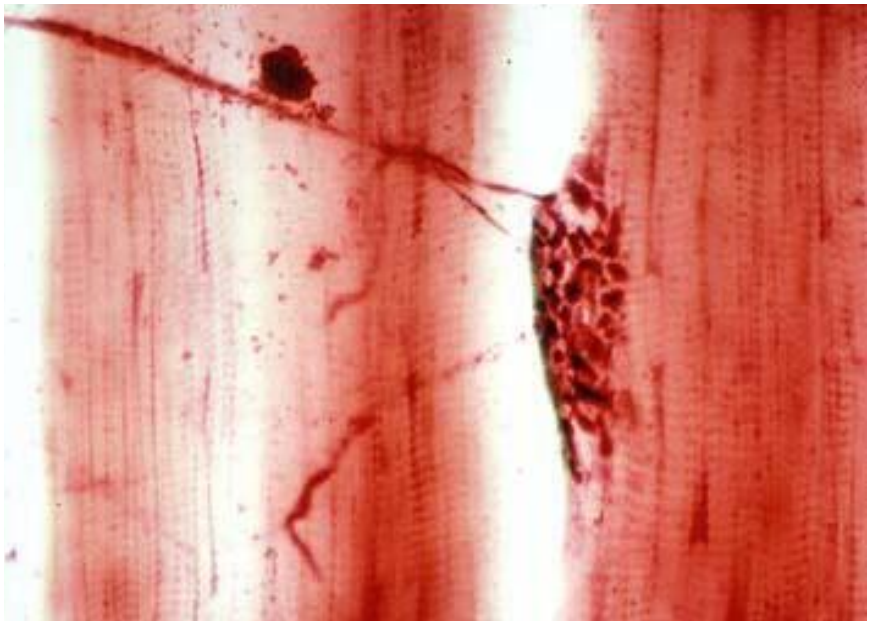
III. *EFFECTORY* (effectors)

Motor

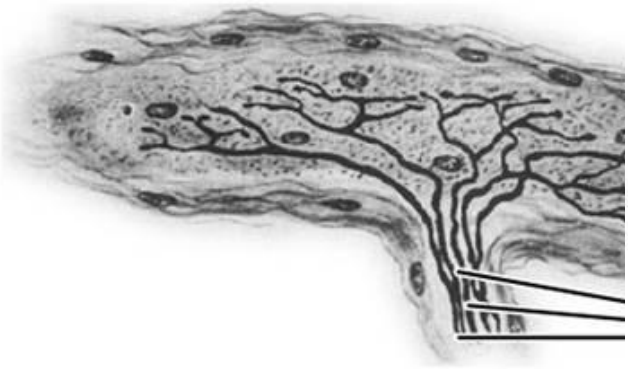
Secretory

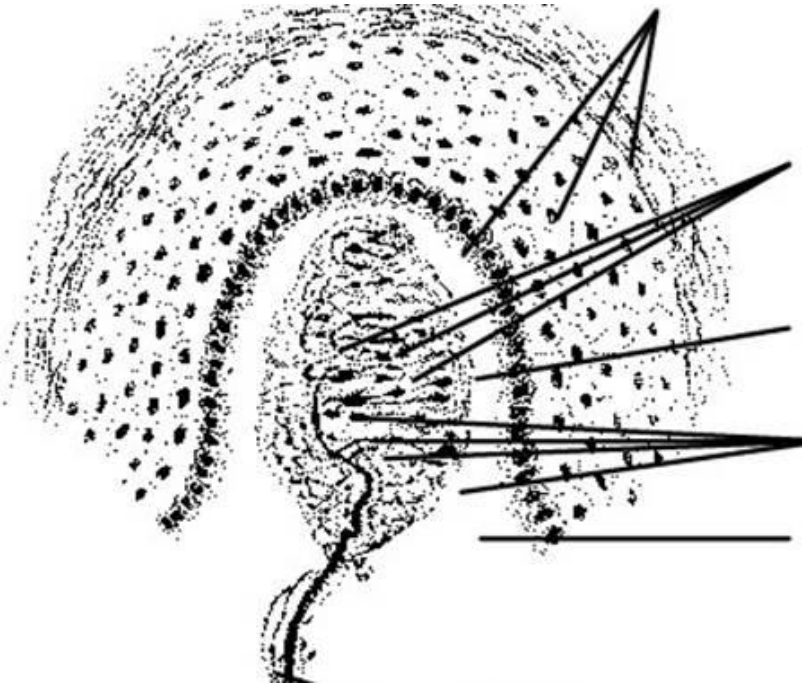
Nerve endings

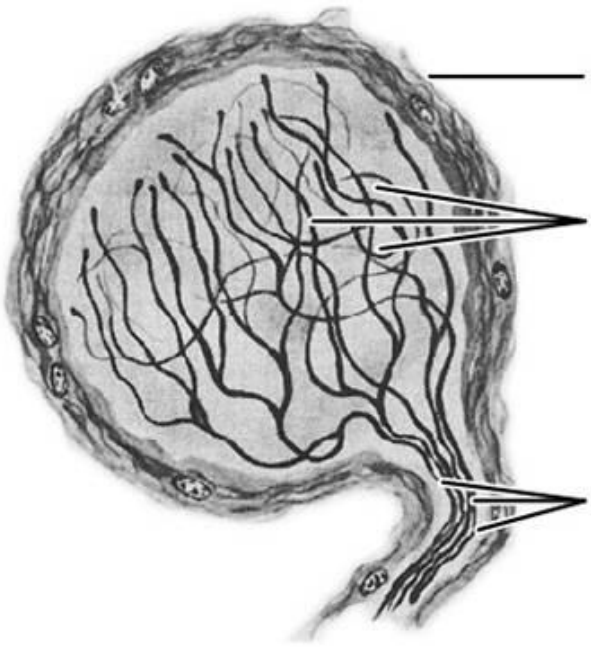




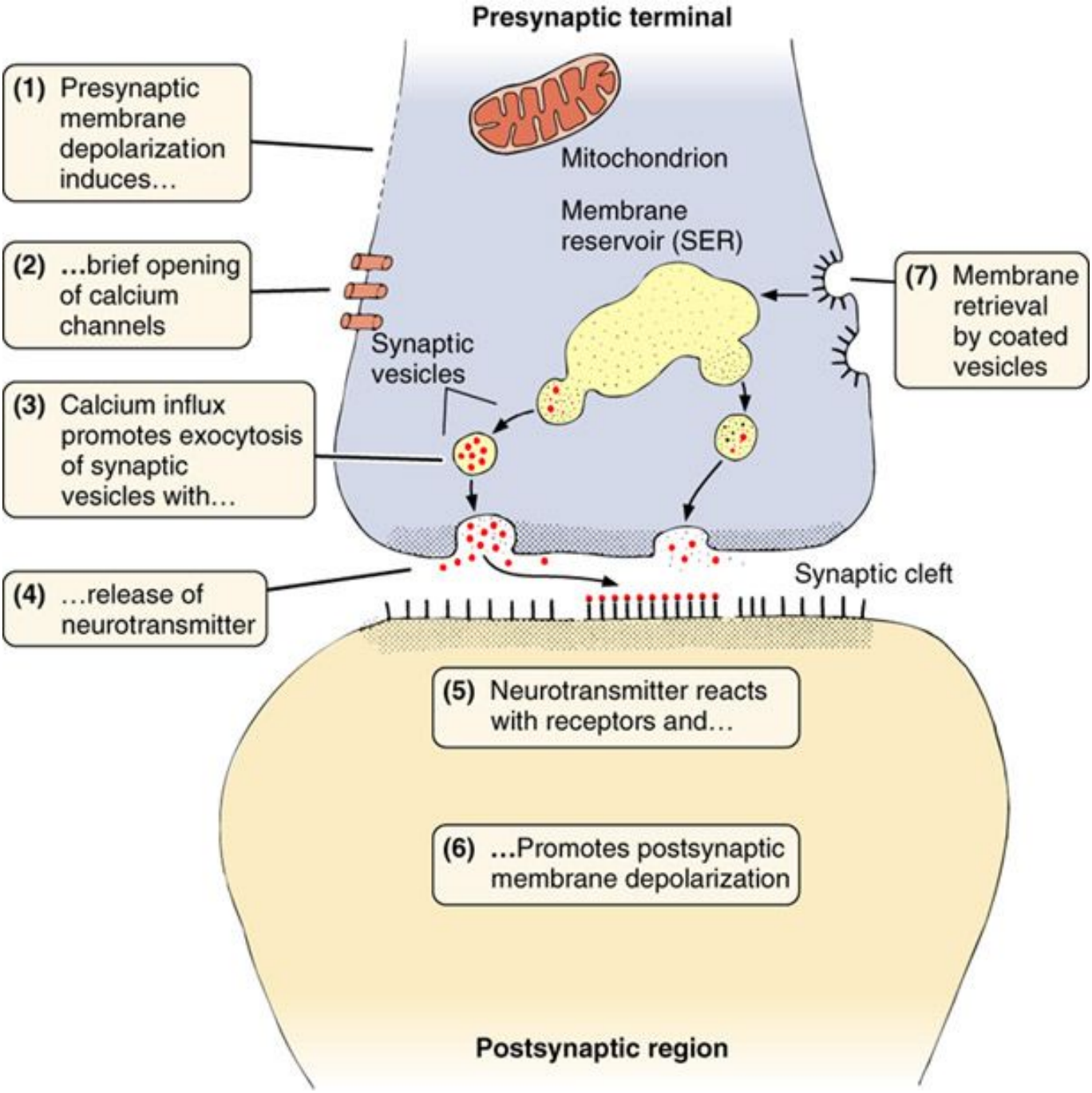
Nerve endings







SYNAPSES


Presynaptic terminal
(1) Presynaptic membrane depolarization induces…
Mitochondrion
Membrane reservoir (SER)
(2) …brief opening of calcium channels
(7) Membrane retrieval by coated vesicles
Synaptic vesicles
(3) Calcium influx promotes exocytosis of synaptic vesicles with…
(4) …release of neurotransmitter
Synaptic cleft
(5) Neurotransmitter reacts with receptors and…
(6) …Promotes postsynaptic membrane depolarization
Postsynaptic region

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