

PNS

Last updated: April 20, 2019

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ANATOMY

1. Blood vessels

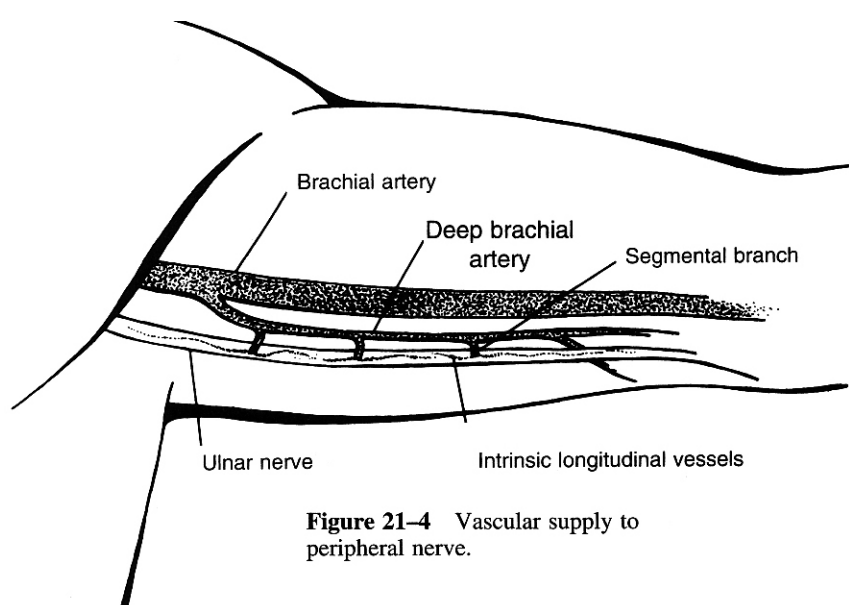
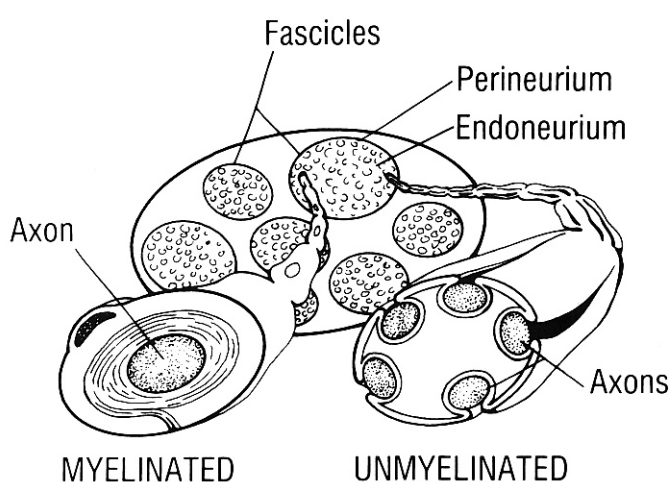


Figure 21-4 Vascular supply to peripheral nerve.

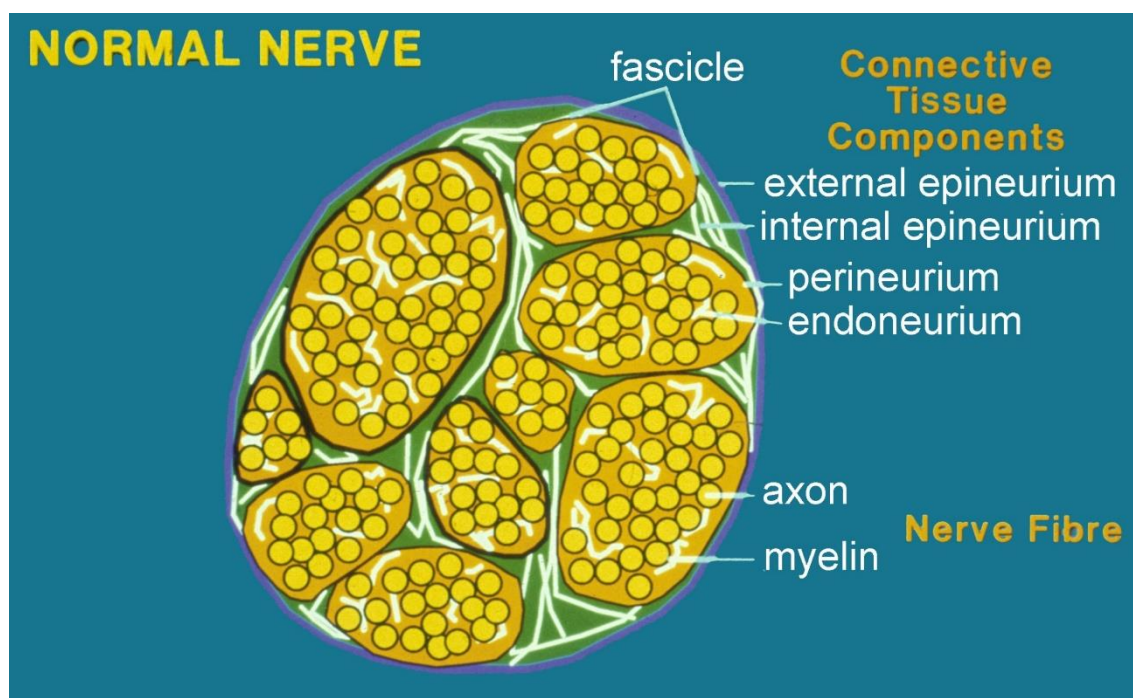
2. Three levels of connective tissue (within which fibers and vessels lie)

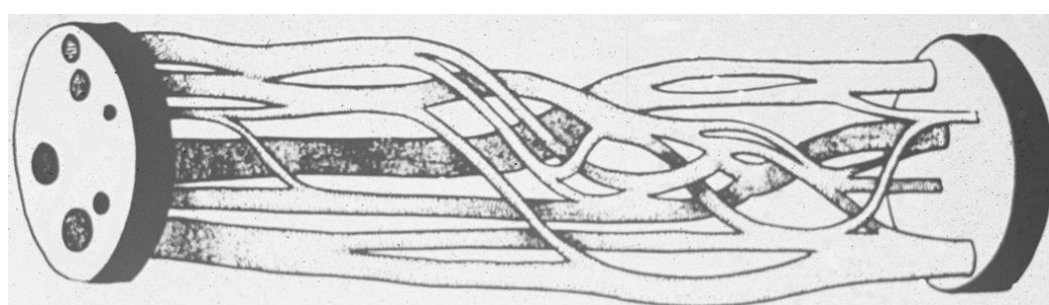
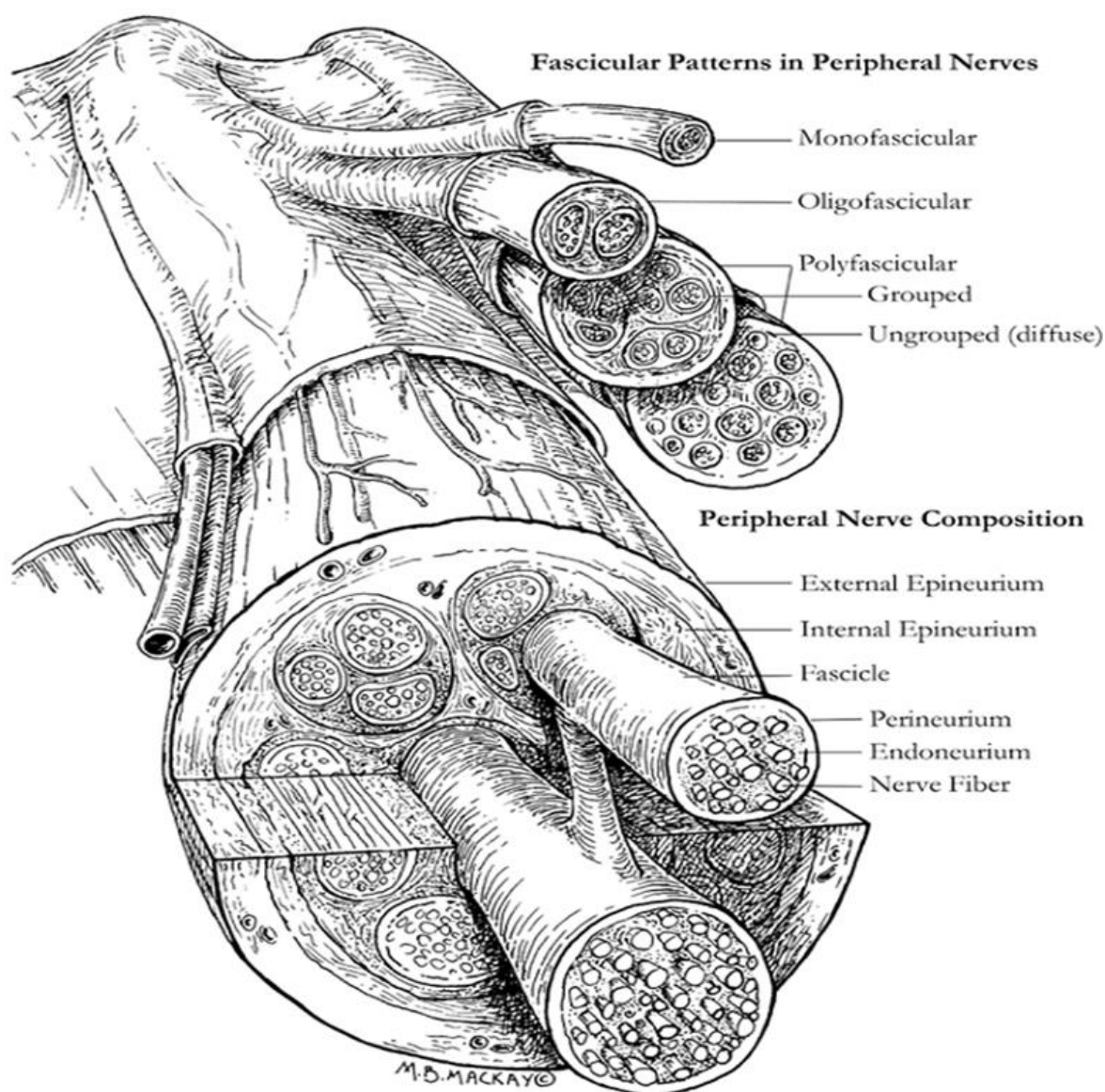
1. **EPINEURIUM**
 - 1) **EXTERNAL EPINEURIUM** – tough, surrounds periphery of nerve.
 - 2) **INTERNAL EPINEURIUM** – loose, occupies space between fascicles.
 - represents up to 50% of cross-sectional area of nerve trunk.
 - thicker where nerve crosses joint.
 - well-developed **vascular plexus** runs within epineurium.
2. **PERINEURIUM** – surrounds each fascicle.
 - thin, dense, multilayered connective tissue.
 - **blood-nerve barrier**: tight basement membranes within perineurium protect endoneurial space.
 - tensile strength of perineurium maintains intrafascicular pressures.
 - **vascular structures** traverse perineurium obliquely to enter endoneurial space.
3. **ENDONEURIUM** – surrounds individual myelinated nerve fiber or group of unmyelinated nerve fibers.
 - delicate collagenous matrix with fibroblasts, mast cells, and **capillary network**



3. Nerve fibers

- all axons are bundled together into **FASCICLES**:
 - fascicles are located within **internal epineurium**.
 - bounded by **perineurium**.
- fascicles are often grouped together into **GROUPED FASCICLES**.
 - can be easily divided along internal epineurial planes.
 - major peripheral nerves contain many grouped fascicles.
 - there is constant **redistribution of fascicle organization along peripheral nerve** (*interfascicular* plexuses allow for interconnections).
- fascicles are more numerous and smaller where nerve crosses joint.
 - smaller fascicles and more internal epineurium between them allows for increased protection of nerve fibers.

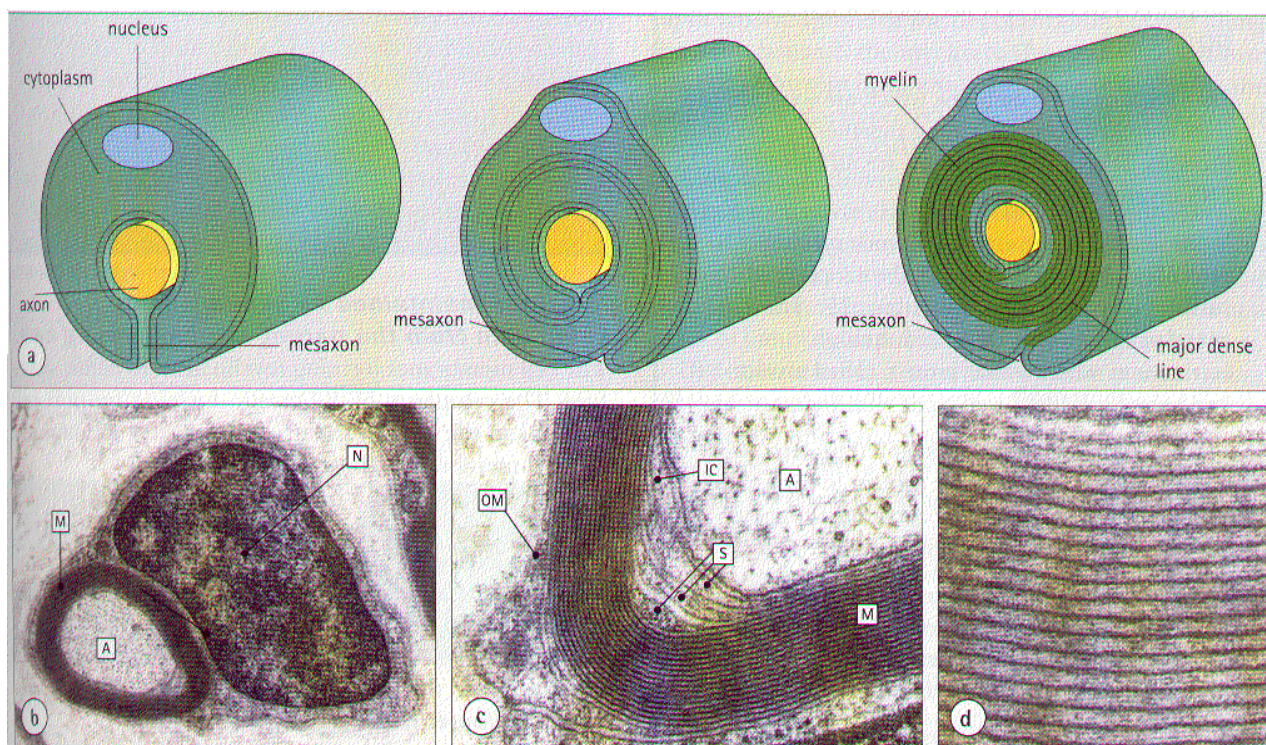




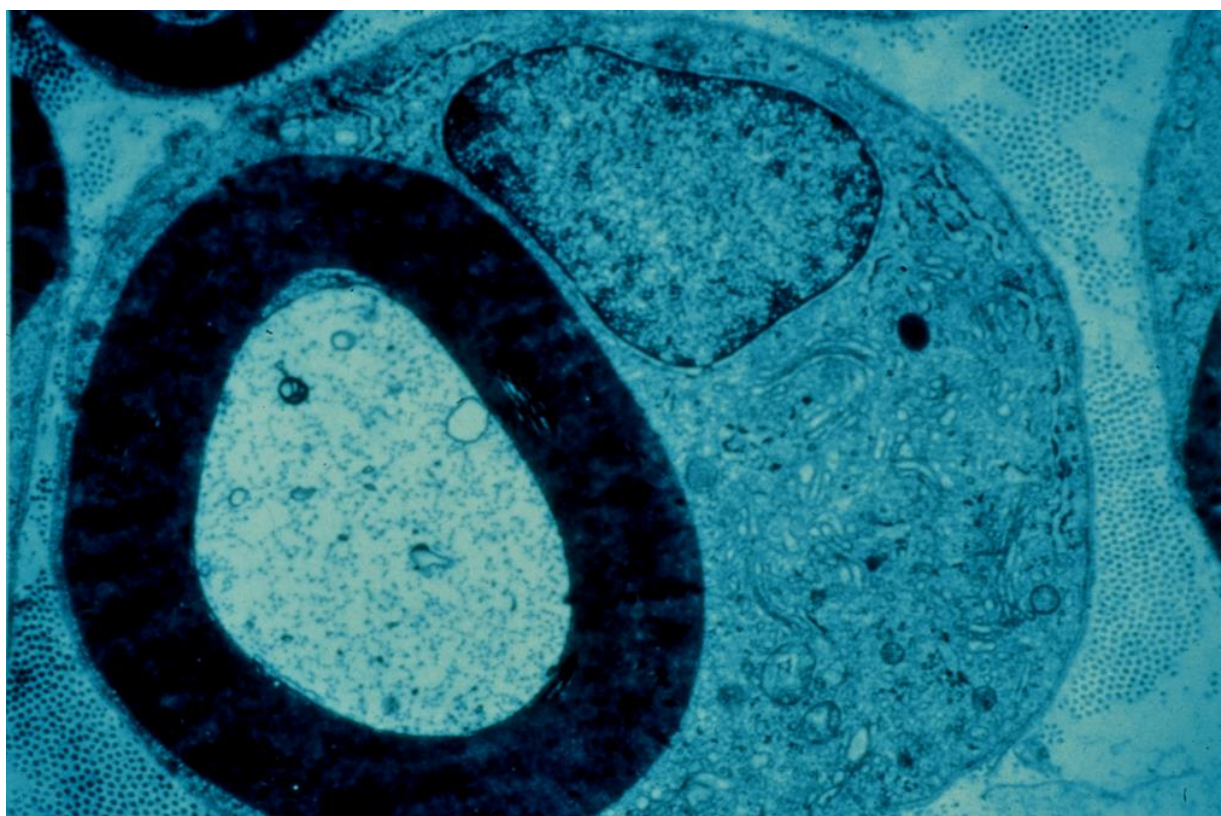
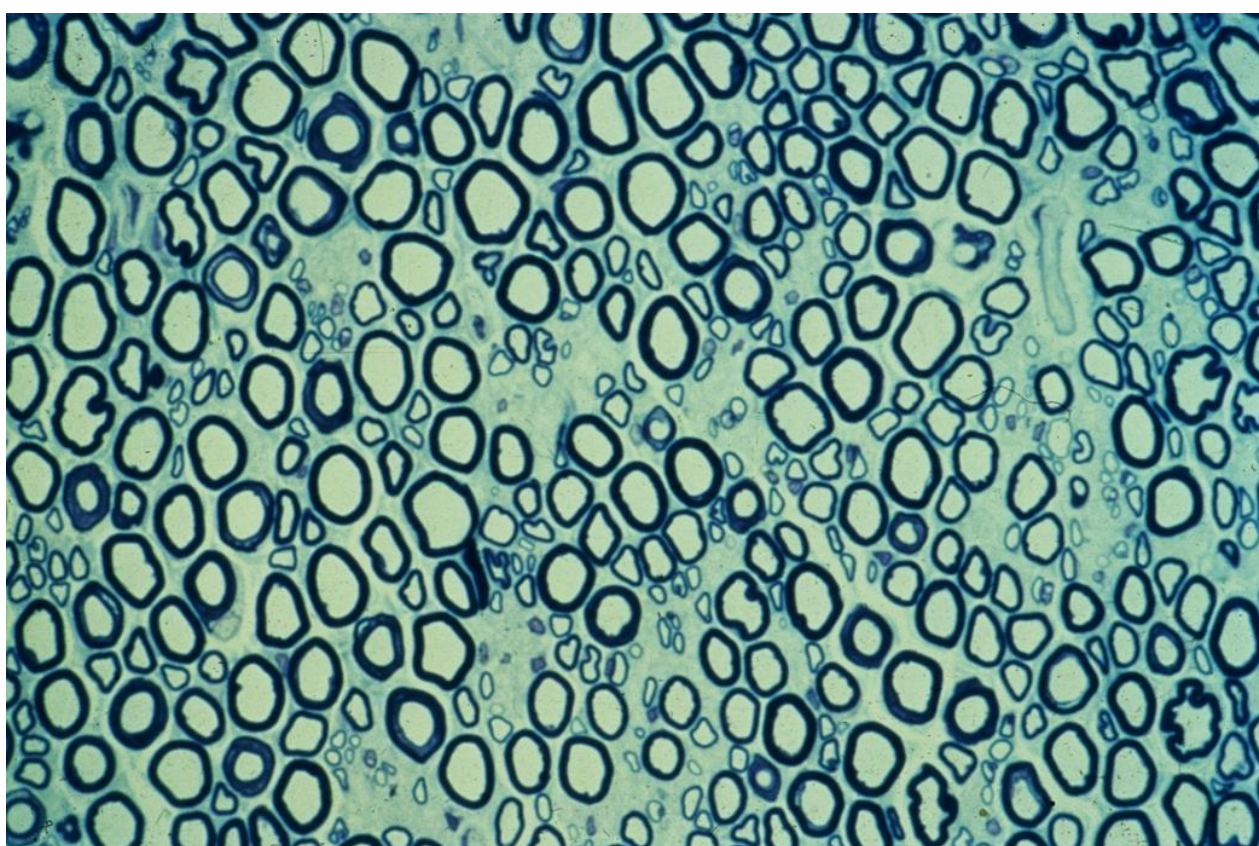
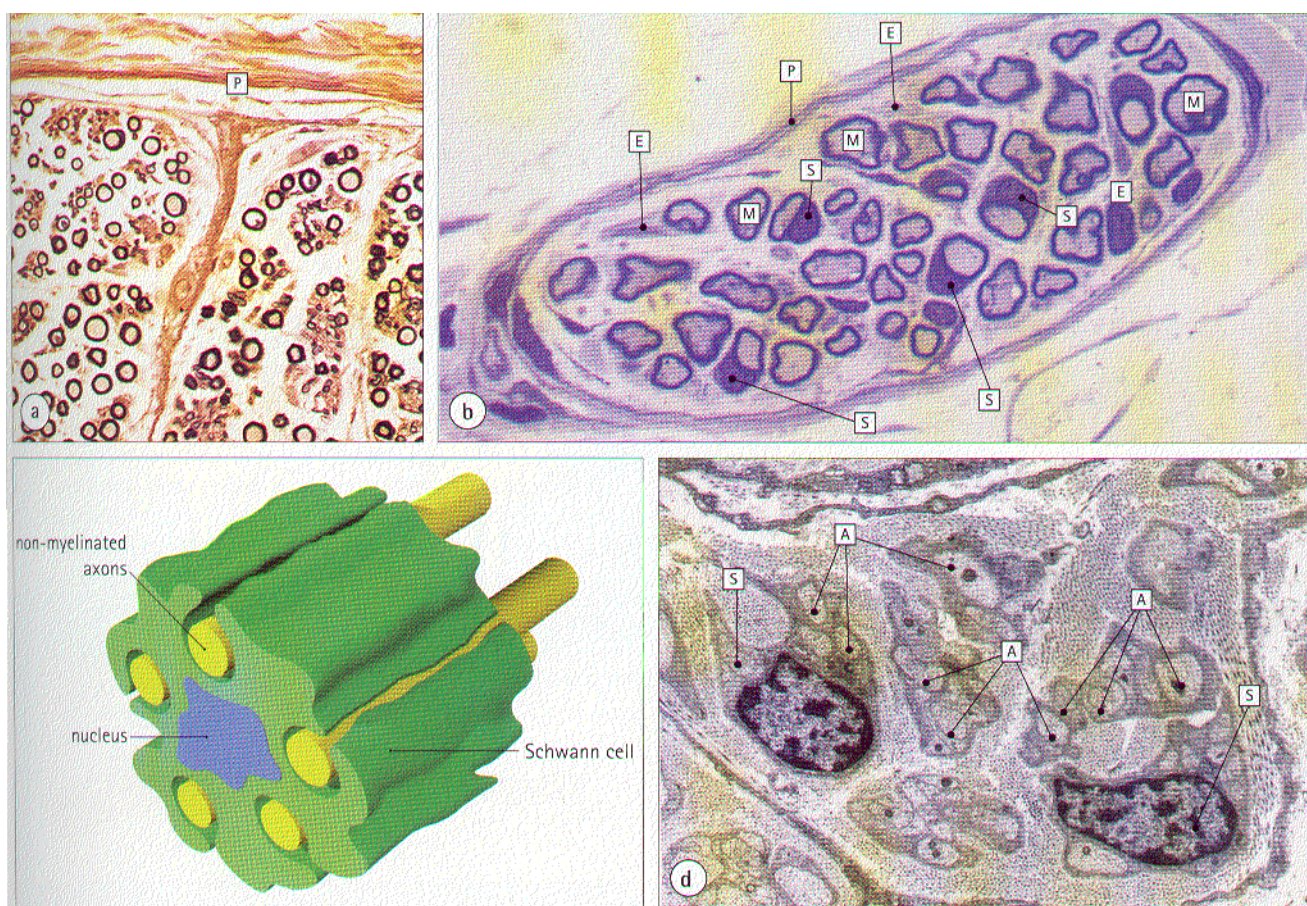
HISTOLOGY

- up to 500 Schwann cells may myelinate single axon.
- peripheral nerves contain both *myelinated* and *unmyelinated* fibers (in average 4:1) traveling within each fascicle.

Myelination process:



Unmyelinated fibers:



PHYSIOLOGY

AXOPLASMIC TRANSPORT

- multiple transport mechanisms:

1. **ANTEROGRADE** transport:
 - 1) **fast**
 - 2) **slow** – speed is high but frequent prolonged stops (average speed is slow)
 - all cellular *proteins* and *neurotransmitters* are produced in cell body; cell body may be at significant distance from terminal axon.
2. **RETROGRADE fast** transport (removes *breakdown products* from distal axon back to cell body).

BIBLIOGRAPHY for ch. "PNS" → follow this [LINK](#) >>