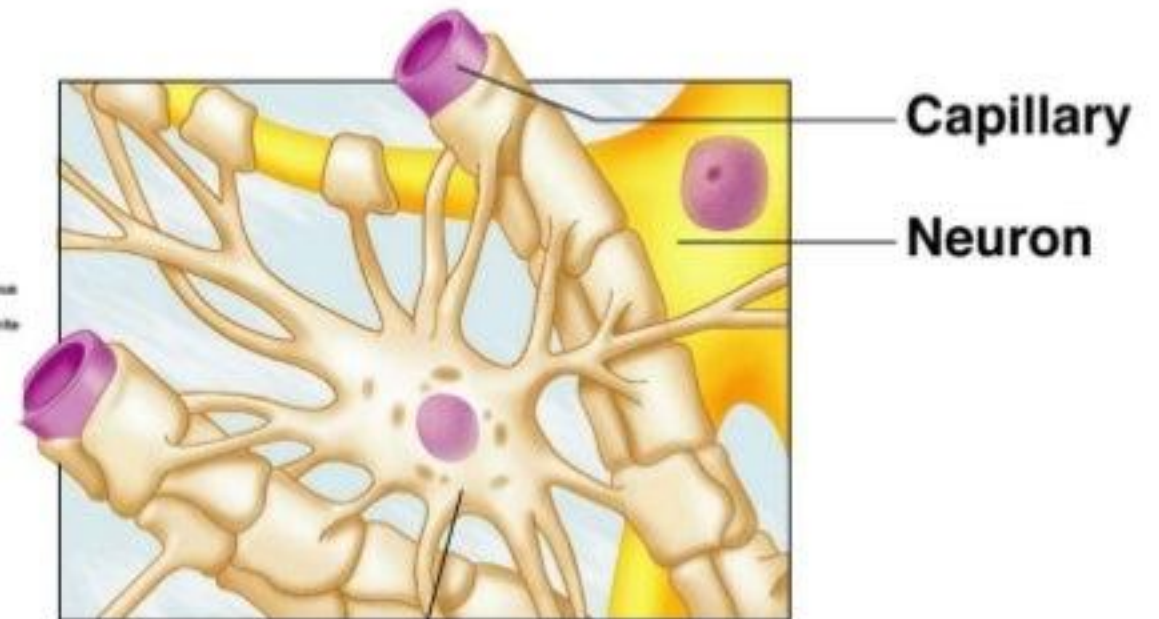
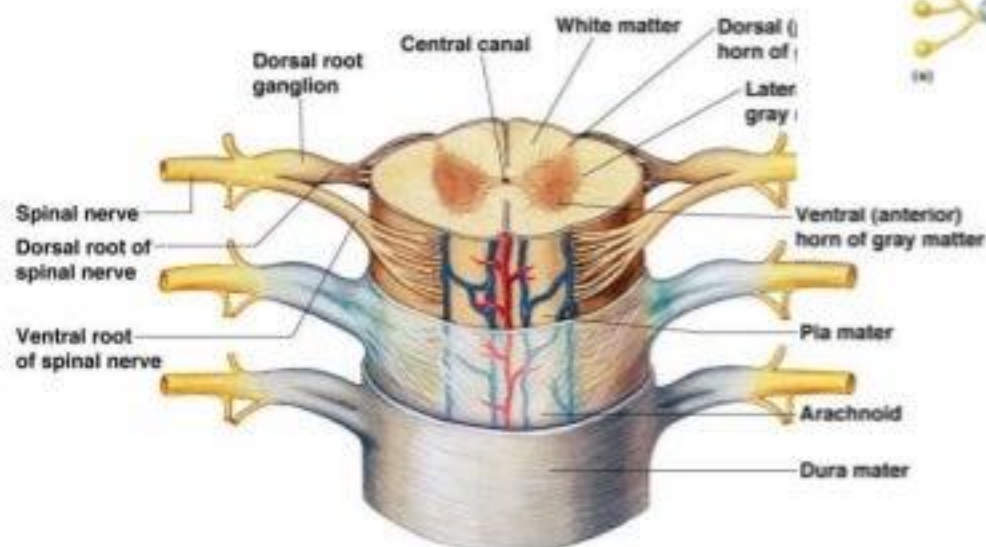
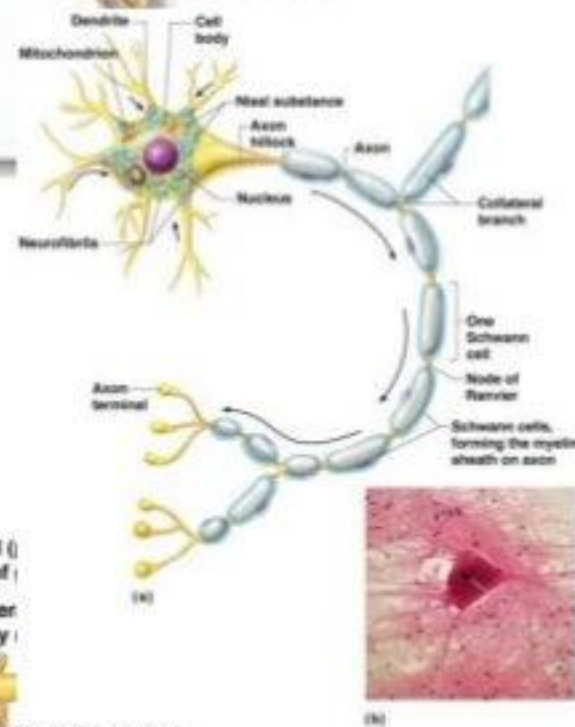


# THE NERVOUS SYSTEM



(a) Astrocyte

# FUNCTIONS OF THE NERVOUS SYSTEM

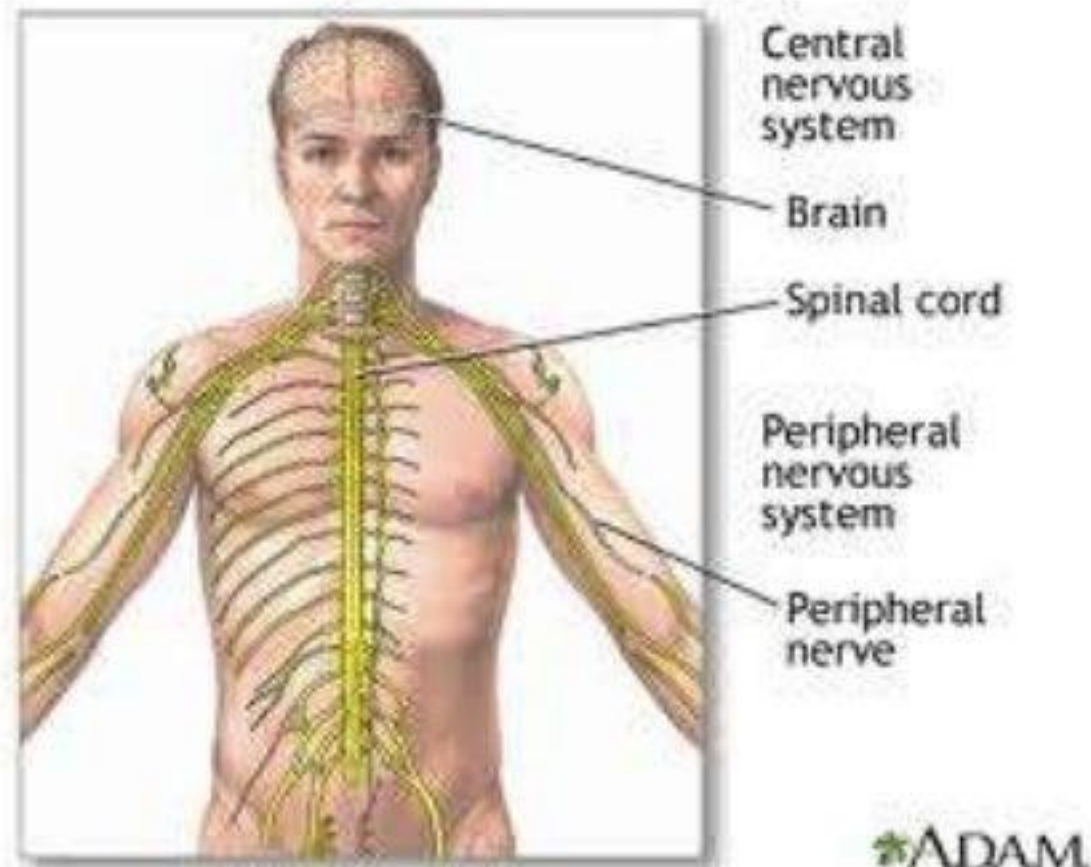
- ⊙ **Sensory input—gathering information**
  - To monitor changes occurring inside and outside the body
  - Changes = stimuli
- ⊙ **Integration**
  - To process and interpret sensory input and decide if action is needed



# FUNCTIONS OF THE NERVOUS SYSTEM

## ⦿ Motor output

- A response to integrated stimuli
- The response activates muscles or glands



# FUNCTIONS OF THE NERVOUS SYSTEM

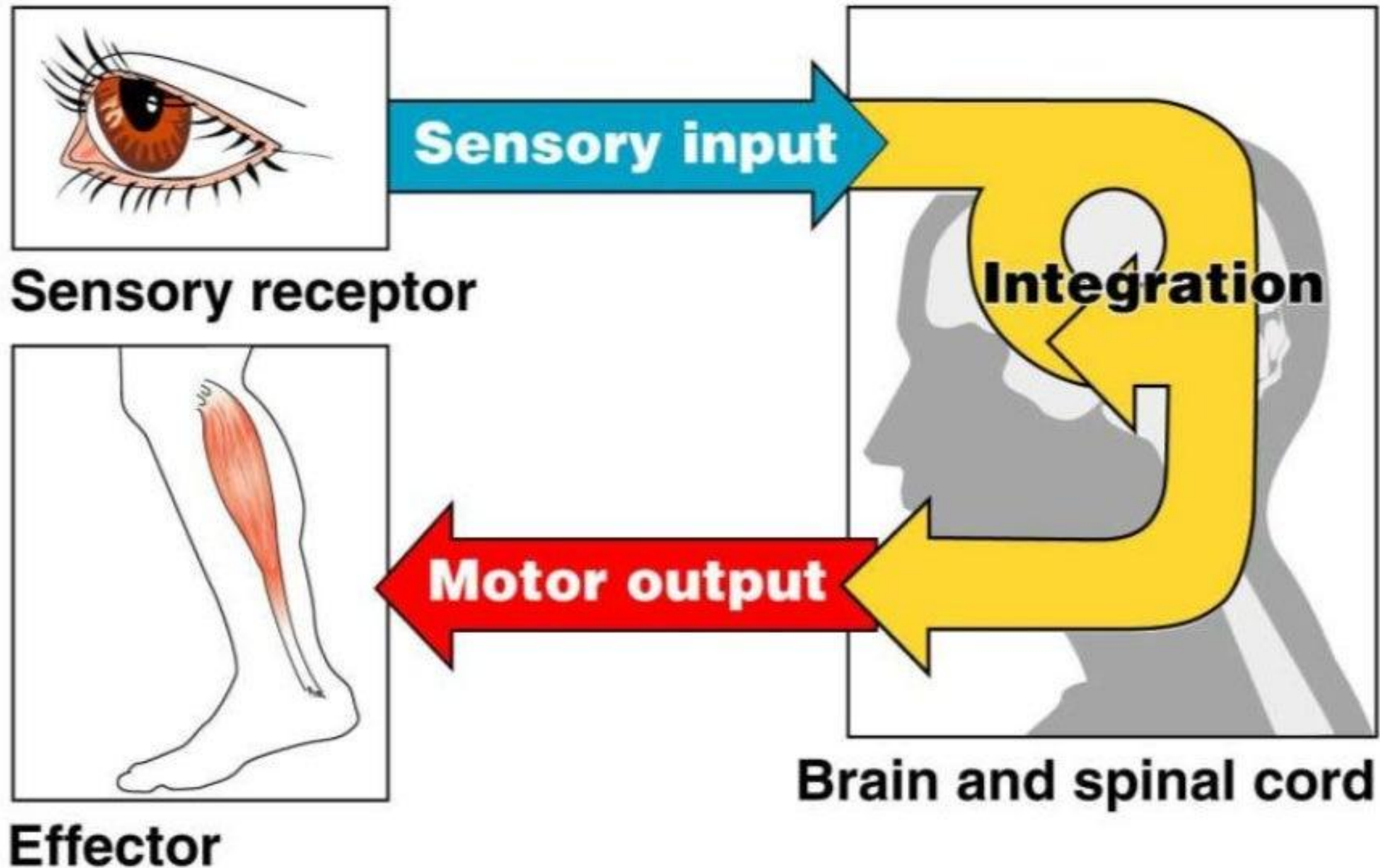


Figure 7.1

# STRUCTURAL CLASSIFICATION OF THE NERVOUS SYSTEM

- ⊙ Central nervous system (CNS)

- Brain
- Spinal cord

- ⊙ Peripheral nervous system (PNS)

- Nerves outside the brain and spinal cord
  - Spinal nerves
  - Cranial nerves



# FUNCTIONAL CLASSIFICATION OF THE PERIPHERAL NERVOUS SYSTEM

- ◉ **Sensory (afferent) division**

- Nerve fibers that carry information to the central nervous system

- ◉ **Motor (efferent) division**

- Nerve fibers that carry impulses away from the central nervous system

# ORGANIZATION OF THE NERVOUS SYSTEM

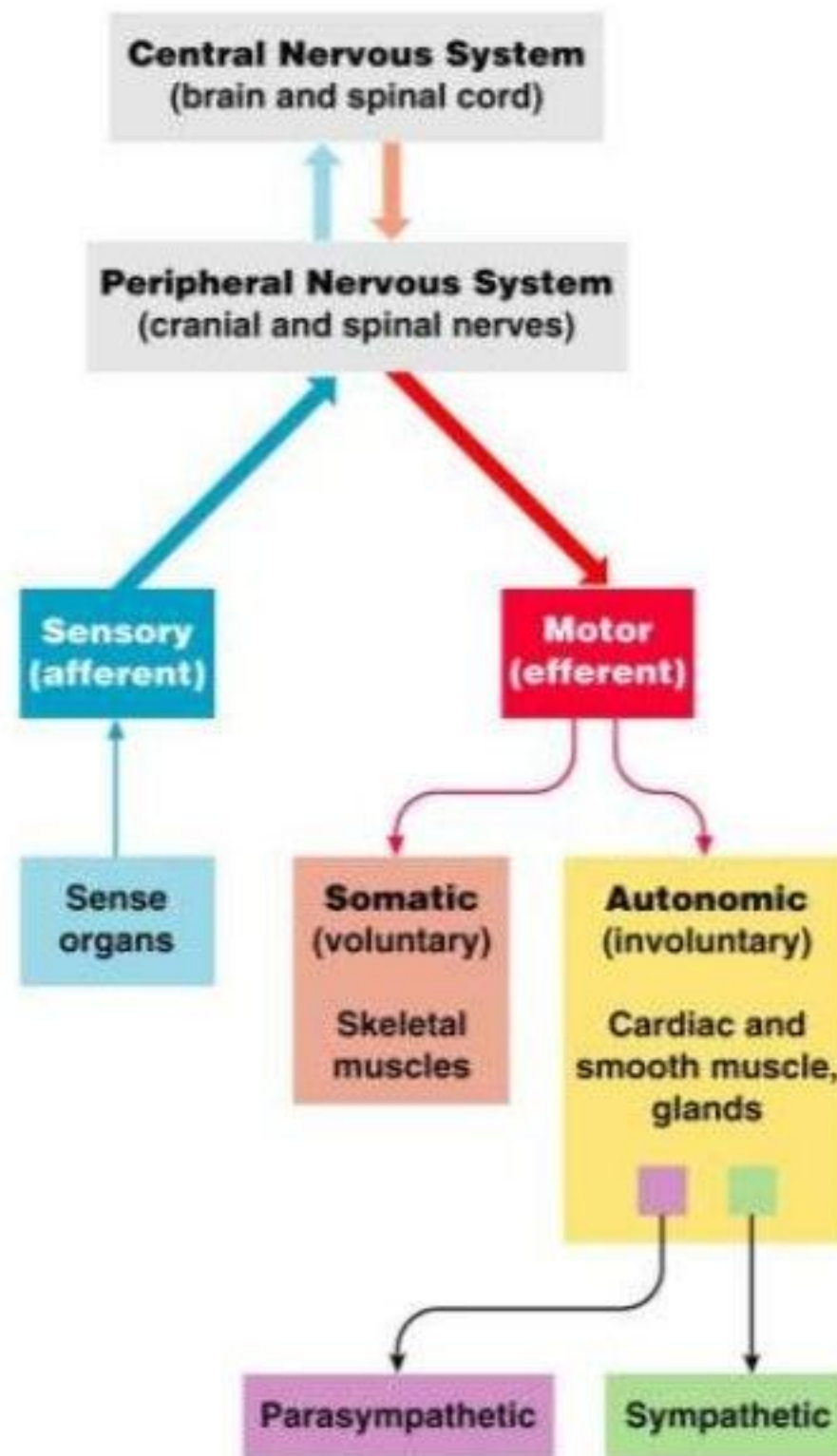


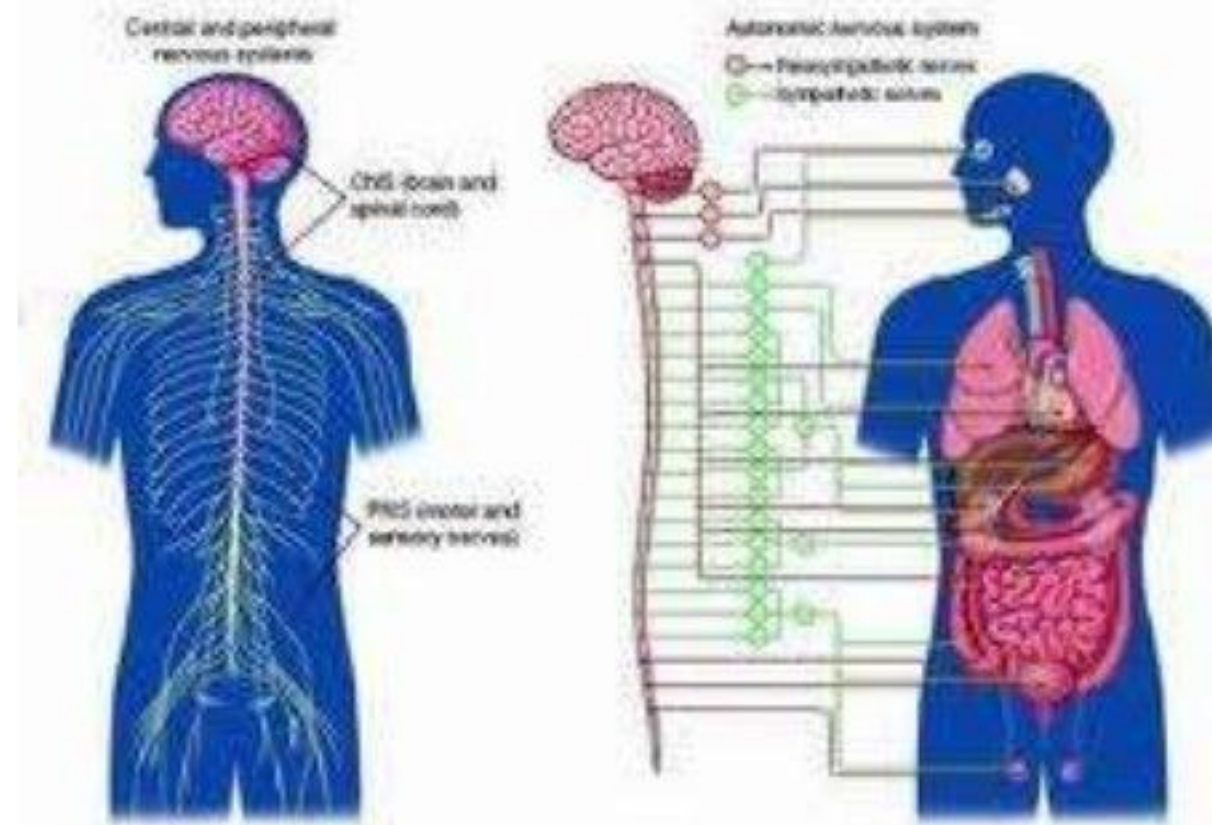
Figure 7.2



# FUNCTIONAL CLASSIFICATION OF THE PERIPHERAL NERVOUS SYSTEM

## ⦿ Motor (efferent) division (continued)

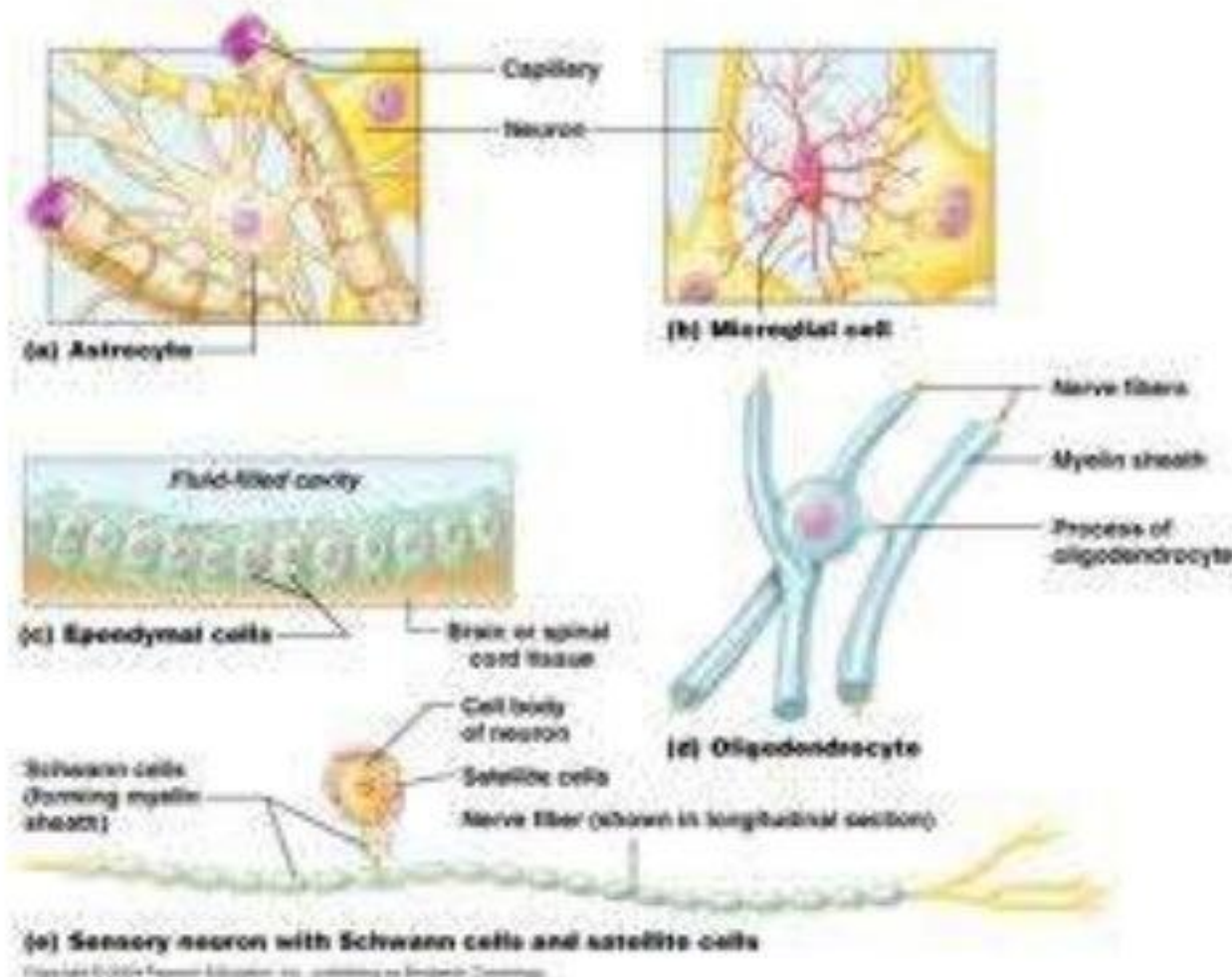
- Two subdivisions
  - Somatic nervous system = voluntary
  - Autonomic nervous system = involuntary





# NERVOUS TISSUE: SUPPORT CELLS

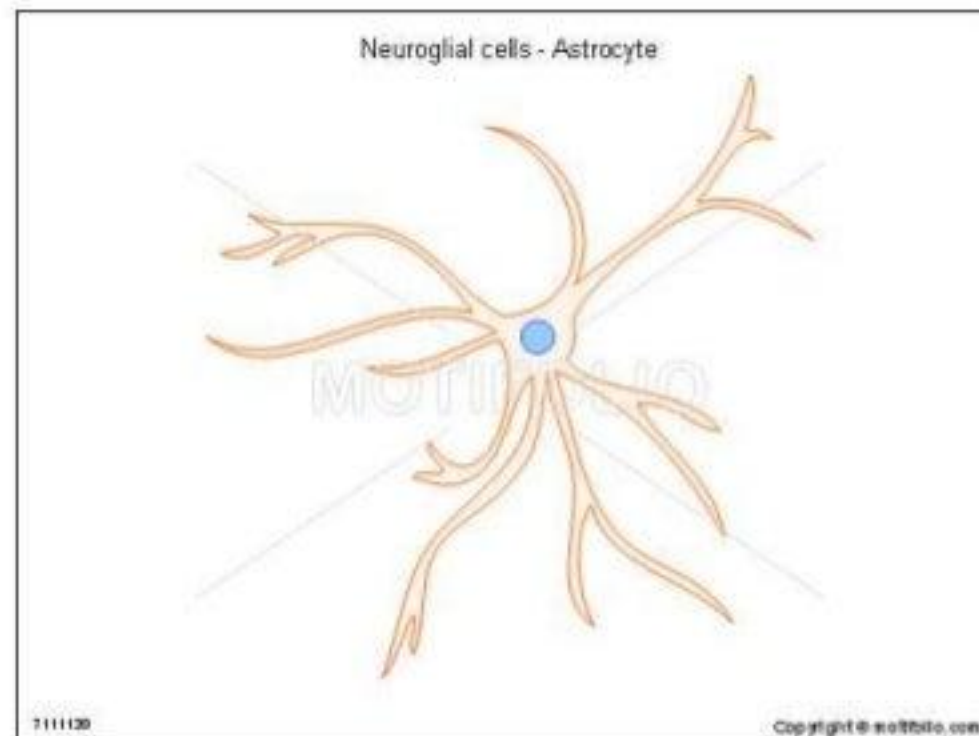
- Support cells in the CNS are grouped together as “neuroglia”
- Function: to support, insulate, and protect neurons



# NERVOUS TISSUE: SUPPORT CELLS

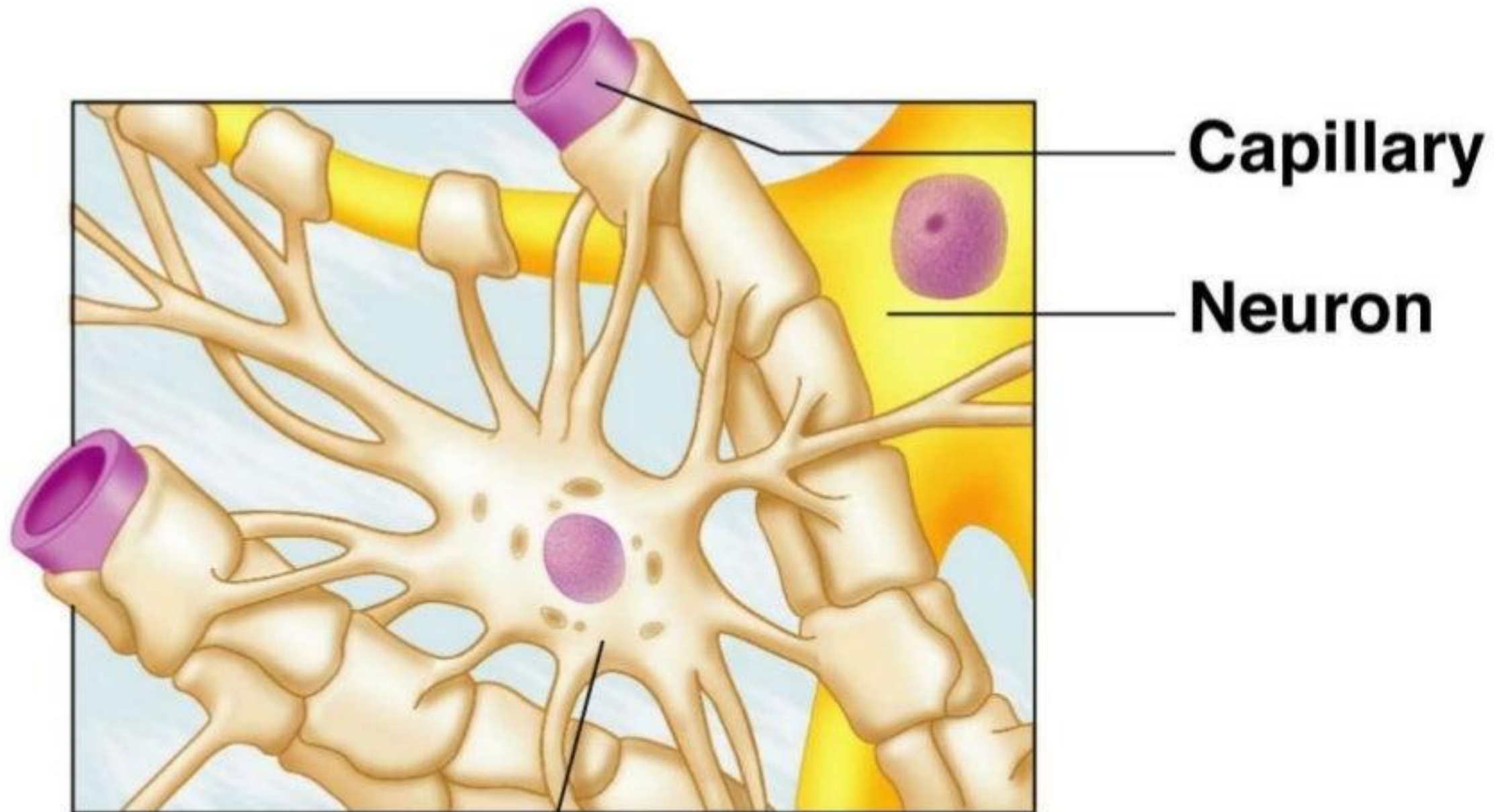
## ⦿ Astrocytes

- Abundant, star-shaped cells
- Brace neurons
- Form barrier between capillaries and neurons
- Control the chemical environment of the brain





# NERVOUS TISSUE: SUPPORT CELLS



**(a) Astrocyte**

# NERVOUS TISSUE: SUPPORT CELLS

## ◉ Microglia

- Spiderlike phagocytes
- Dispose of debris



# NERVOUS TISSUE: SUPPORT CELLS

**Neuron**



**(b) Microglial cell**

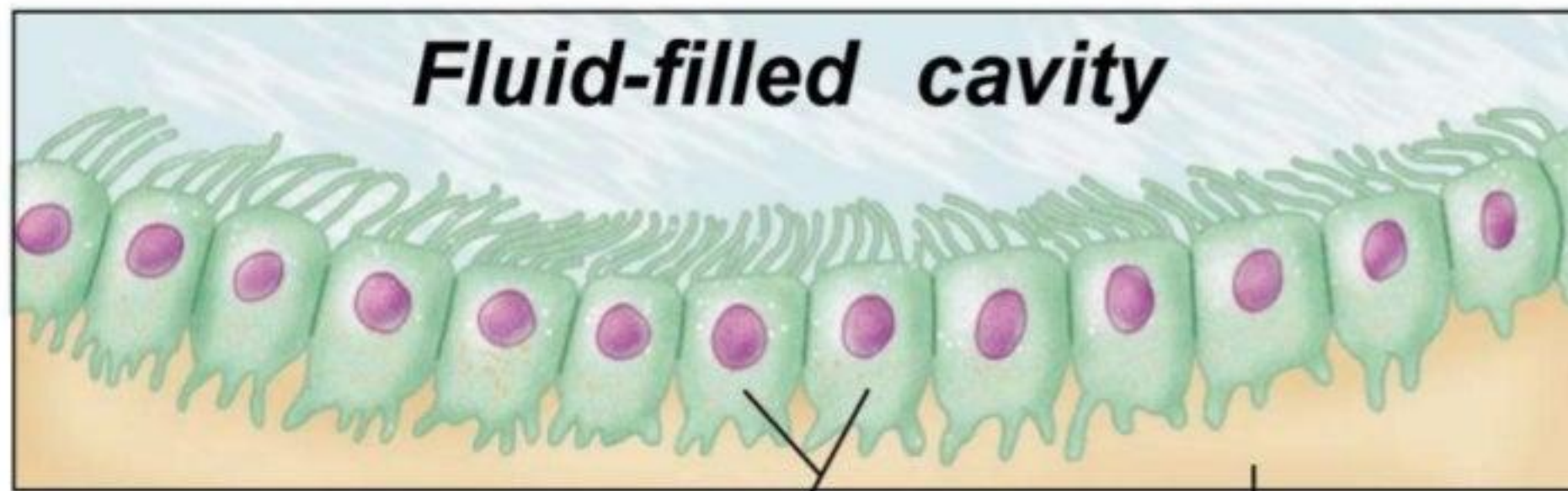
# NERVOUS TISSUE: SUPPORT CELLS

## ⊙ Ependymal cells

- Line cavities of the brain and spinal cord
- Circulate cerebrospinal fluid



# NERVOUS TISSUE: SUPPORT CELLS



**(c) Ependymal cells**

**Brain or spinal  
cord tissue**

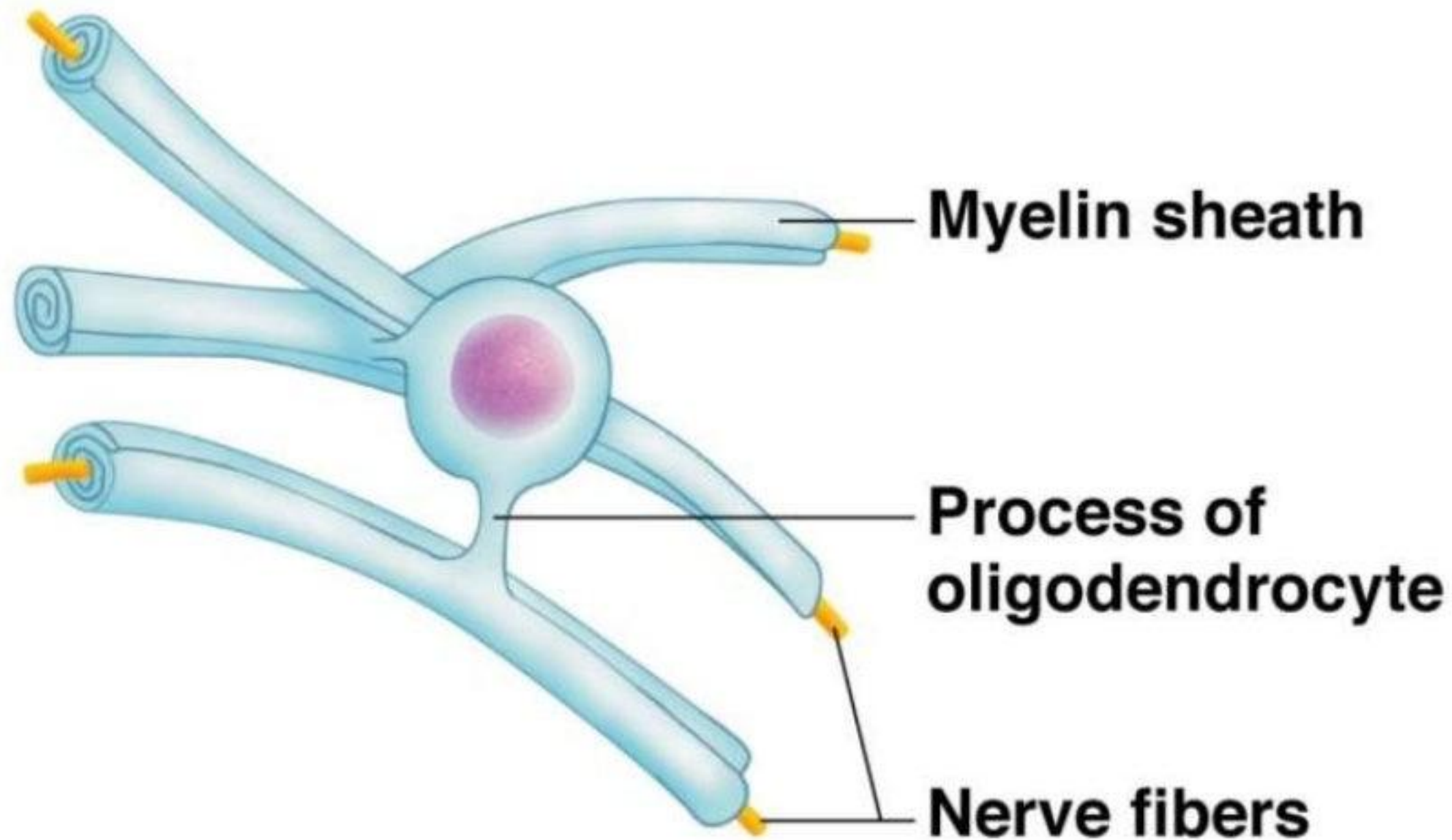
# NERVOUS TISSUE: SUPPORT CELLS

## ⦿ Oligodendrocytes

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



# NERVOUS TISSUE: SUPPORT CELLS



**(d) Oligodendrocyte**

# NERVOUS TISSUE: SUPPORT CELLS

- ⊙ Satellite cells

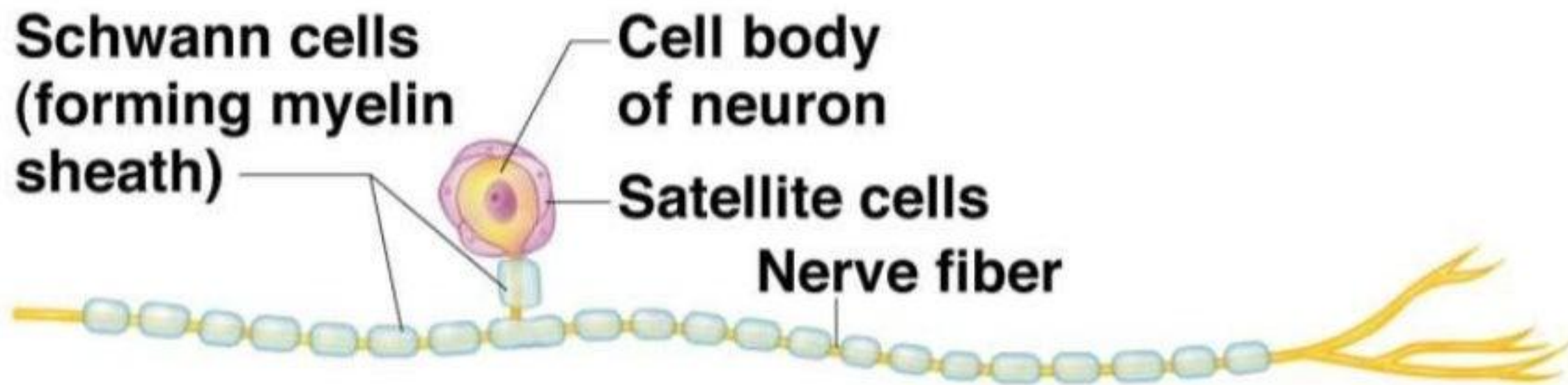
- Protect neuron cell bodies

- ⊙ Schwann cells

- Form myelin sheath in the peripheral nervous system



# NERVOUS TISSUE: SUPPORT CELLS



**(e) Sensory neuron with Schwann cells and satellite cells**

# NERVOUS TISSUE: NEURONS

- ⊙ **Neurons = nerve cells**

- Cells specialized to transmit messages
- Major regions of neurons
  - Cell body—nucleus and metabolic center of the cell
  - Processes—fibers that extend from the cell body