

Unit 2: Tissues

Lesson 3: Nervous tissue

Activity 1 (15'): Introduction to nervous system

Step 1 (5'): In pairs, read and put in order the four paragraphs .

Book: Structure and function of the body (Thibodeau-Patton, 14th Edition- Elsevier)

1 These functions are accomplished by specialized signals called **nerve impulses**. In general, the functions of the nervous system result in rapid activity that lasts usually for a short duration. For example, we can chew our food normally, walk, and perform coordinated muscular movements only if our nervous system functions properly. The nerve impulse permits the rapid and precise control of diverse body functions. Other types of nerve impulses cause glands to secrete fluids. In addition, elements of the nervous system can recognize certain **stimuli**

2 (STIM-yoo-lye), such as heat, light, pressure, or temperature, that affect the body. When stimulated, these specialized components of the nervous system, called *sense organs* (discussed in Chapter 9), generate nervous impulses that travel to the brain or spinal cord where analysis or relay occurs and, if needed, appropriate action is initiated.

4 **Nervous System**

The *brain, spinal cord, and nerves* are the organs of the *nervous system*. As you can see in Figure 4-5, nerves extend from the brain and spinal cord to

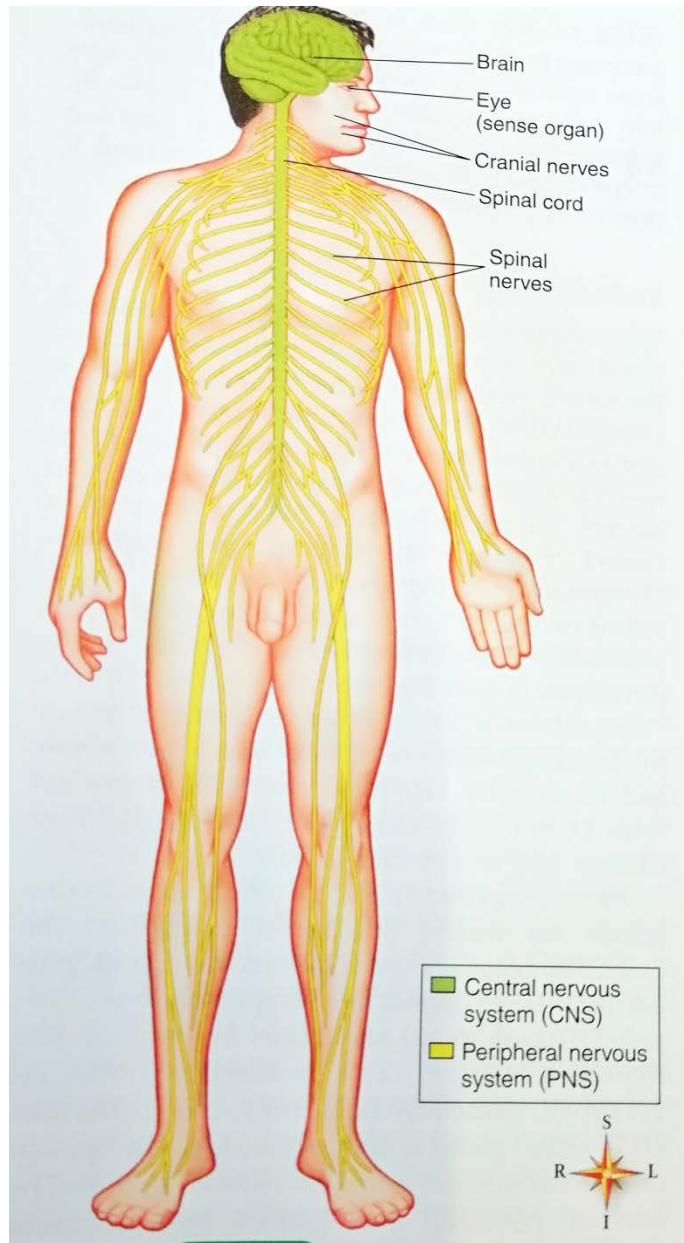
3 every area of the body. The extensive networking of the components of the nervous system makes it possible for this complex system to perform its primary functions. These include the following:

1. Communication between body functions
2. Integration of body functions
3. Control of body functions
4. Recognition of sensory stimuli

Unit 2- Lesson 3: Nervous Tissues

Step 2 (10'): Based on what you have read previously, in pairs answer these questions:

1. What are the functions of the nervous system?
2. What are the organs in the nervous system?
3. Looking at the following image say 1. how the nervous system is divided and 2. what the organs in each system are.
4. In your opinion, what do peripheral and central nervous mean?



Structure and function of the body (Thibodeau-Patton, 14th Edition- Elsevier)

Activity 2 (25'): Nervous system

Read the following text and then in pairs answer the questions

Book: Structure and function of the body (Thibodeau-Patton, 14th Edition- Elsevier)

ORGANS AND DIVISIONS OF THE NERVOUS SYSTEM

The organs of the nervous system as a whole include the brain and spinal cord, the numerous nerves of the body, the special sense organs such as the eyes and ears, and the microscopic sense organs such as those found in the skin. The system as a whole consists of two principal divisions called the *central nervous system* and the *peripheral nervous system* (Figure 8-1). Because the brain and spinal cord occupy a midline or central location in the body, together they are called the **central nervous system**, or **CNS**. Similarly, the usual designation for the nerves of the body is the **peripheral nervous system**, or **PNS**. The term *peripheral* is appropriate because nerves extend to outlying or peripheral parts of the body. A subdivision of the peripheral nervous system, called the **autonomic nervous system**, or **ANS**, consists of structures that regulate the body's automatic or involuntary functions (for example, the heart rate, the contractions of the stomach and intestines, and the secretion of chemical compounds by glands).

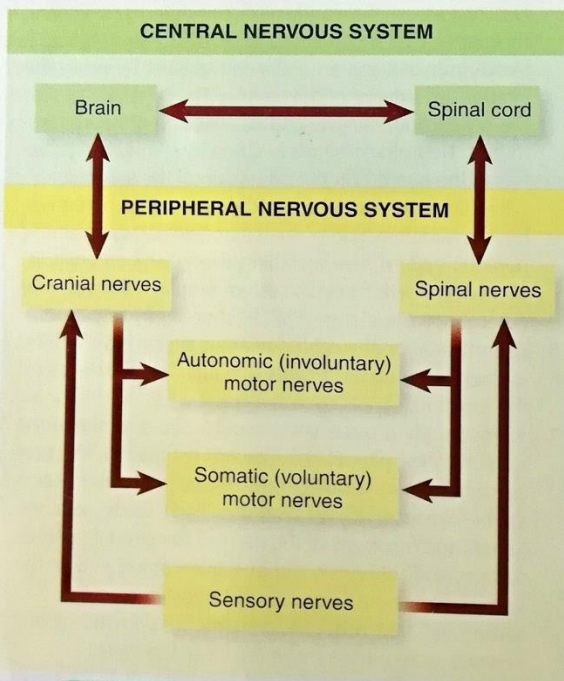


FIGURE 8-1 Divisions of the nervous system.

CELLS OF THE NERVOUS SYSTEM

The two types of cells found in the nervous system are called **neurons** (NOO-ronz) or nerve cells and **glia** (GLEE-ah), which are support cells. Neurons conduct impulses, whereas glia support neurons.

Neurons

Each neuron consists of three parts: a main part called the neuron **cell body**, one or more branching projections called **dendrites** (DEN-drytes), and one elongated projection known as an **axon**. Identify each part on the neuron shown in Figure 8-2. Dendrites are the processes or projections that transmit impulses to the neuron cell bodies, and axons are the processes that transmit impulses away from the neuron cell bodies.

The three types of neurons are classified according to the direction in which they transmit impulses:

1. Sensory neurons
2. Motor neurons
3. Interneurons

Sensory neurons transmit impulses to the spinal cord and brain from all parts of the body. Sensory neurons are also called **afferent neurons**.

Motor neurons transmit impulses in the opposite direction—away from the brain and spinal cord. They do not conduct impulses to all parts of the body—only to two kinds of tissue—muscle and glandular epithelial tissue. Motor neurons are called **efferent neurons**.

Interneurons conduct impulses from sensory neurons to motor neurons. They also often connect with each other to form complex, central networks of nerve fibers. Interneurons are sometimes called *central* or *connecting* neurons.

The axon shown in Figure 8-2, *B*, is surrounded by a segmented wrapping of a material called **myelin** (MY-eh-lin). Myelin is a white, fatty substance formed by *Schwann cells* that wrap around some axons outside the central nervous system. Such fibers are called **myelinated fibers**. In Figure 8-2, *B*, one such axon has been enlarged to show

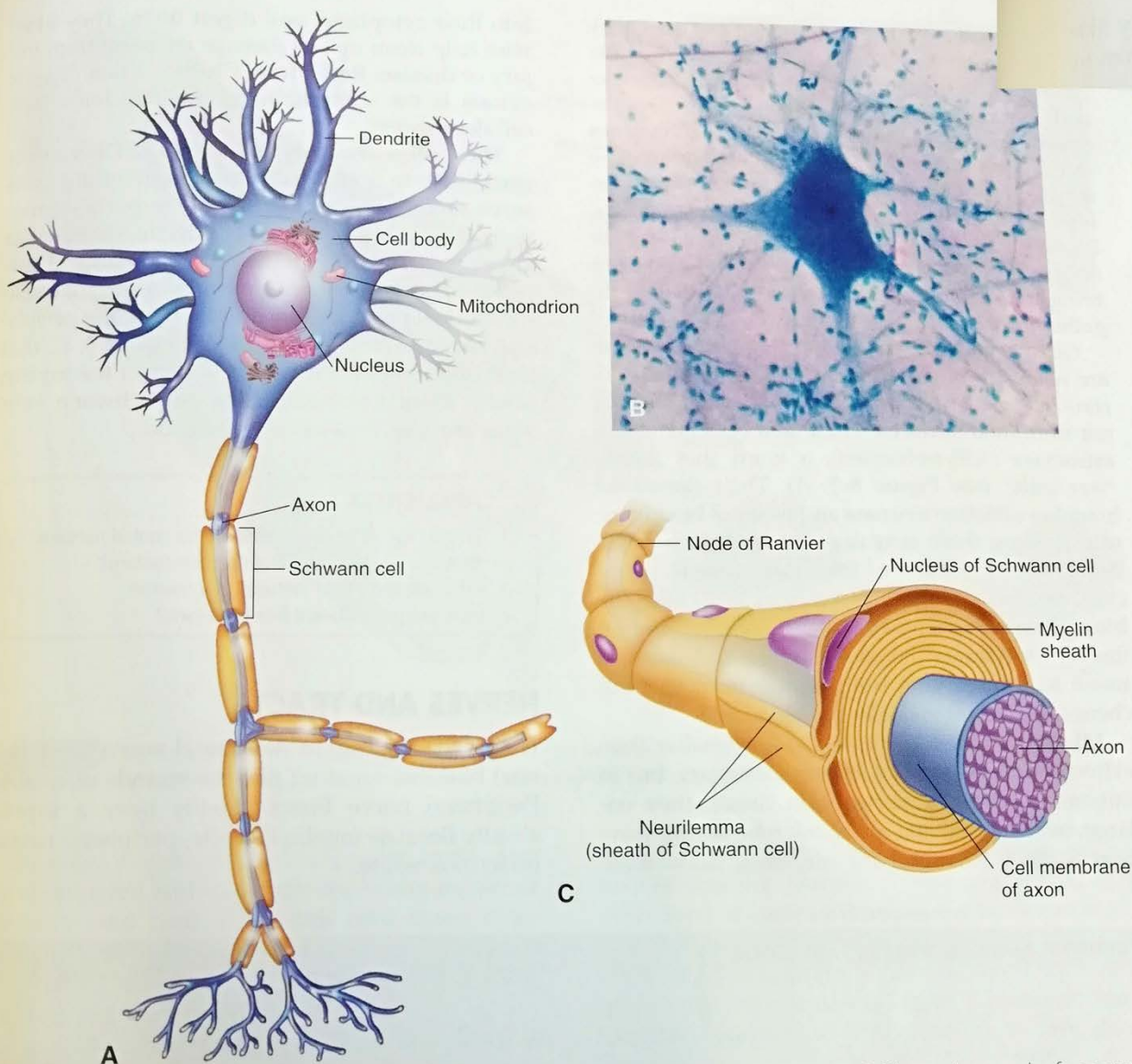


FIGURE 8-2 Neuron. A, Diagram of a typical neuron showing dendrites, a cell body, and an axon. B, Photomicrograph of a neuron. C, Segment of a myelinated axon cut to show detail of the concentric layers of the Schwann cell filled with myelin.

additional detail. **Nodes of Ranvier** (rahn-vee-AY) are indentations between adjacent Schwann cells.

The outer cell membrane of a Schwann cell is called the **neurilemma** (noo-ri-LEM-mah). It is clinically significant that axons in the brain and spinal cord have no neurilemma, because neurilemma plays an essential part in the regeneration of cut and injured axons. Therefore the potential

for regeneration in the brain and spinal cord is far less than it is in the peripheral nervous system.

- Questions:
1. *How is the peripheral nervous system divided?*
 2. *What are the major features of a neuron?*
 3. *What are the three different types of neurons? What are their functions?*

Activity 3 (10'): Autonomic Nervous system

The autonomic nervous system is a part of the peripheral nervous system that regulates the involuntary body functions. It is divided into two parts: parasympathetic and sympathetic. Both of these systems control the same group of body functions, but they have opposite effects on the functions that they regulate.

Based on the following image, write if the sentence refers to parasympathetic (P) or Sympathetic (S).

1. Constricts blood vessels _____
2. Stimulates bladder _____
3. Increases sweat secretion _____
4. Increases peristalsis _____
5. Inhibits defecation _____
6. Slows heartbeat _____
7. Dilates pupils _____
8. Stimulates “goose pump” _____
9. Increases secretion of digestive juices _____
10. Accelerates heartbeat _____

