

# Nervous System



The nervous system is the master coordinating system of the body. Every thought, action, and sensation reflects its activity. Because of its complexity, the structures of the nervous system are described in terms of two principal divisions—the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS, consisting of the brain and spinal cord, interprets incoming sensory information and issues instructions based on past experience. The PNS, consisting of cranial and spinal nerves and ganglia, provides the communication lines between the CNS and the body's muscles, glands, and sensory receptors. The nervous system is also divided functionally in terms of motor activities into the somatic and autonomic divisions. It is important, however, to recognize that these classifications are made for the sake of convenience and that the nervous system acts in an integrated manner both structurally and functionally.

Student activities provided in this chapter consider neuron anatomy and physiology, identify the various structures of the central and peripheral nervous system, consider reflex and sensory physiology, and summarize autonomic nervous system anatomy and physiology. Because every body system is controlled, at least in part, by the nervous system, these understandings are extremely important to comprehending how the body functions as a whole.

1. List the three major functions of the nervous system.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

7. Figure 7-1 is a diagram of a neuron. First, label the parts indicated on the illustration by leader lines. Then choose different colors for each of the structures listed below and use them to color in the coding circles and corresponding structures in the illustration. Next, circle the term in the list of three terms to the left of the diagram that best describes this neuron's structural class. Finally, draw arrows on the figure to indicate the direction of impulse transmission along the neuron's membrane.

- Axon
- Dendrites
- Cell body
- Myelin sheath

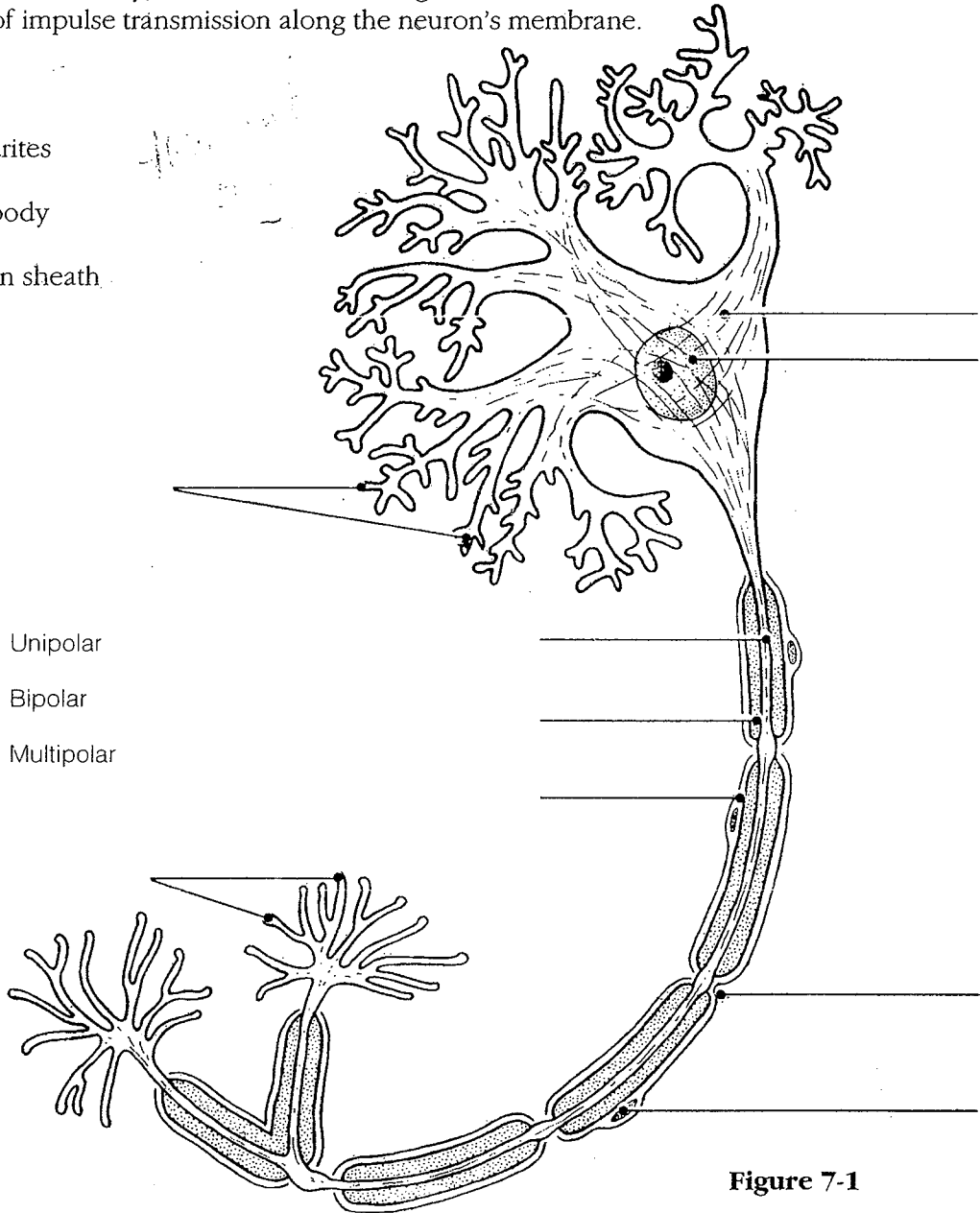


Figure 7-1

8. List in order the *minimum* elements in a reflex arc from the stimulus to the activity of the effector. Place your responses in the answer blanks.

- |             |                   |
|-------------|-------------------|
| 1. Stimulus | 4. _____          |
| 2. _____    | 5. Effector organ |
| 3. _____    |                   |

11. Refer to Figure 7-2, showing a reflex arc, as you complete this exercise. First, briefly answer the following questions by inserting your responses in the spaces provided.

1. What is the stimulus? \_\_\_\_\_
2. What tissue is the effector? \_\_\_\_\_
3. How many synapses occur in this reflex arc? \_\_\_\_\_

Next, select different colors for each of the following structures and use them to color in the coding circles and corresponding structures in the diagram. Finally, draw arrows on the figure indicating the direction of impulse transmission through this reflex pathway.

- |                       |                 |                       |                    |
|-----------------------|-----------------|-----------------------|--------------------|
| <input type="radio"/> | Receptor region | <input type="radio"/> | Association neuron |
| <input type="radio"/> | Afferent neuron | <input type="radio"/> | Efferent neuron    |
| <input type="radio"/> | Effector        |                       |                    |

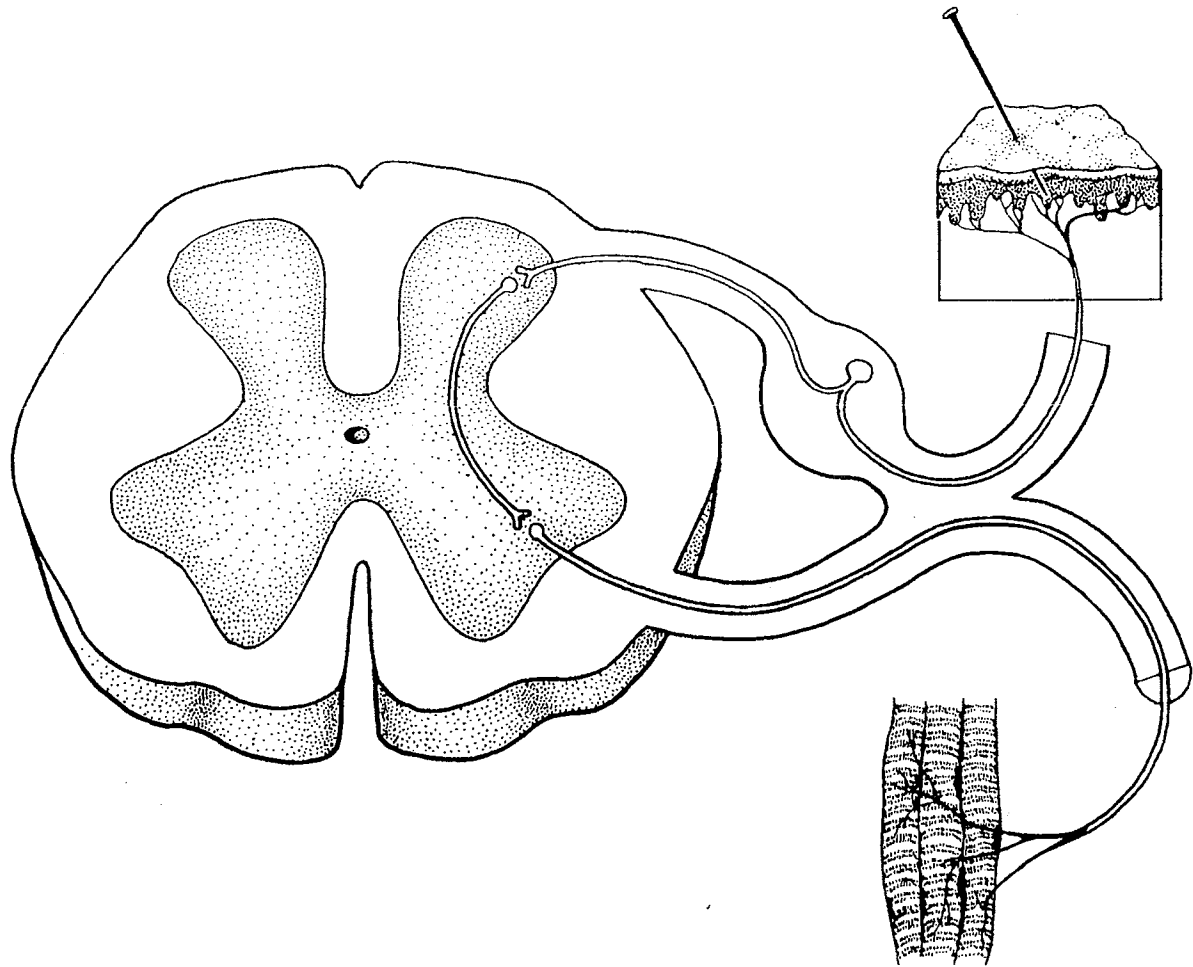


Figure 7-2