TOPIC: CELLS OF THE NERVOUS SYSTEM

Neurons vs. Glial Cells

◆ There are two main types of cells in the nervous system:

Neurons

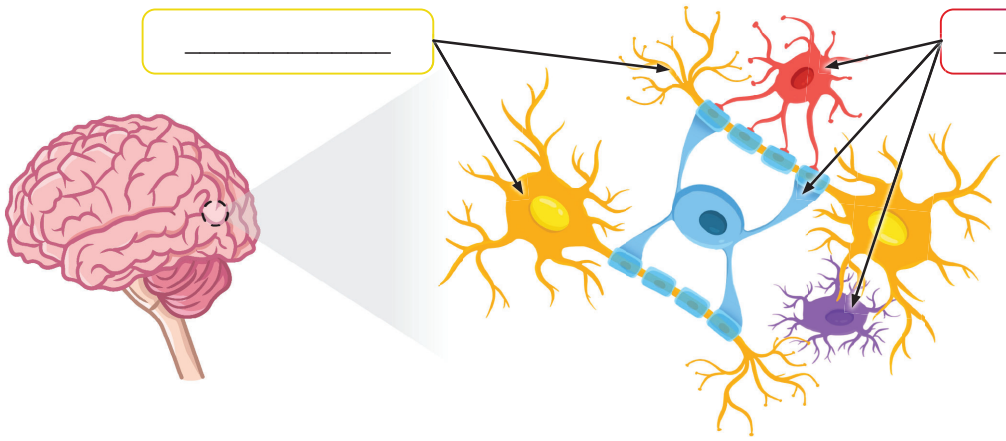
Specialized cells that communicate via _____chemical signals.

Glial Cells

Cells that insulate, support, and nourish neurons; support neuronal _____.

_____

_____ **Cells**



EXAMPLE

For each statement below, write the letter of the statement in the box if it describes a neuron or a glial cell. One statement will describe both neurons and glial cells.

a) "Housekeeping Cells".
b) Send electrochemical signals.
c) Cell in the nervous system.
d) Provide insulation.

Neurons: _____

Glial Cells: _____

PRACTICE

True or False: if false, choose the answer that best corrects the statement.

Neurons are the ***only*** important cell type in the nervous system.

a) True.
b) False; both neurons and glial cells are important for nervous system function.
c) False; there are hundreds of cell types in the nervous system, and all of them are important.
d) False; glial cells are the most important cell type for nervous system function.

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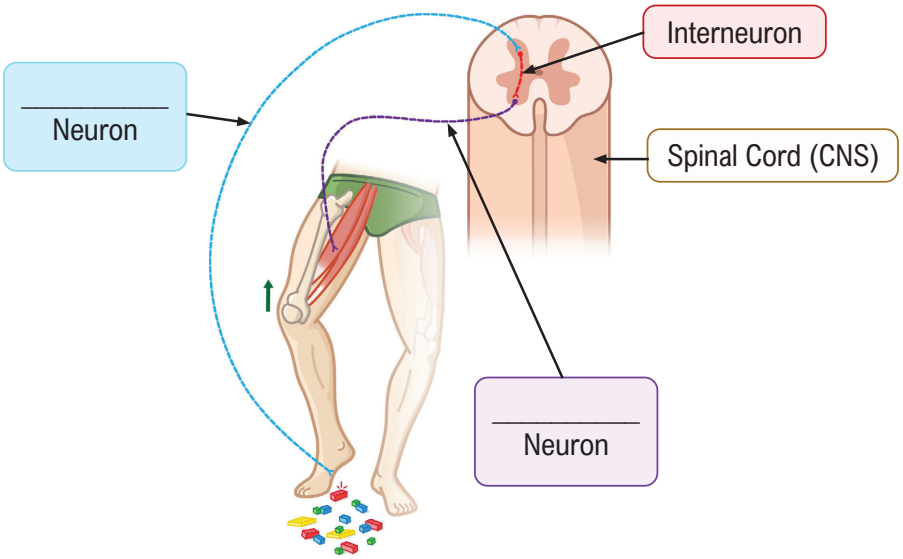
Types of Neurons

◆ Neurons can be grouped into 3 functional classes:

- **Sensory Neurons:** Receive _____ information and convey signals to CNS.
- **Motor Neurons:** Carry signals from the CNS to the muscles to produce _____.
- **Interneurons:** _____ sensory neurons, motor neurons, and other interneurons.



EXAMPLE

Two pathways are given below. Fill in the blanks with the words "sensory" or "motor" to complete the pathways.

◆ Brain → Spinal cord → _____ neuron → Muscle fiber contracts.

◆ Sensory stimuli → _____ neuron → Spinal cord → Brain.

PRACTICE

Which of the following statements are true about interneurons?

I) Interneurons can be found in the spinal cord.

II) Interneurons only connect to motor neurons.

III) Interneurons can connect sensory and motor neurons.

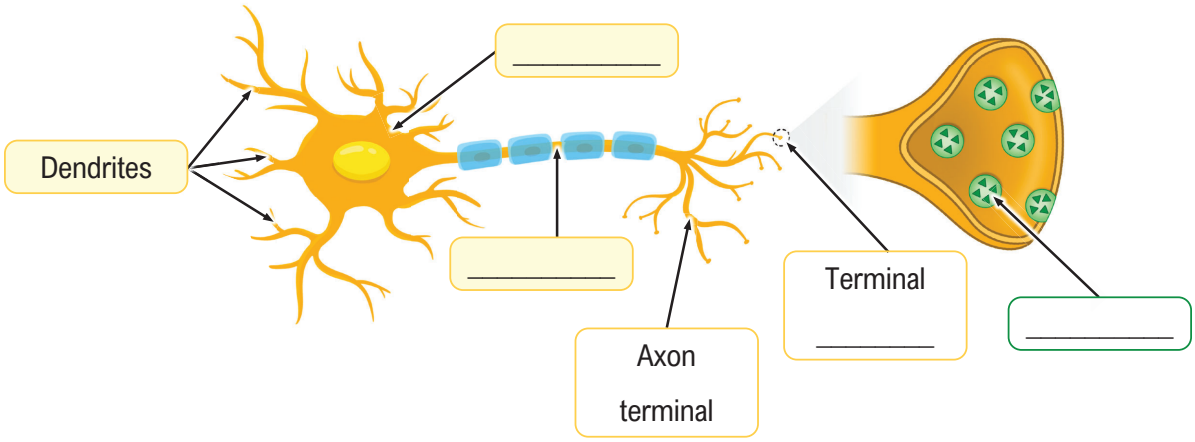
a) I & II only. b) I & III only. c) II & III only. d) I, II, & III.

TOPIC: CELLS OF THE NERVOUS SYSTEM

Anatomy of a Neuron

◆ All neurons have the same basic parts:

- **Soma** (cell _____): Contains the nucleus and organelles.
- **Dendrites:** The part of the neuron that _____ chemical messages from other neurons.
  - Most neurons have multiple dendrites.
- **Axon:** The part of the neuron that _____ messages to other neurons.
  - Neurons have _____ axon, though it can have multiple _____, called **axon terminals**.
  - Axon terminals end in **terminal** _____, which contain **vesicles** filled with neurotransmitters.



EXAMPLE

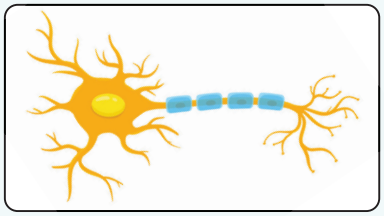
Mark the following on the image below.

◆ Put an x on the soma.

◆ Draw a box around the axon.

◆ Circle any dendrites.

◆ Draw an arrow in the direction a neuronal signal would move.



PRACTICE

_____ are responsible for sending chemical messages, and the _____ are responsible for receiving them.

a) Soma: Axons.

b) Soma: Dendrites.

c) Axons: Soma.

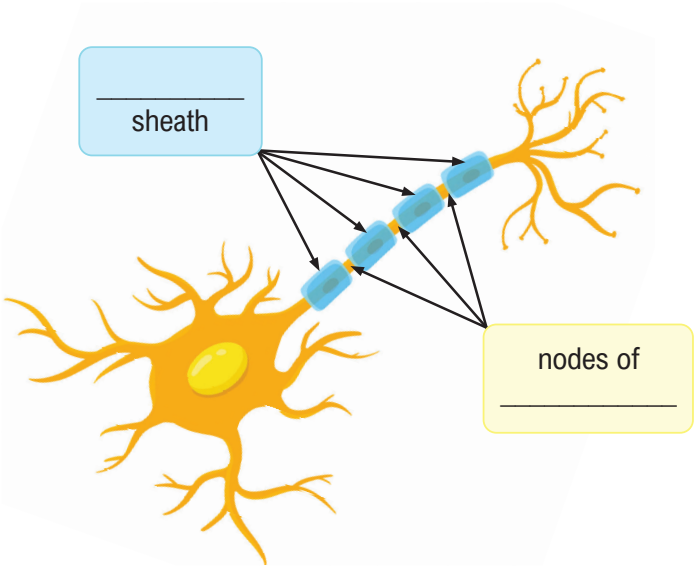
d) Axons. Dendrites.

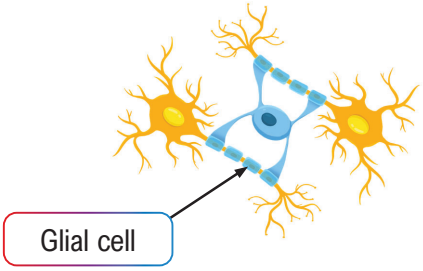
TOPIC: CELLS OF THE NERVOUS SYSTEM

The Myelin Sheath

◆ Many axons are coated in a **myelin sheath**: a layer of _____ tissue that covers and insulates the axon.

- Helps electrical signal move down the axon _____ and with less resistance.
- Made of _____ cells.
- Forms in clumps with _____ between them called **nodes of Ranvier**.





EXAMPLE

For the statements below, circle any statement that accurately describes myelin.

a) Made of glial cells.

b) Keep neurons from changing temperature.

c) Spaces between myelin are called nodes of Ranvier.

d) Helps electrical signal be conducted more quickly.

e) Layer of fatty tissue that wraps the dendrites.

TOPIC: CELLS OF THE NERVOUS SYSTEM

PRACTICE

The neurodegenerative condition Multiple Sclerosis (MS) is characterized by the degradation of myelin wrapping in neurons in the brain and spinal cord. Patients with MS can experience vision loss, muscle weakness, and emotional changes. Which of the following could explain these changes in MS patients?

a) Loss of myelin prevents efficient neural communication.
b) Loss of myelin prevents the release of chemical messengers between neurons by blocking vesicles.
c) Loss of myelin prevents the movement of important cell-sustaining proteins from the soma.
d) Loss of myelin causes near-instant neuronal death.

PRACTICE

Myelin is not continuous for the length of the axon. What structures are formed by the gaps in myelin?

a) Dendritic terminals.
b) Axon terminals.
c) Nodes of Ranvier.
d) Glial gaps.