

Non myelinated - easier to damage, less regrowth - Permanent
(Grey)

Myelinated - tougher to tear regrow better b/c myelin tube leads back to connection
(White)

VII. Nervous System

A. Intro

1. EQ - What general functions are done by your nervous system?

- transport stimuli from internal & external environment
- response to stimuli
- control body func.
- process and store info

2. EQ - What are the 3 different ways we describe the parts of your nervous system?

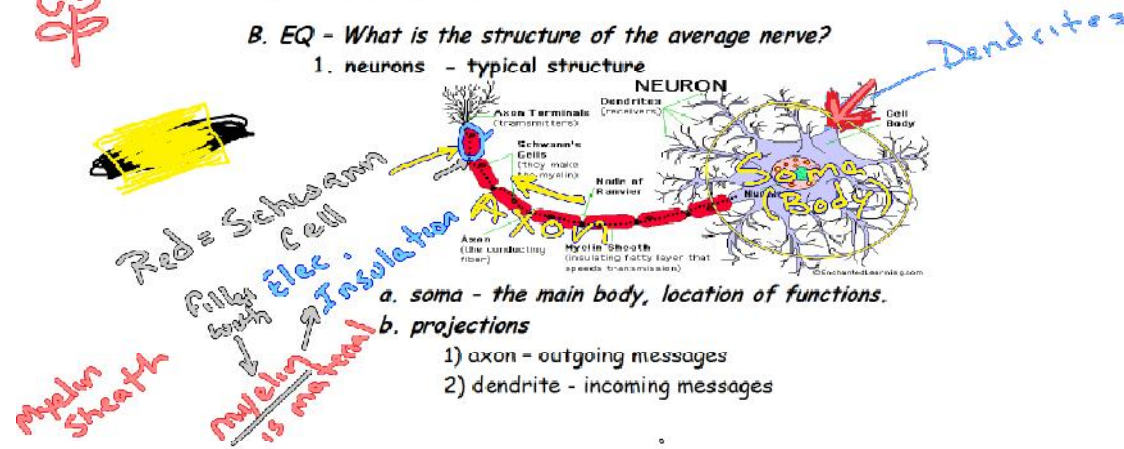
- Anatomical**
 - central - Brain & Spinal Cord
 - peripheral - "nerves" in the extremities
- physiological**
 - sensory - incoming information
 - motor - outgoing information
 - autonomic - bodily functions
- Level of func**
 - Spinal cord - reflex
 - Lower brain - invol. Func., balance, basic drives
 - Higher brain - vol. Func., think, interpret senses, memory

† Explain how categorizing the brain into anatomical divisions is different from categorizing it by physiological divisions.



B. EQ - What is the structure of the average nerve?

1. neurons - typical structure



a. soma - the main body, location of functions.

b. projections

- axon - outgoing messages
- dendrite - incoming messages

✦ Compare a neuron to a webcam you use to have a video chat with someone on the internet. What parts of the computer equipment involved perform similar functions to the parts of a neuron? Explain.

(non-myelinated) (Grey Matter = w/o myelin) → **Processes** (Think, memory, actions)
 White Matter (myelinated) w/ myelin → **Long distance wires**

c. myelin - protein

- 1) Structure - in Schwann cell wrapped around axon.
- 2) Function - electrical insulation

20-30%

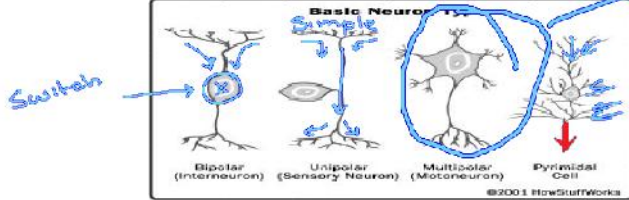
✦ What function does myelin perform, what type of nervous tissue contains myelin and where do you primarily find that type of nervous tissue?

d. EQ - What determines if nerve damage is permanent?

- 1) none- if soma is damaged
- 2) slow-if axon is damaged
Axon dies, the Schwann cells degenerate but the neurilemma remains as a tube leading to the original site of attachment.

✦ Discuss the relationship between the presence of a neurilemma and nerve repair

2. EQ - How does the design of nerve cells give them different ways of processing nerve messages?



- Bipolar (if-then)- connects two neurons or two small groups of neurons. Functions like a switch or trigger. (Withdrawal reflex)**
- Unipolar (ditto)- nerve endings in sensory organs**
- Multipolar (listen up)- sends one message to many recipients (motor unit)**
- Pyramidal (in summary)- connects a large number of neurons and combines their collective inputs into one output.**

✦ What is the difference in function between a unipolar neuron and a pyramidal cell?

3. Nerve

a. neurons, connective, blood

b. all located in peripheral ns

c. Categories of spinal nerve fibers (note that cranial are separate)

- 1) somatic efferent - motor impulses to muscle
- 2) visceral efferent - motor imp. To int organs
- 3) somatic afferent - senses from skin and muscle
- 4) visceral afferent - senses from int organs

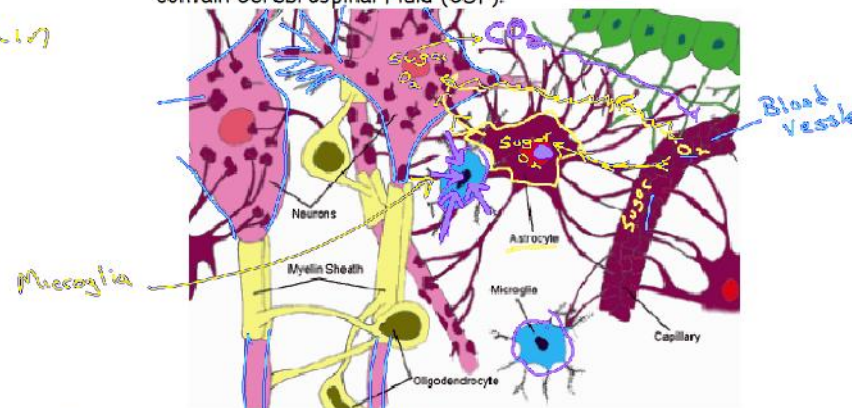
4. Neuroglia - "nerve glue"

a. Cells of various shapes found within the nervous system. They are not neurons themselves

b. Types

- 1) Astrocytes - support & nourishment
- 2) Oligodendrocytes - form myelin within the brain for electrical insulation
- 3) Microglia - remove bacteria and cellular debris, especially after brain trauma. *absorb waste*
- 4) Ependyma - line ventricles and spinal canal to contain Cerebrospinal Fluid (CSF).

Blood/Brain Barrier



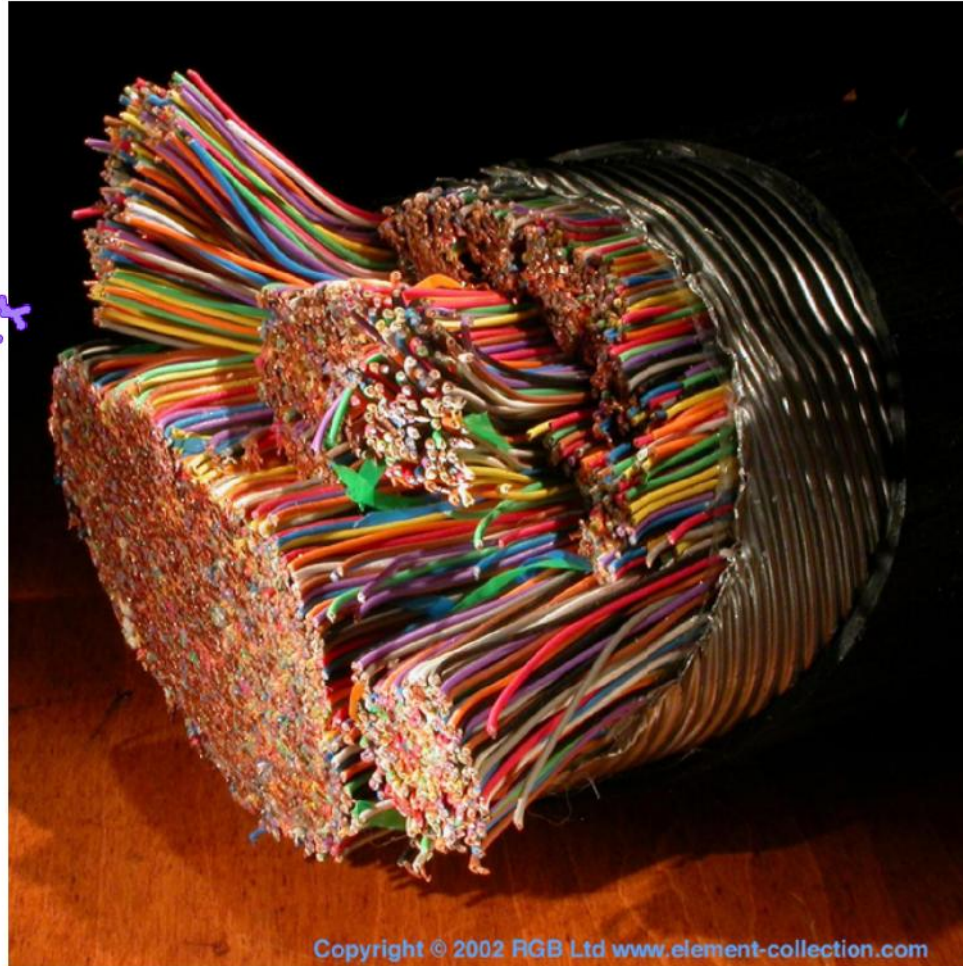
✦ What is the difference between neurons and neuroglia?

✦ Explain the difference between the role of an astrocyte and the role of a microglial cell.

Myelin

- Elec. insulation

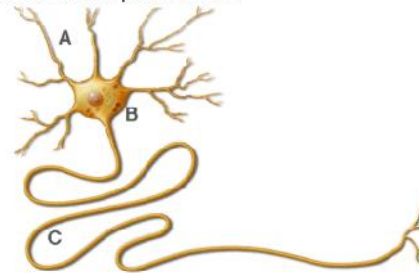
- If missing
messages
won't get
to the correct
destination



AIP Nervous 1: Anatomy Review (Neurons)

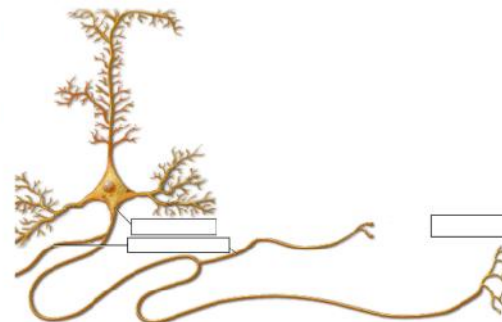
1. (Page 3.) Give two reasons why neurons can communicate.
2. (Page 3.) What do neurons communicate with?
3. (Page 4.) What three characteristic structural features do all neurons have?

4. (Page 5.) How many dendrites and axons there on a multipolar neuron?
5. (Page 5.) Label the dendrites, cell bodies, and axons of this neuron:



6. (Page 5.) Tell if the following are characteristic of dendrites, cell bodies, and/or axons:
 - a. Receptive and integrative region of the neuron.
 - b. Receives signals from other cells and sends them toward the axon.
 - c. Sum up, or integrate, the incoming signals.
 - d. generates an action potential
 - e. The main nutritional and metabolic region of the neuron.
 - f. The transmitting or conductive region of the neuron.
7. (Page 6.) What are outgoing signals on neurons called?
8. (Page 6.) On what part of the neuron are action potentials conducted? In which direction do they go?
9. (Page 6.) How are action potentials generated?

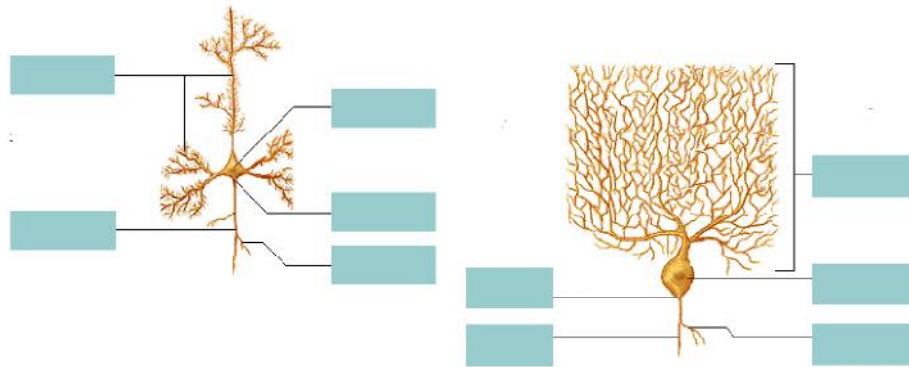
10. (Page 7.) What are the junctions between neurons called?
11. (Page 8.) What is the relationship between the length of an axon and the size of its cell body?
12. (Page 9.) Label the diagram on p. 9.



13. (Page 9.) What terms are used for the following?
- The region of the cell body that the axon arises from.
 - Branches of axons.
 - Profuse branches at the end of axons.

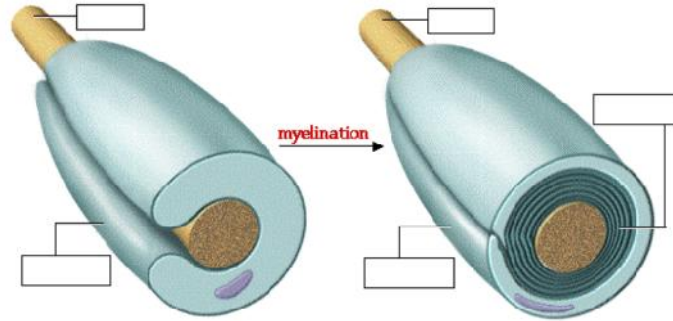
14. (Page 9.) Describe where action potentials are generated and where they travel.

Click on the Quiz button and label the parts of each diagram. Fill them in below.



Click the Back To Topic Button to return to the tutorial.

19. (Page 10.) Label the diagram on page 10.



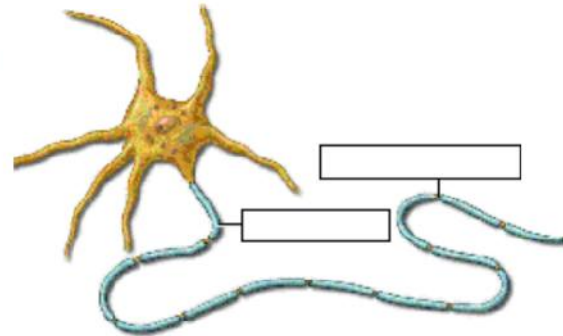
20. (Page 10.) What terms are used to describe the following:

- The insulating material that some axons are covered with.
- support cells in the peripheral nervous system which produce myelin.
- The process of the formation of the myelin sheath.

21. (Page 10.) What is the myelin sheath made of in the peripheral nervous system?

22. (Page 11.) Label the diagram on p. 11.

23. (Page 11.) What are the gaps in the myelin sheath called?





Grey (no myelin)

White (myelin)