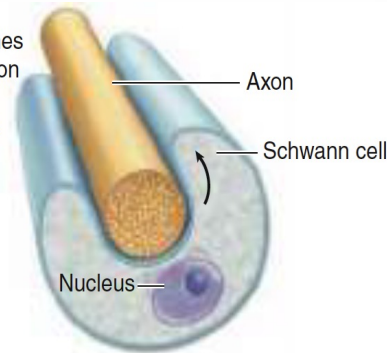


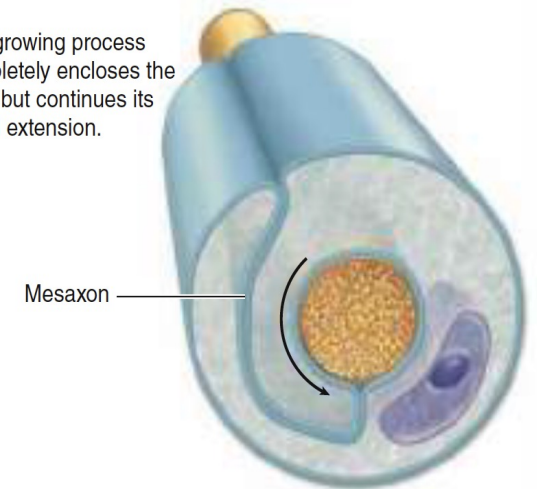
..PERIPHERAL NERVOUS TISSUE/NERVES

- The main components:
- Nerves, ganglia, and nerve endings.
- Nerves are bundles of nerve fibers (axons) surrounded by schwann cells (neurolemmocytes) and layers of connective tissue.
- Mesaxon: plasma membrane of each covering schwann cell fuses with itself

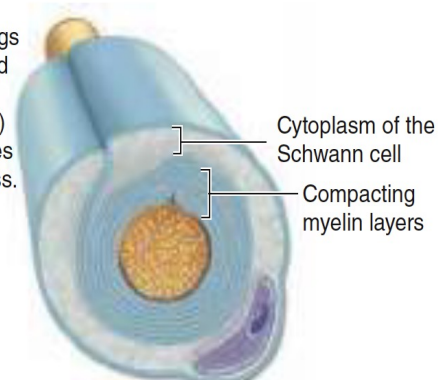
① Schwann cell becomes aligned along the axon and extends a wide cytoplasmic process to encircle it.



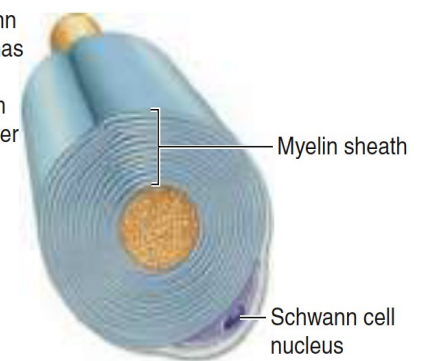
② The growing process completely encloses the axon but continues its spiral extension.



③ The spiral wrappings become compacted layers of cell membrane (myelin) as cytoplasm leaves the growing process.



④ The mature Schwann cell myelin sheath has up to 100 lamellae, with most cytoplasm in the outermost layer with the cell body.



MYELIN SHEATH

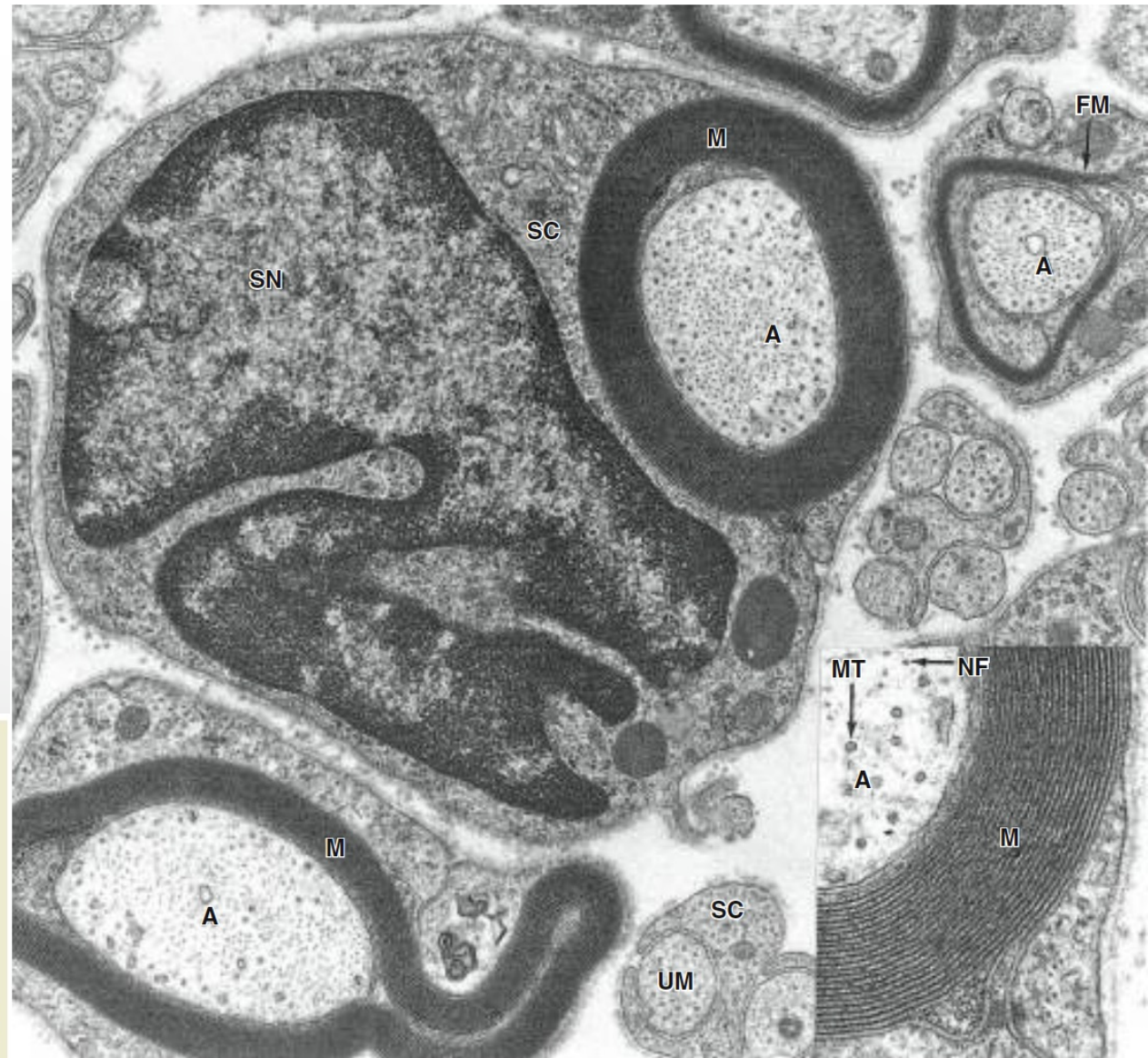
- Membranes of schwann cells have a higher proportion of lipids than do other cell membranes

Cross section of PNS fibers in the TEM reveals differences between myelinated and unmyelinated axons. Large axons (A) are wrapped in a thick myelin sheath (M) of multiple layers of Schwann cell membrane.

The inset shows a portion of myelin at higher magnification in which the major dense lines of individual membrane layers can be distinguished, as well as the neurofilaments (NF) and microtubules (MT) in the axoplasm (A). At the center of the photo is a Schwann cell showing its active nucleus (SN) and Golgi-rich cytoplasm (SC). At the right is an axon around which myelin is still forming (FM).

Unmyelinated axons (UM) are much smaller in diameter, and many such fibers may be engulfed by a single Schwann cell (SC). The glial cell does not form myelin wrappings around such small axons but simply encloses them. Whether it forms myelin or not, each Schwann cell is surrounded, as shown, by an external lamina containing type IV collagen and laminin like the basal laminae of epithelial cells. (X28,000, inset X70,000)

(Used with permission from Dr Mary Bartlett Bunge, The Miami Project to Cure Paralysis, University of Miami Miller School of Medicine, Miami, FL.)

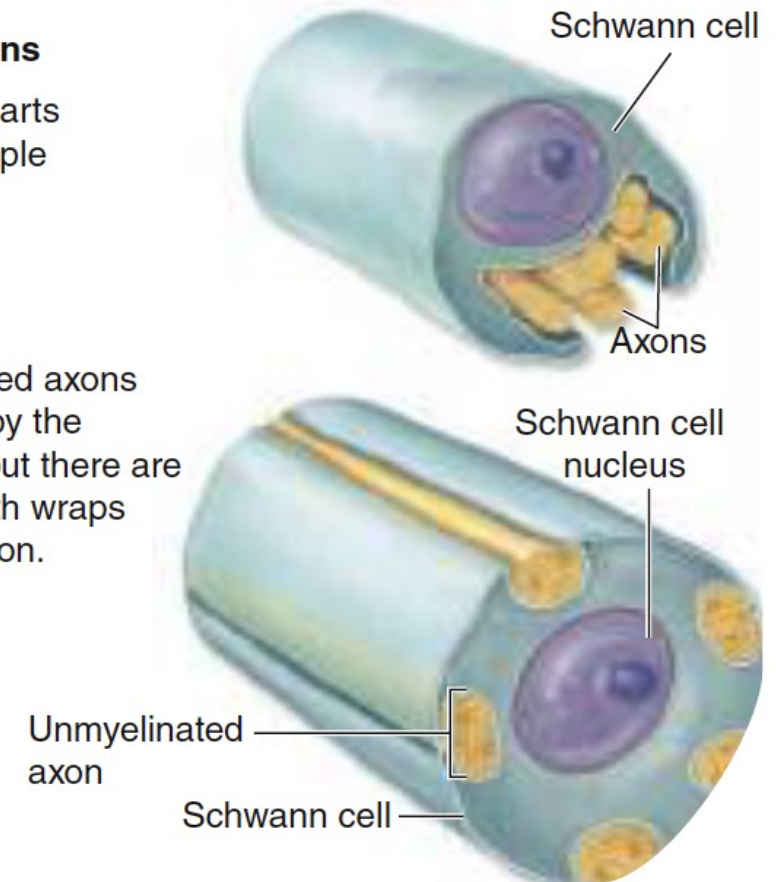


UNMYELINATED AXONS

- Many axons in one schwann cell.
- Slow

Unmyelinated axons

- ① Schwann cell starts to envelop multiple axons.
- ② The unmyelinated axons are enveloped by the Schwann cell, but there are *no* myelin sheath wraps around each axon.

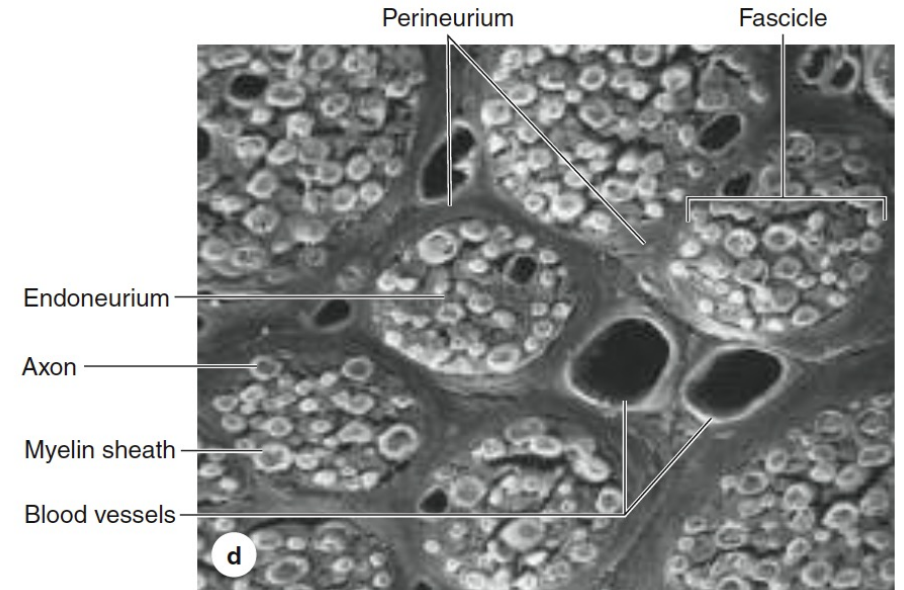
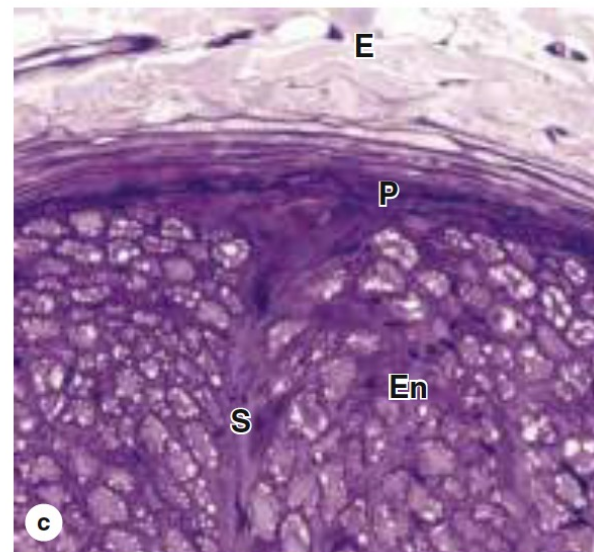
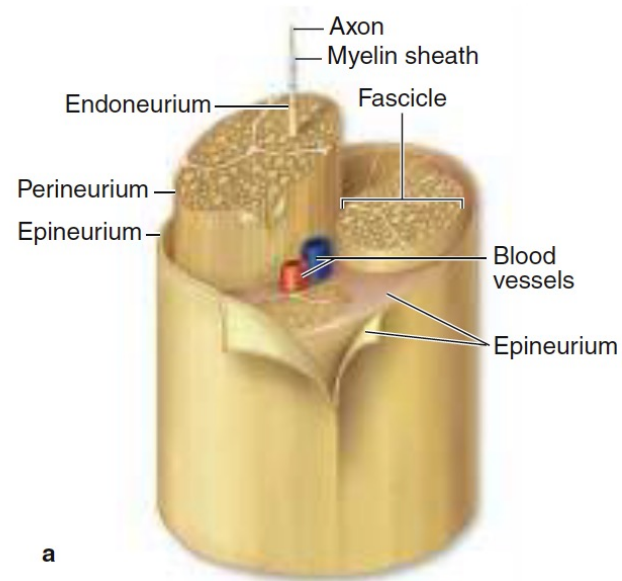


NERVE ORGANIZATION

- Nerves have a whitish, glistening appearance ---myelin and collagen.
- Endoneurium: immediately around the external lamina of the schwann cells, consisting of reticular fibers, scattered fibroblasts, and capillaries.
- Perineurium: surrounds groups of axons with schwann cells and endoneurium--- fascicles-- containing flat fibrocytes with their edges sealed together by tight junctions
- Epineurium: irregular fibrous coat extends deeply to fill the space between fascicles



NERVES

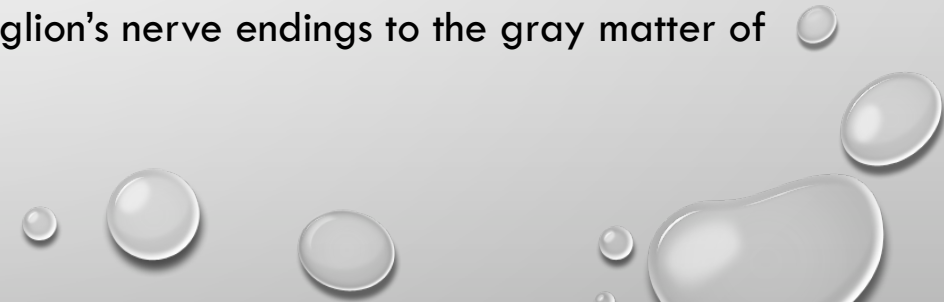




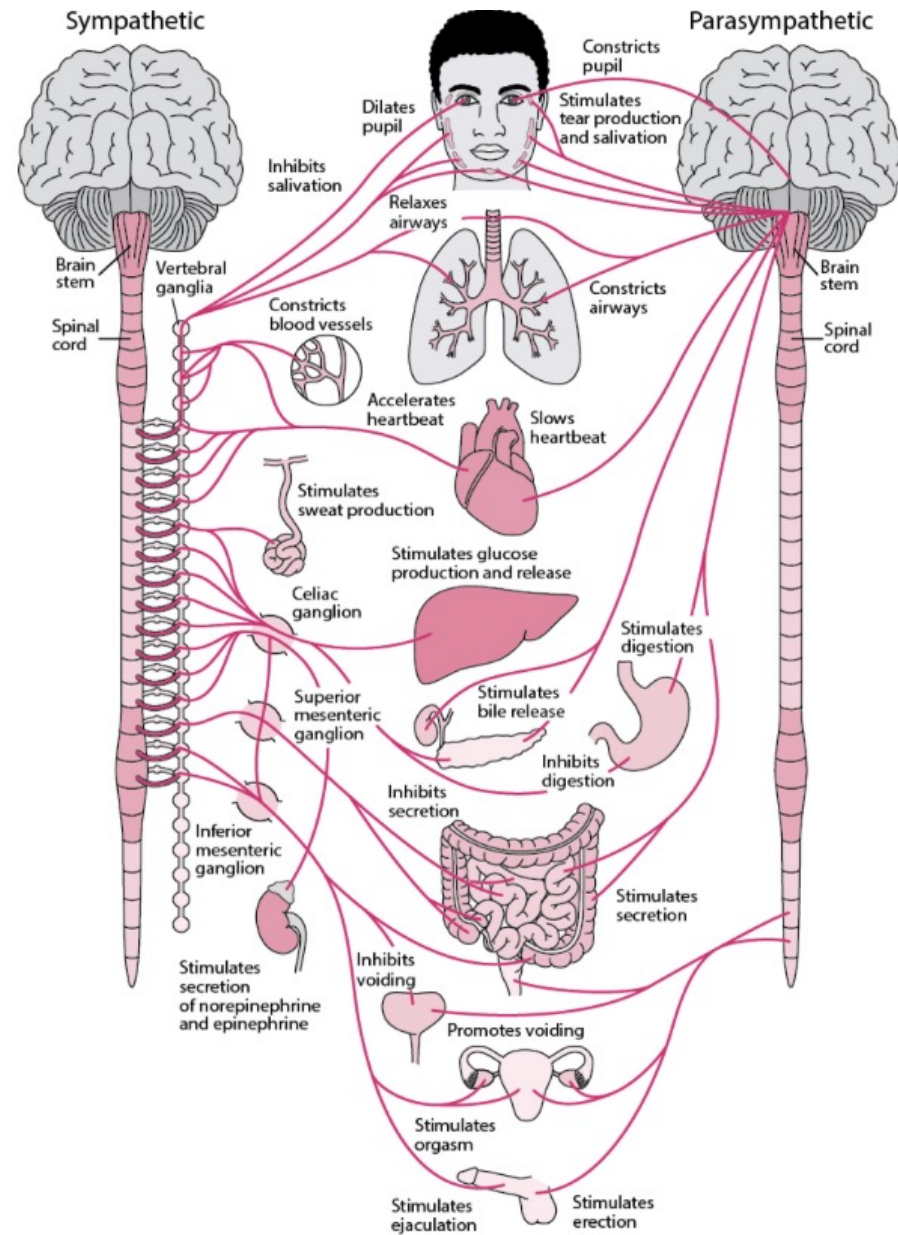
GNGLIA

- Ovoid structures containing neuronal cell bodies and their surrounding glial satellite cells supported by delicate connective tissue and surrounded by a denser capsule.

Sensory ganglia

- Sensory ganglia receive afferent impulses that go to the CNS.
 - Sensory ganglia are associated with both cranial nerves (cranial ganglia) and the dorsal roots of the spinal nerves (spinal ganglia).
 - Are pseudounipolar and relay information from the ganglion's nerve endings to the gray matter of the spinal cord via synapses with local neurons.
- 

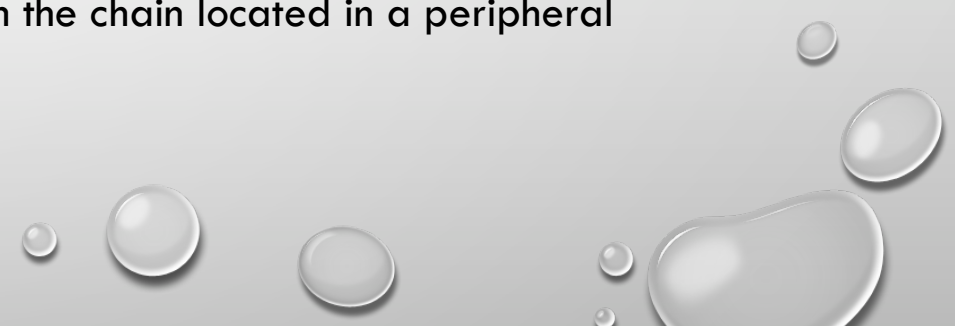
ANS



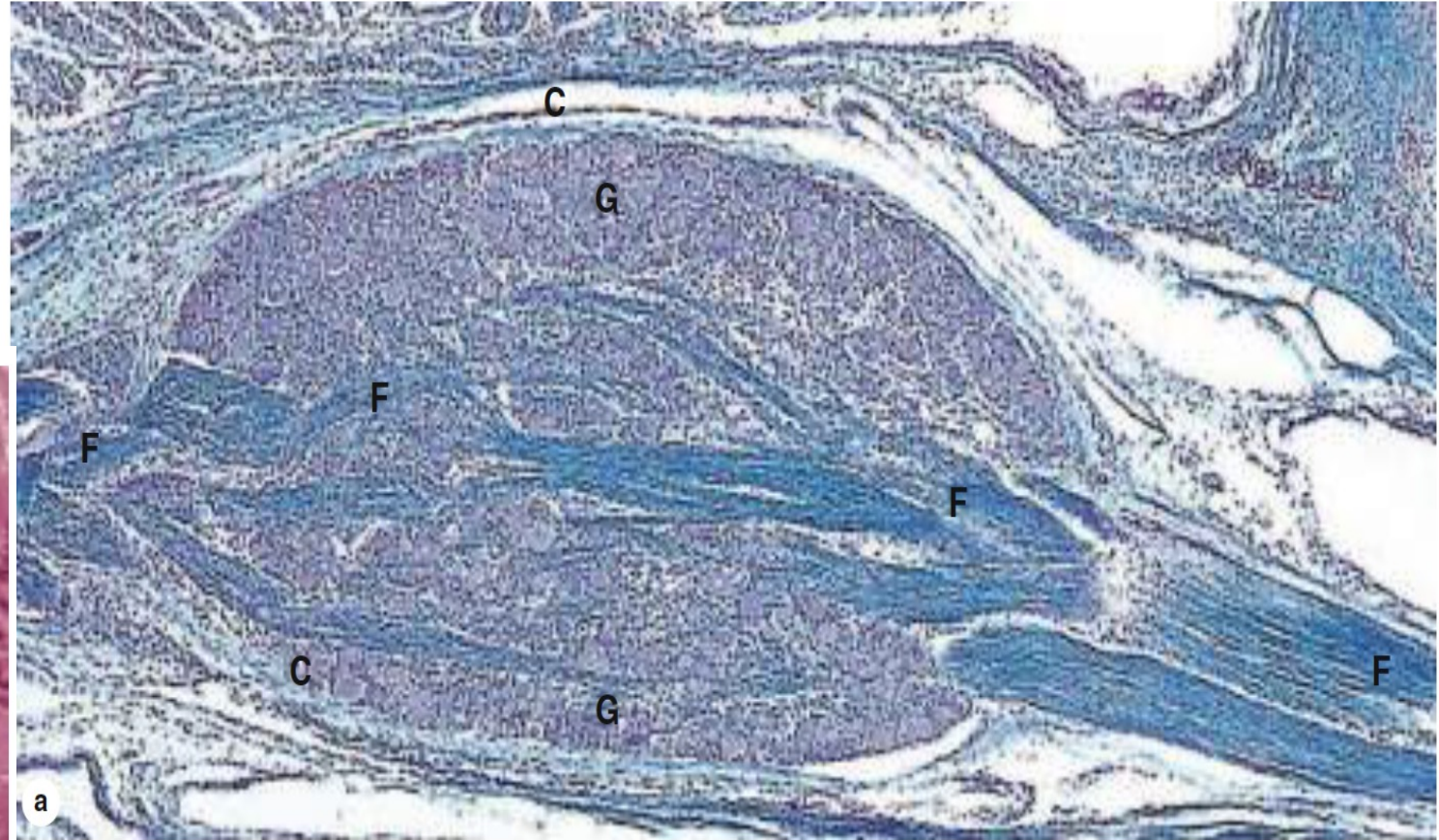
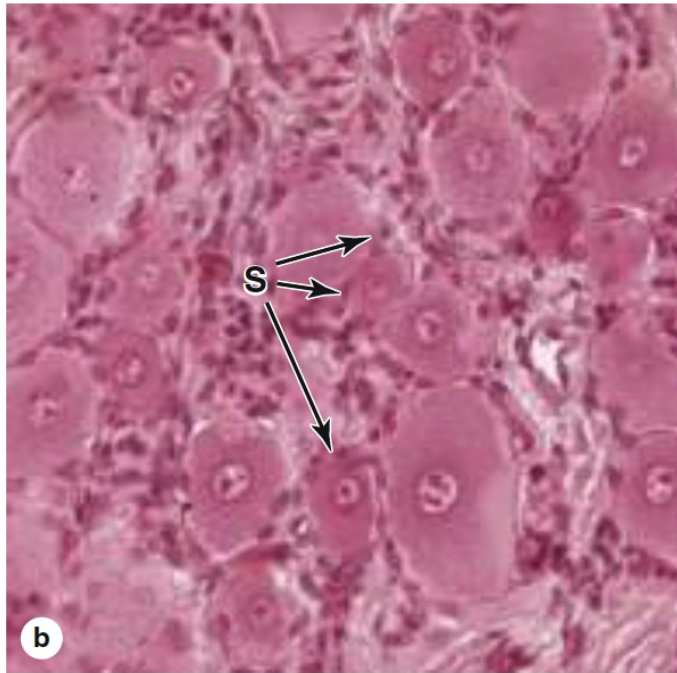


AUTONOMIC NS

Autonomic ganglia


- Small bulbous dilations in autonomic nerves, usually with multipolar neurons.
 - Some are located within certain organs, especially in the walls of the digestive tract --- intramural ganglia.
 - Autonomic nerves use two-neuron circuits.
 - The first neuron of the chain, with the **preganglionic** fiber, is located in the CNS--- synapse with **postganglionic** fibers of the second multipolar neuron in the chain located in a peripheral ganglion system.
- 

SENSORY G.





REGENERATION

- Neurotrophins: growth factors produced by both neurons and glial cells.
 - Stem cells.
 - Astrocytes.
 - Existing neurons.
 - Please study the corresponding material from the textbook
- 

NERVE REGNRATION

Please study the corresponding material from the textbook

