

Nervous Tissue: Structure and Function

Nervous tissue is made up of two principal cell types:

1. Neurons

- Nerve cell
- Functions:
 - ✓ **Irritability: ability to respond to a stimulus**
 - ✓ **Conductivity: ability to transmit the impulse to other neurons, muscles, or glands**
- Do not divide

Nervous Tissue: Structure and Function

Nervous tissue is made up of two principal cell types:

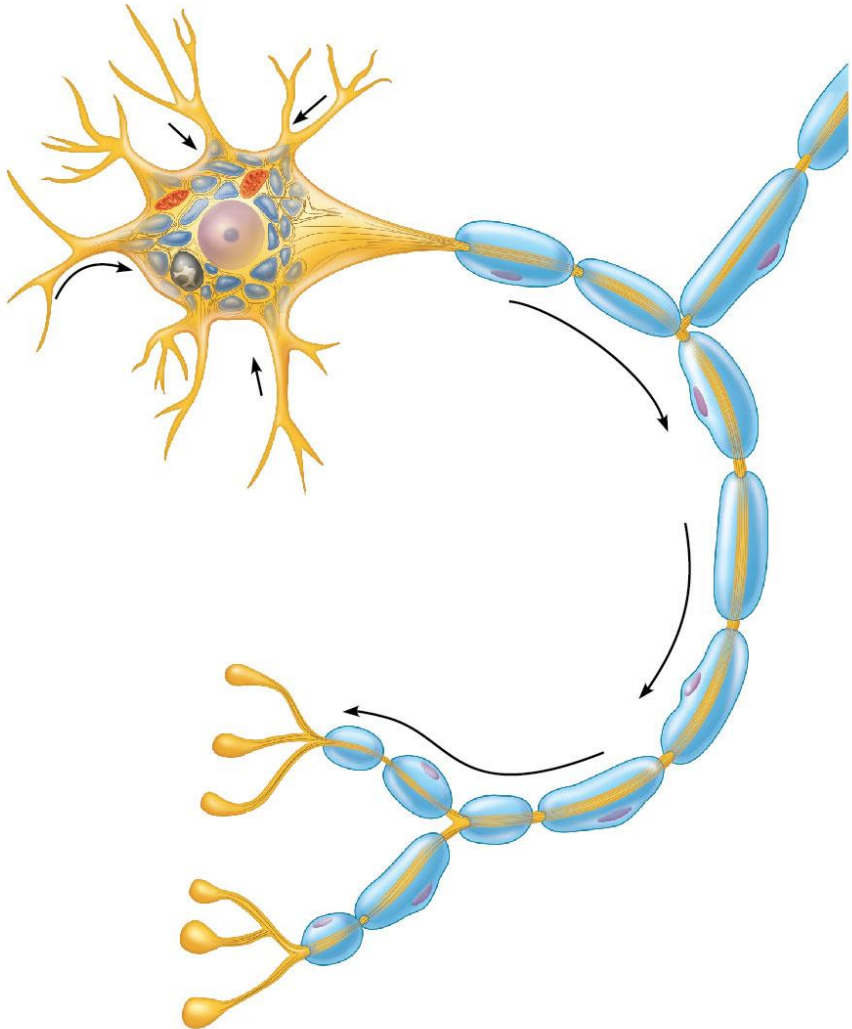
2. Neuroglia

- Supporting cell
- Functions:
 - ✓ **Protect, Support, Insulate neurons**
- Unable to conduct nerve impulses
- Never lose the ability to divide

Nervous Tissue: Neurons

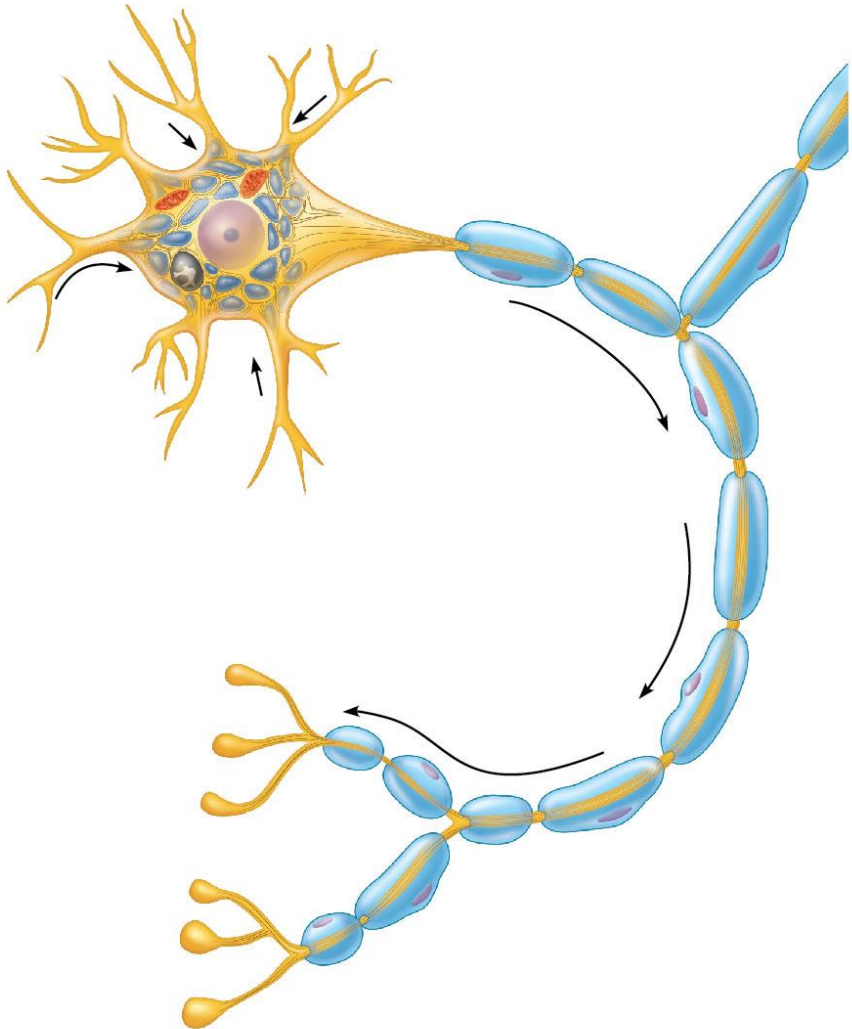
- Major regions of all neurons:
 - **Cell body**—nucleus and metabolic center of the cell
 - **Processes**—fibers that extend from the cell body
 - Two types of processes:
 1. **Dendrites**—conduct impulses toward the cell body
 2. **Axons**—conduct impulses away from the cell body

Label the Cell Body



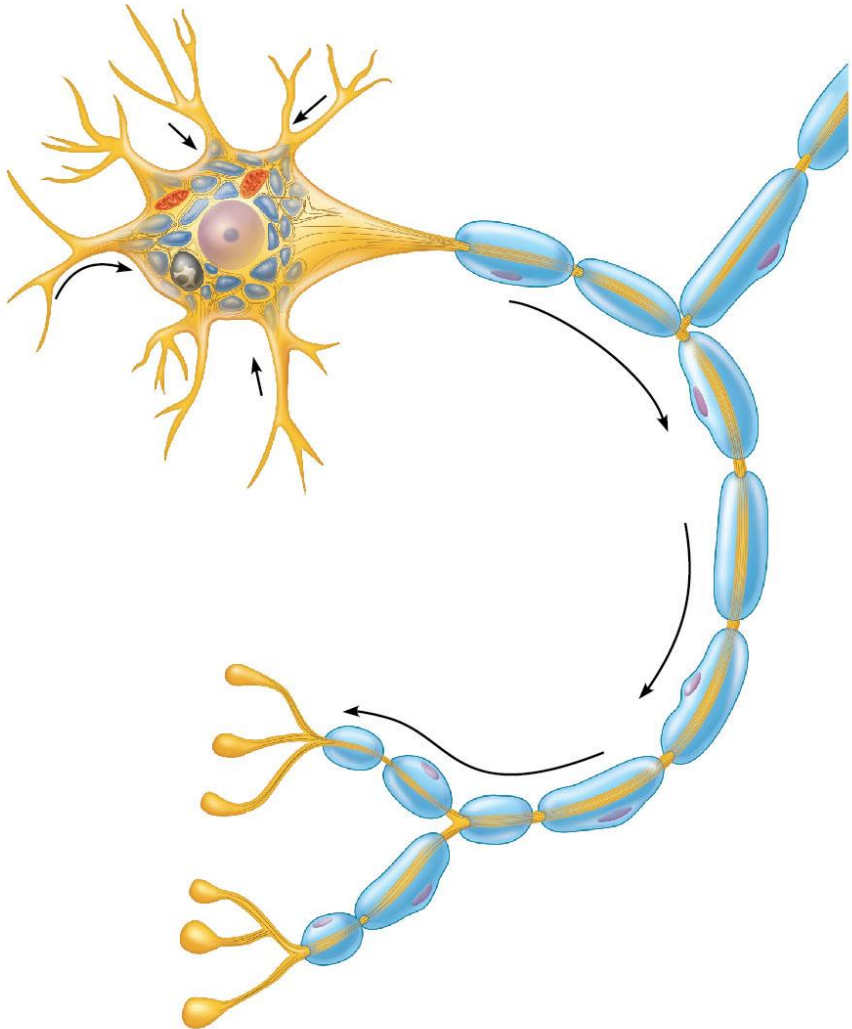
Students, draw anywhere on this slide!

Label the Dendrite

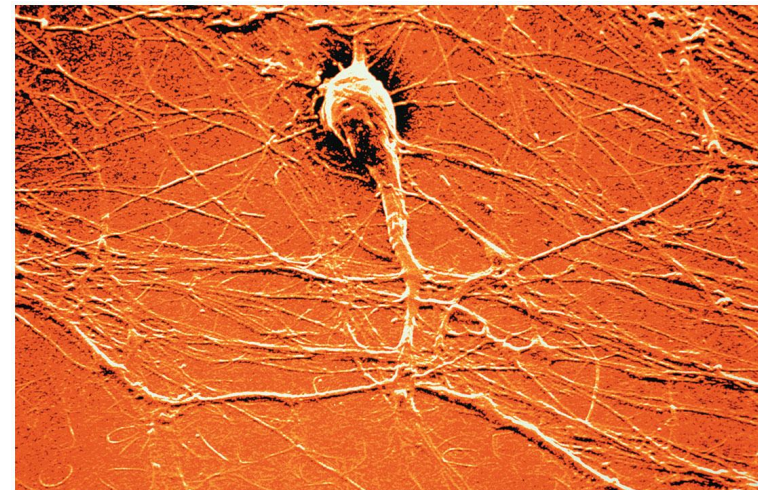
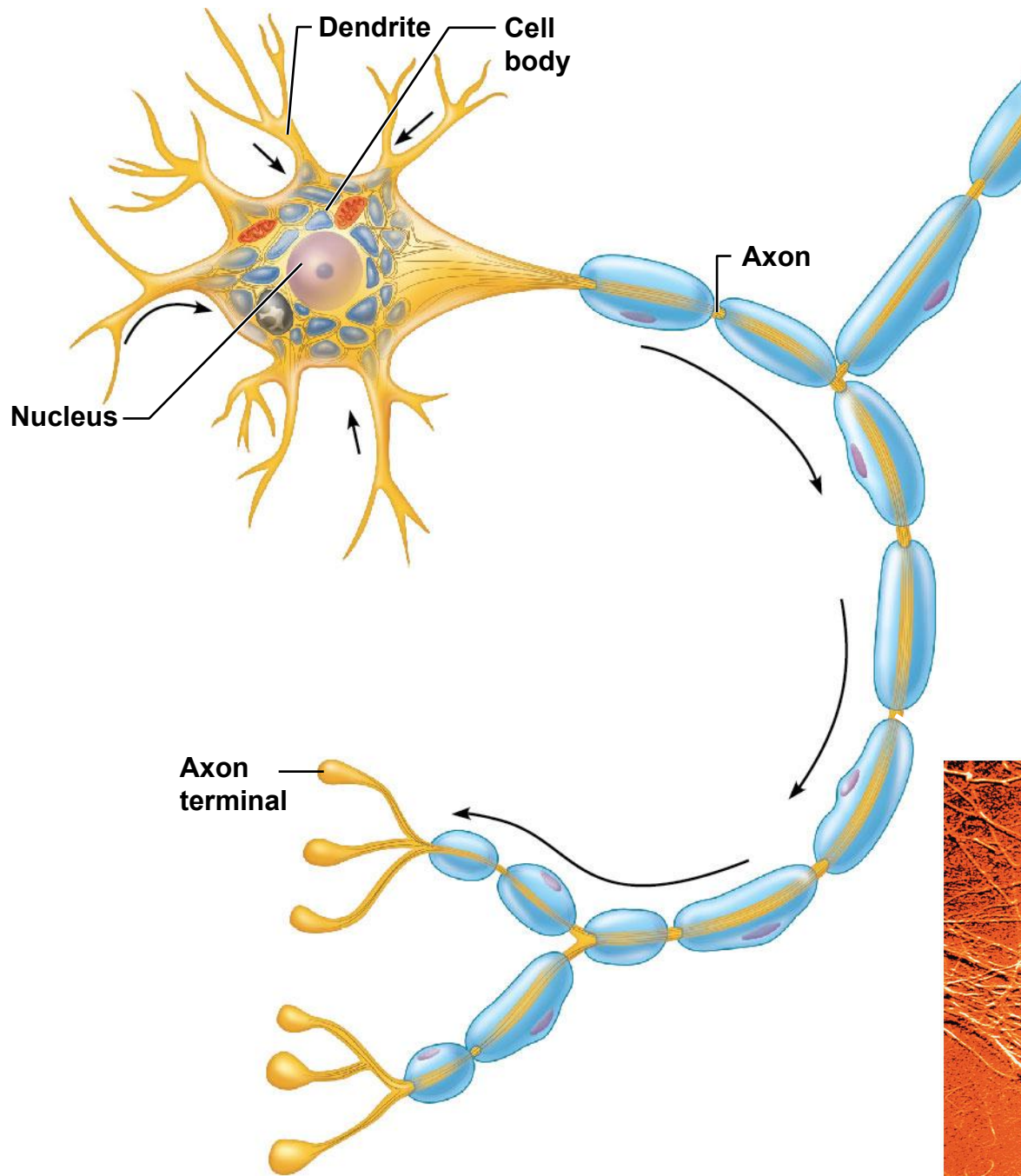


Students, draw anywhere on this slide!

Label the Axon



Students, draw anywhere on this slide!

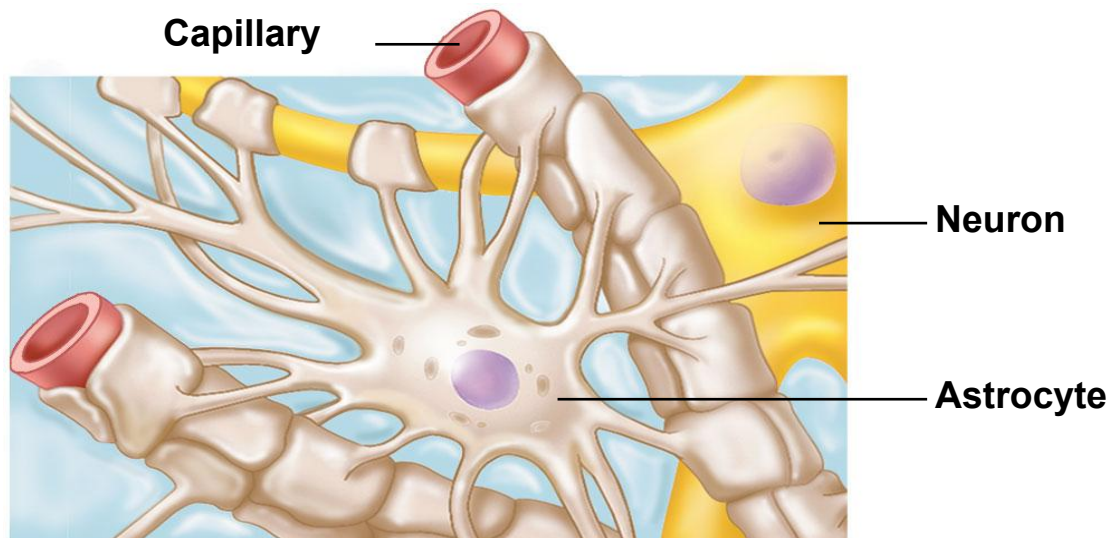


Nervous Tissue: Neuroglia

- There are 6 different types of neuroglia:
 - CNS Neuroglia:
 - ✓ **Astrocytes**
 - ✓ **Microglia**
 - ✓ **Ependymal cells**
 - ✓ **Oligodendrocytes**
 - PNS Neuroglia:
 - ✓ **Schwann cells**
 - ✓ **Satellite cells**

CNS Neuroglia

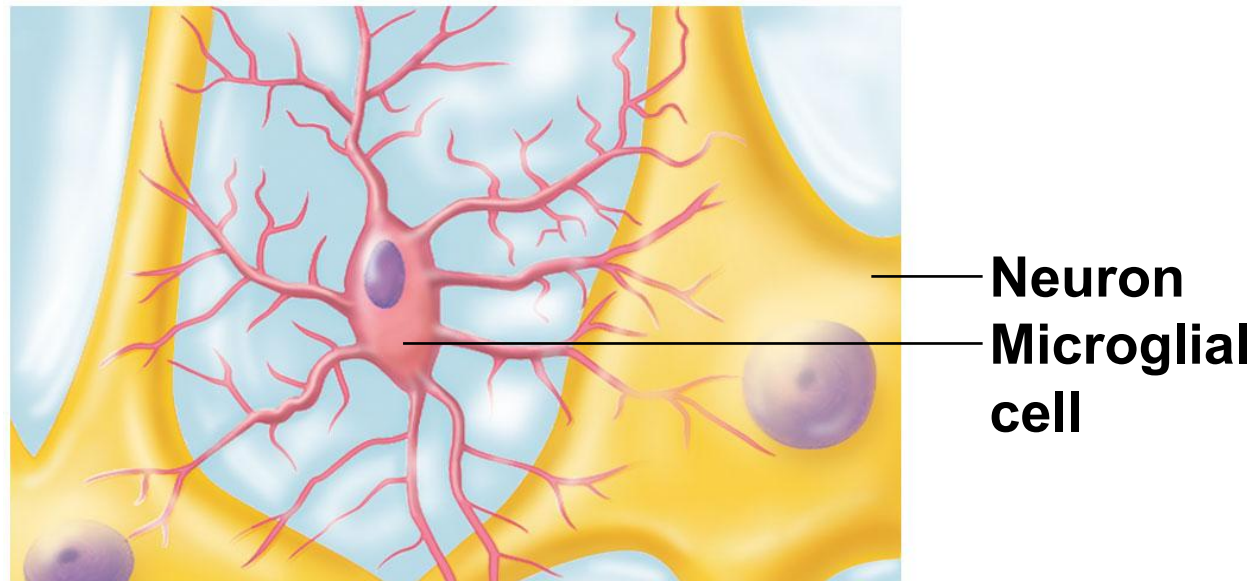
- Astrocytes
 - **Abundant, star-shaped cells**
 - **Brace and anchor neurons to their nutrient supply, the blood capillaries**
 - **Protect neurons from harmful substances in blood**
 - **Control the chemical environment of the brain**



Astrocytes are the most abundant and versatile neuroglia.

CNS Neuroglia

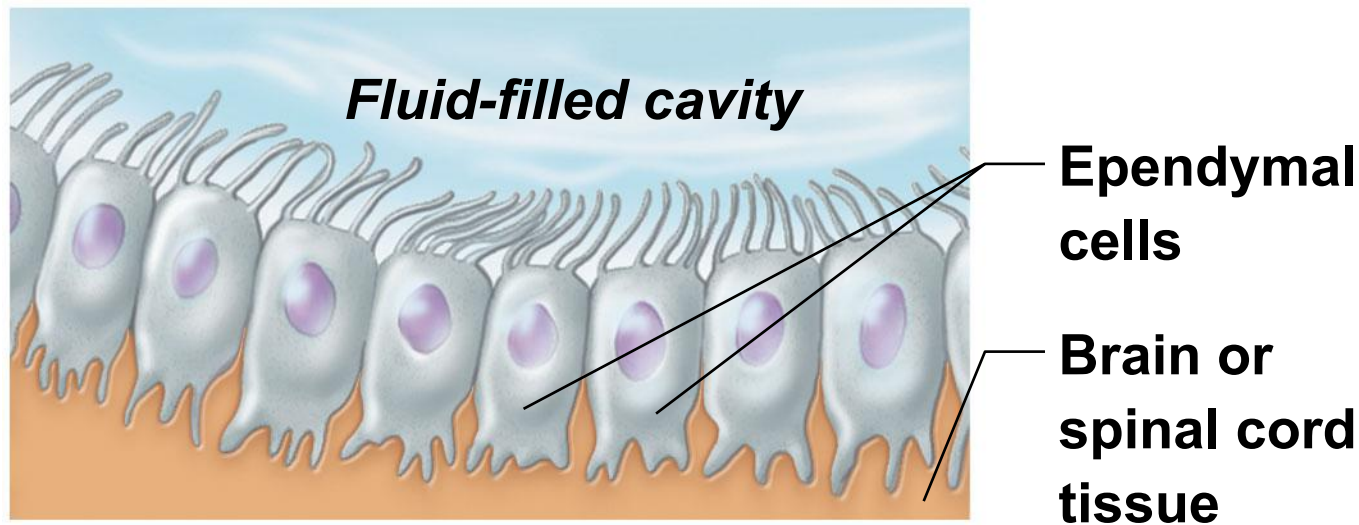
- Microglia
 - **Spider-like phagocytes**
 - **Monitor health of nearby neurons**
 - **Dispose of debris**



Microglial cells are phagocytes that defend CNS cells.

CNS Neuroglia

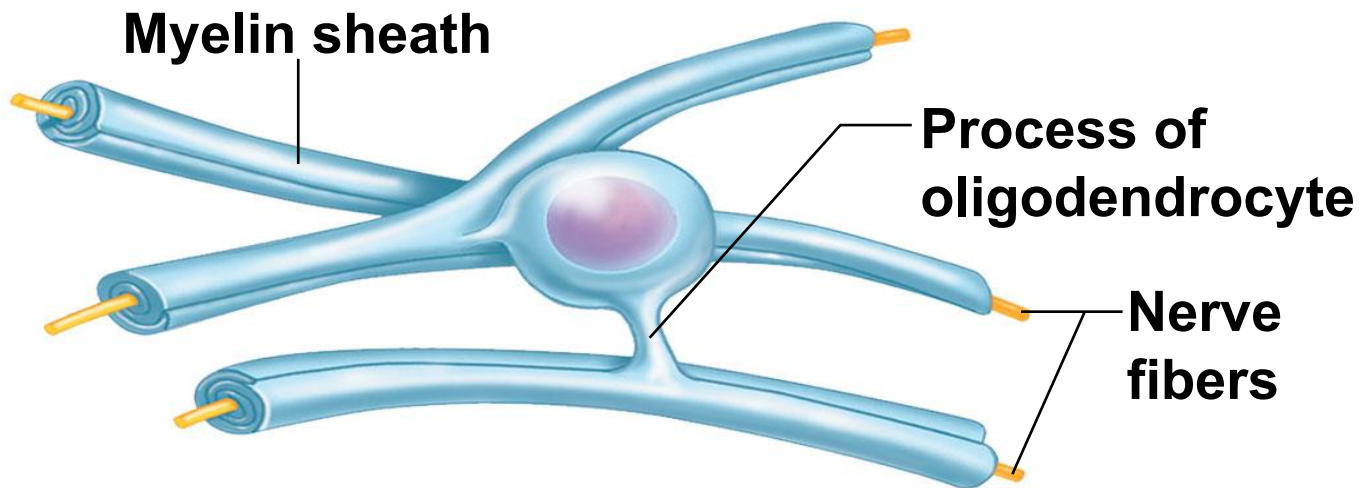
- Ependymal cells
 - **Line cavities of the brain and spinal cord**
 - **Cilia assist with circulation of cerebrospinal fluid (CSF)**



Ependymal cells line cerebrospinal fluid-filled cavities.

CNS Neuroglia

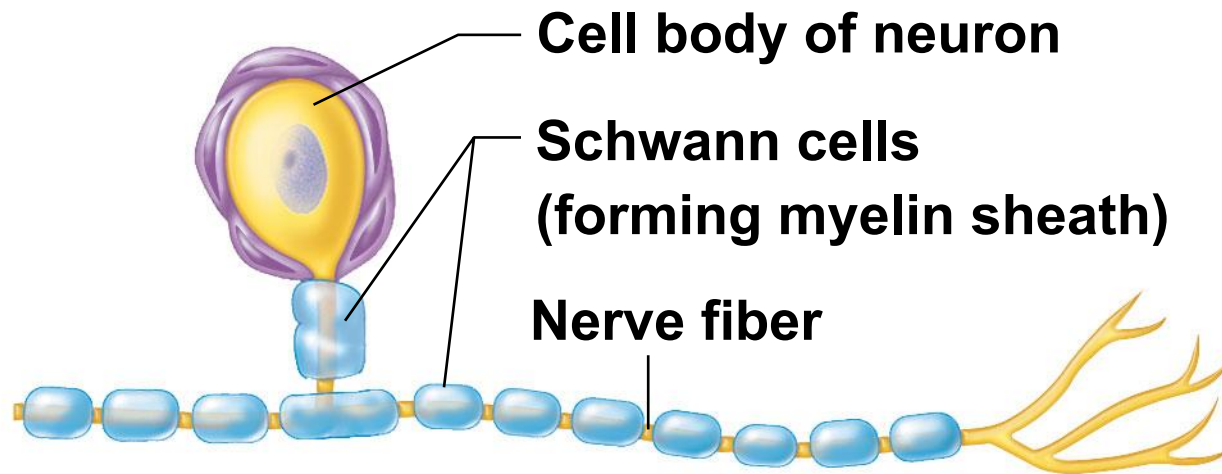
- Oligodendrocytes
 - **Wrap around nerve fibers in the central nervous system**
 - **Produce myelin sheaths**



Oligodendrocytes have processes that form myelin sheaths around CNS nerve fibers.

PNS Neuroglia

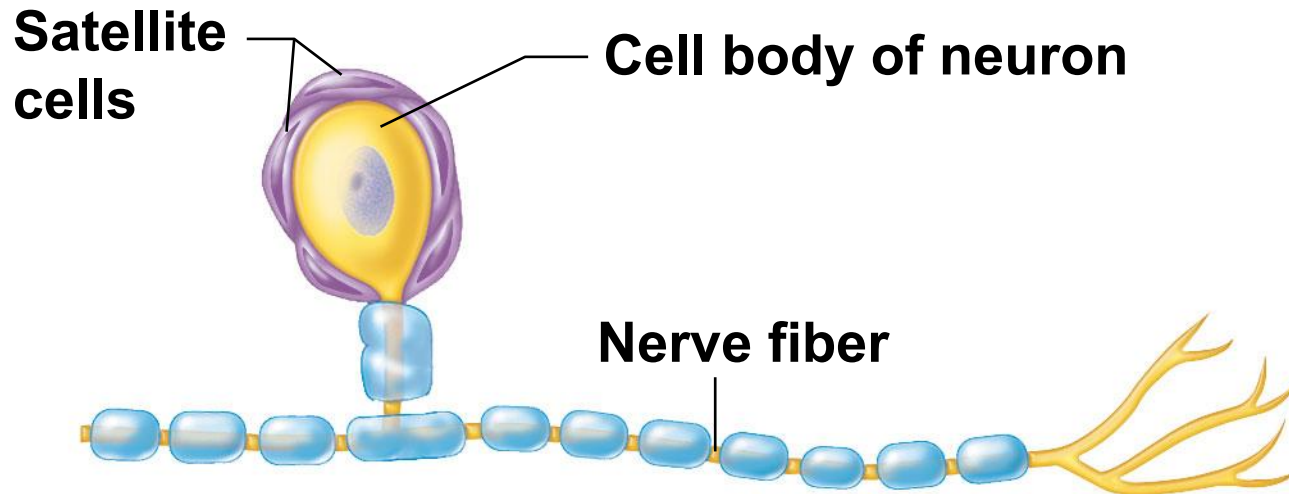
- Schwann cells
 - **Form myelin sheath around nerve fibers in the PNS**



Schwann cells (which form myelin) surround neurons in the PNS.

PNS Neuroglia

- Satellite cells
 - Protect and cushion neuron cell bodies

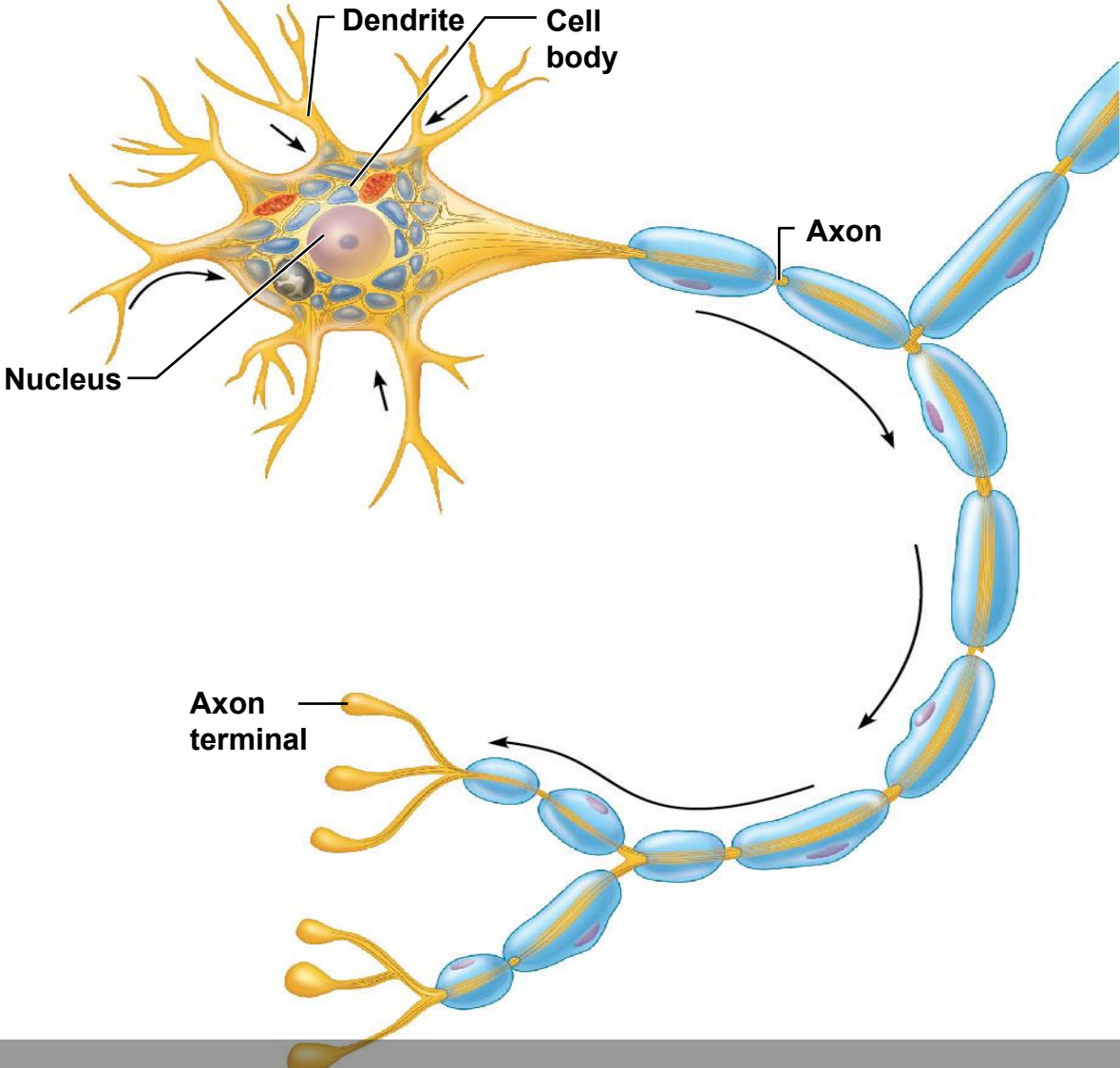


(e) Satellite cells surround neurons in the PNS.

Myelin Sheaths

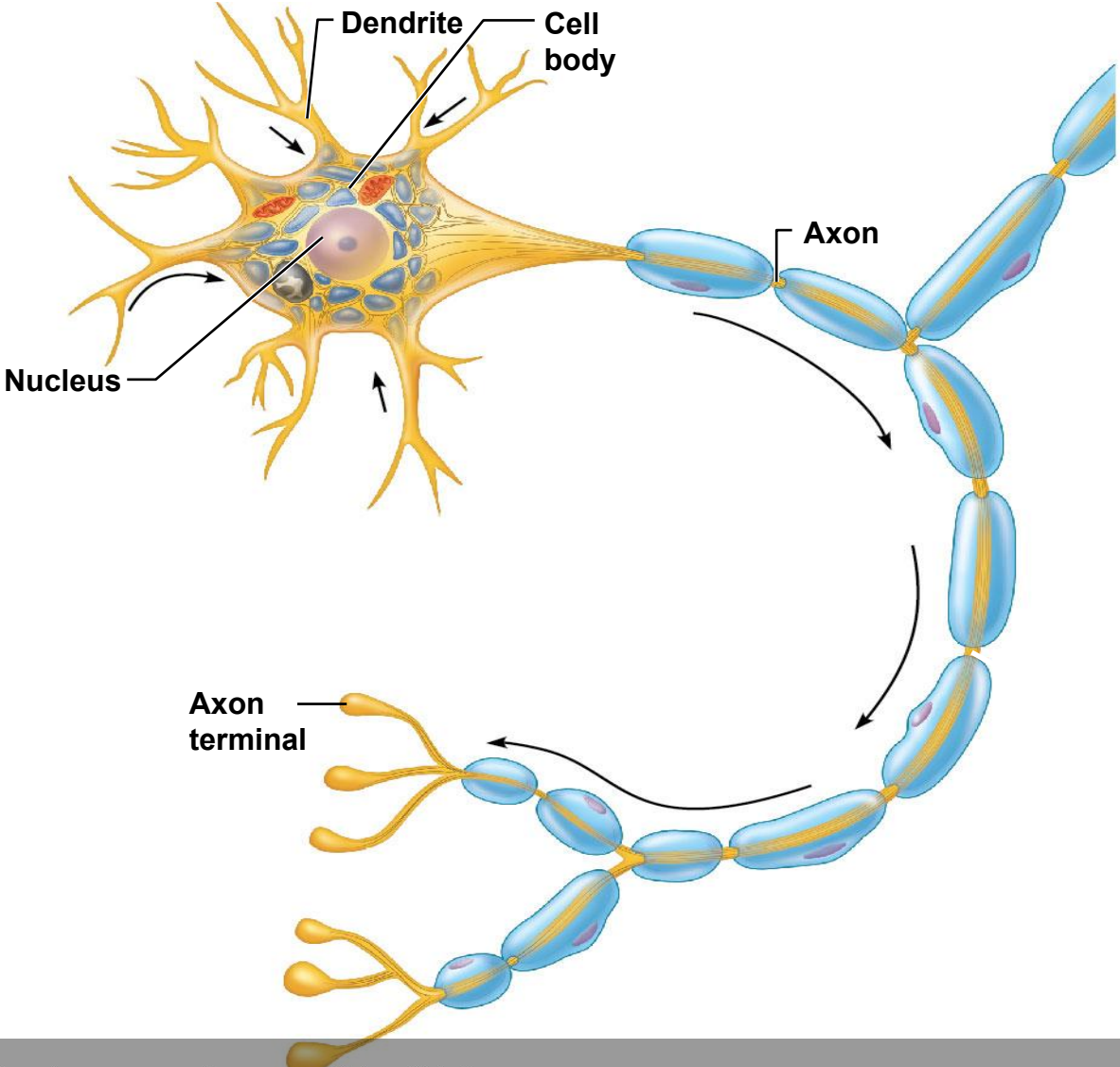
- Myelin
 - **White, fatty material covering axons**
 - **Protects and insulates fibers**
 - **Speeds up nerve impulse transmission**
- Cells forming myelin sheaths:
 - **Oligodendrocytes—around axons of the CNS**
 - **Schwann cells—around axons of the PNS**
 - **Nodes of Ranvier—gaps in myelin sheath along the axon**

Label the Myelin Sheath

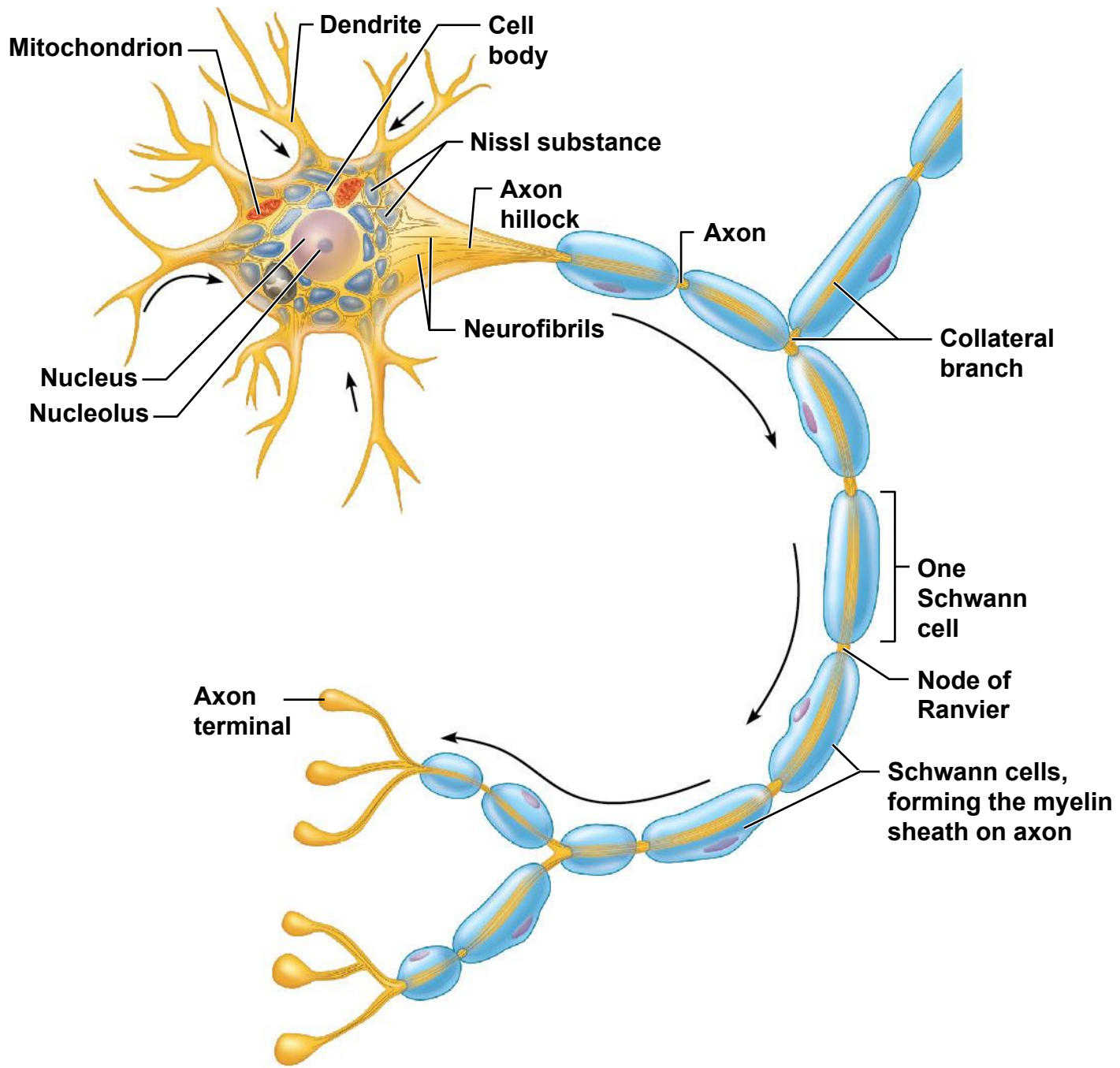


Students, draw anywhere on this slide!

Label the Nodes of Ranvier



Students, draw anywhere on this slide!



Exit Slip

What type of neuroglia form the myelin sheath of neurons found in the brain?



Students, write your response!

Exit Slip

What type of neuroglia form the myelin sheath of neurons found in the peripheral nerves?



Students, write your response!

Exit Slip

Predict how myelin sheaths might affect nerve impulse transmission speed?



Students, write your response!

Exit Slip

How are Schwann cells and satellite cells similar?

How are they different?



Students, write your response!

Exit Slip

Which type of cells would be found in large numbers if you had a bacterial infection in your brain?

How would these cells respond?



Students, write your response!

Exit Slip

How do astrocytes connect the nervous system and the cardiovascular system?



Students, write your response!

Exit Slip

Which cell type protects the brain and spinal cord by lining the cavities?



Students, write your response!

Exit Slip

Why is a brain tumor more likely to be formed from neuroglia than from neurons?



Students, write your response!