

Human Body - Part I

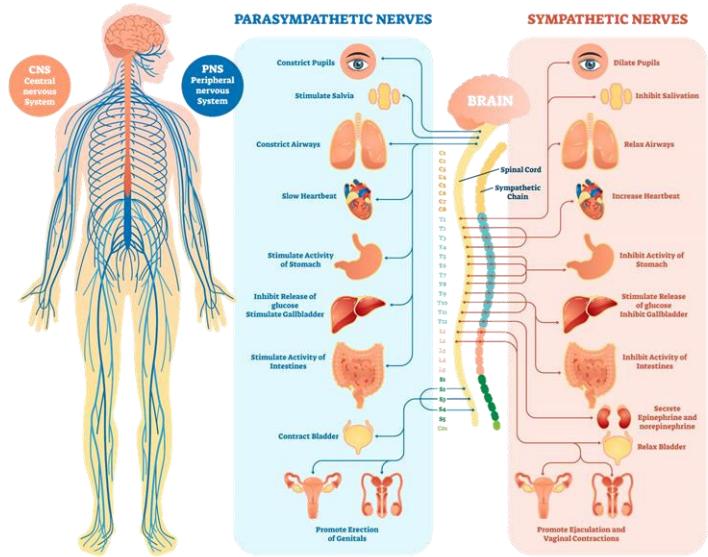
Section 4: The Nervous System

Human brains are like complex communication networks. The brain is a system of nerves that sends and receives electrical signals throughout the body. The nervous system's two main organs, the brain and the spinal cord play a vital role in the body's ability to collect information, process it, and respond to it.

The **nervous system** is made up of two divisions that work together: the **central nervous system** and the **peripheral nervous system**. The central nervous system is the control center of the body, which is made up of the brain and spinal cord. It processes information and then creates a response, which is then delivered to the correct part of the body via the peripheral nervous system.

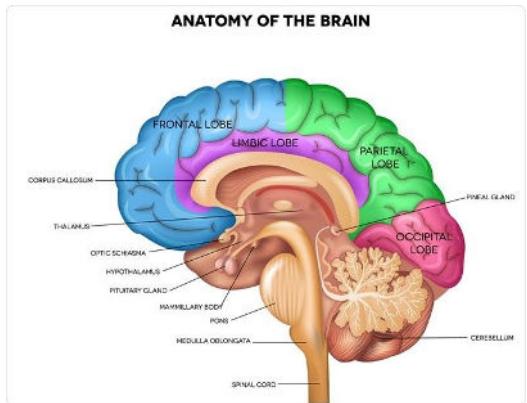
The control center of the nervous system is the brain. The **brain**, located in the skull, is comprised of three main regions. The **cerebrum** is the largest part of the brain, and it sits on top of the brain stem. It controls movement, the senses, speech, and abstract thought. This section of the brain is divided into two hemispheres. Each hemisphere controls different skills or ways of thinking. The right hemisphere of the brain is referred to as the analog brain. It controls creativity and artistic senses, processing information from the "big picture" first and then looking at the details. The left brain is sometimes called the digital brain since it controls logical thinking, reading, writing, and processing information analytically and sequentially. Finally, the cerebrum's outer layer is called the cerebral cortex, which controls body movements and processes information from the sense organs.

HUMAN NERVOUS SYSTEM



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Section 4: The Nervous System Continued



The **cerebellum** is the second largest brain region, located under the cerebrum and next to the brain stem. It coordinates the action of muscles and helps maintain balance. Hand-eye coordination develops here, giving the cerebellum a vital role in decision-making. The **brain stem** is the smallest of the three parts and is found underneath the cerebrum. It connects the brain and the spinal cord. It filters data to and from other parts of the brain and controls involuntary actions like breathing and heart rate.

The other nerves not found inside the central nervous system are located in the **peripheral nervous system**. The peripheral nervous system consists of a network of nerves that branch out from the central nervous system and connect it to the rest of the body. There are two divisions within the peripheral nervous system: the motor division and the sensory division. The motor division transmits impulses from the central nervous system to muscles and glands, allowing us to move. The sensory division transmits impulses from sense organs to the central nervous system, sending messages to the brain about what something might smell, taste, feel, look or sound like. A **reflex** is an automatic response that occurs rapidly and without conscious control. It helps protect the body.

The sensory receptors in our bodies allow us to detect or sense the physical aspects of our environment. Our senses include stimuli both inside and outside of the body. **Vision**, or sight, is our ability to see light. Light enters our eyes and stimulates the **rods** and **cones**, cells found in the **retina**. They send impulses to the optic nerve, and the brain interprets the image we see. **Hearing** is our ability to sense sound. The ears pick up sound waves caused by vibrations that the brain interprets. **Taste** and **smell** work closely together as both have sensory neurons that sense chemicals. The chemicals trigger responses in receptors in the nose and mouth. Taste is controlled by nerve cells on the tongue, whereas sensory neurons in the nose detect numerous smells. **Touch** is the body's ability to sense pain, pressure, or temperature. Sensory receptors pick up changes in these and send impulses to the brain or spinal cord.

Review:

1. What is the function of the central nervous system?
2. Describe characteristics of the cerebellum.
3. Can you identify the five senses?