



The Nervous System

Chapter 16 Lesson 1

Functions of the Nervous System

- Your brain is just one part of your nervous system- your body's communication network and control center.
- Your nervous system controls all your body's actions and functions.
- Your nervous system senses changes not only within your body but also outside of it in your environment and enables you to respond within fractions of a second.

Structure of the Nervous System

- There are two main divisions of the nervous system, the central nervous system (CNS), and the peripheral nervous system (PNS).
- The PNS gathers information from inside and outside the body.
- The CNS receives and analyzes this information and initiates responses.
- The PNS then picks up and carries the response signals.
- This information is transmitted throughout the body by a means of electrical charges or *impulses* at speeds up to 248 miles per hour.
- The messengers and receivers of these transmissions are **neurons** or *nerve cells*.

Functions of Neurons

- Each neuron is made up of three different parts:
- **Cell Body**- consists of a nucleus-the control center of the cell. The nucleus receives and sends nerve impulses.
- **Dendrites**- are branching projections of the cell body. They receive and carry impulses towards the cell body.
- **Axons**- a threadlike extension that carries impulses away from a cell body. Most have a myelin sheath that insulates the nerve fiber that speeds the transmission of impulses.

The Central Nervous System

- The CNS is made up of two parts, the spinal cord and the brain.
- The spinal cord runs down the central canal in your spine and is about 18 inches long. It is protected by cerebral spinal fluid and three layers of connective membranes called spinal *meninges*.
- In the center of the spinal cord is a region called the gray matter. Motor neurons and interneurons are located here whose function is to relay messages from the brain to muscles and glands.

The Brain

- The brain weighs about three pounds, contains almost 100 billion neurons, and is the largest most complex part of your nervous system.
- Your brain helps you receive and process messages- to think, remember, and reason- and coordinates muscular movement.
- Your brain is involved in your emotions and everything you sense. The brain makes up only 2% of your total body weight, but uses more than 20% of the oxygen you inhale.
- The brain has three main divisions: the cerebrum, the cerebellum, and the brain stem.

The Cerebrum

- Definition- *the largest most complex part of the brain.*
- This is the site of the most conscious and intelligent activities.
- Divided into two halves called *cerebral hemispheres.*
- The right hemisphere controls the muscular activity of and receives sensory input from the left half of the body. The left hemisphere does the same for the right.
- The left hemisphere is mainly responsible for language, logic, arithmetic, calculation, analysis and critical thinking.
- The right hemisphere is concerned with imagination, visual thinking, spatial relationships, artistic activities, and emotional responses such as color appreciation.

The Cerebrum cont.

- Each hemisphere has four lobes:
- The frontal lobe controls voluntary movements and also has a role in the use of language.
- The parietal lobe is involved in sensory information such as heat, cold, pain, touch, and body position.
- The occipital lobe contains the sense of vision.
- The temporal lobe contains the senses of hearing and smell, as well as memory, thought, and judgement.

The Cerebellum

The background of the slide is a deep blue gradient. In the upper portion, there are wispy, white clouds. Below the clouds, a thin, bright white horizontal line suggests a horizon. The lower two-thirds of the image are filled with a pattern of fine, white, concentric ripples, resembling the surface of water.