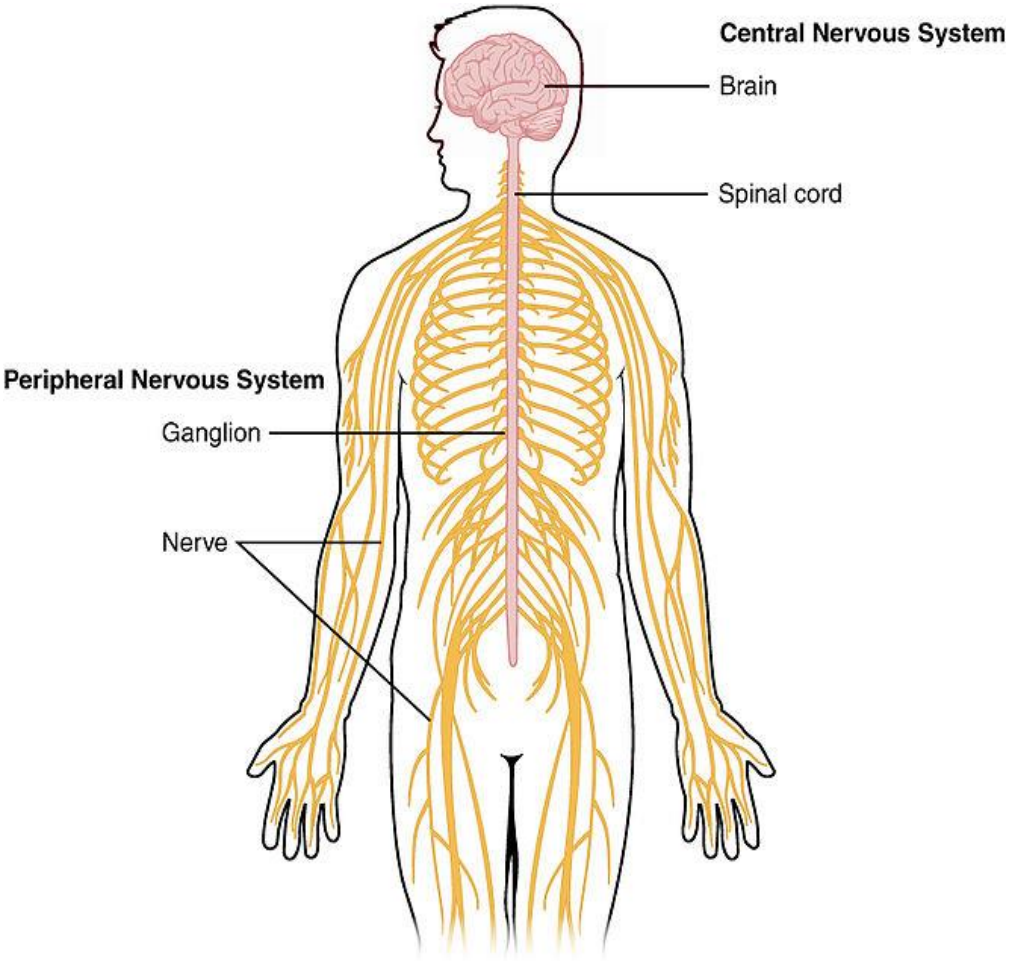
CNS – CENTRAL NERVOUS SYSTEM



The nervous system consists of the brain, spinal cord, and a complex network of neurons. This system is responsible for sending, receiving, and interpreting information from all parts of the body. The nervous system monitors and coordinates internal organ function and responds to changes in the external environment. This system can be divided into two parts:

the central nervous system,

the peripheral nervous system.

CNS is the processing center for the nervous system. It receives information from and sends information to the peripheral nervous system. The two main organs of the CNS are **the brain** and **spinal cord**. The brain processes and interprets sensory information sent from the spinal cord. Both the brain and spinal cord are protected by three layers of connective tissue called the meninges.

Brain

The brain is the control center of the body. It consists of three main components: the forebrain, the brainstem, and the hindbrain. The **forebrain** is responsible for a variety of functions including receiving and processing sensory information, thinking, perceiving, producing and understanding language, and controlling motor function. The forebrain contains structures such as the thalamus and hypothalamus which are responsible for such functions as motor control, relaying sensory information, and controlling autonomic functions. It also contains the largest part of the brain, the cerebrum. Most of the actual information processing in the brain takes place in the cerebral cortex.

The **midbrain** and the hindbrain together make up the brainstem. The midbrain is the portion of the brainstem that connects the hindbrain and the forebrain. This region of the brain is involved in auditory and visual responses as well as motor function.

The **hindbrain** extends from the spinal cord and contains structures such as the pons and cerebellum. These regions assist in maintaining balance and equilibrium, movement coordination, and the conduction of sensory information. The hindbrain also contains the medulla oblongata which is responsible for controlling such autonomic functions as breathing, heart rate, and digestion.

Spinal Cord

The spinal cord is a cylindrical shaped bundle of nerve fibers that is connected to the brain. The spinal cord runs down the center of the protective spinal column extending from the neck to the lower back. Spinal cord nerves transmit information from body organs and external stimuli to the brain and send information from the brain to other areas of the body. The nerves of the spinal cord are grouped into bundles of nerve fibers that travel in two pathways. Ascending nerve tracts carry sensory information from the body to the brain. Descending nerve tracts send information pertaining to motor function from the brain to the rest of the body.

Neurons

Neurons are the basic unit of the nervous system. All cells of the nervous system are comprised of neurons. Neurons contain nerve processes which are "finger-like" projections that extend from the nerve cell body. The nerve processes consist of axons and dendrites which are able to conduct and transmit signals. Axons typically carry signals away from the cell body. They are long nerve processes that may branch out to convey signals to various areas. Dendrites typically carry signals toward the cell body. They are usually more numerous, shorter and more branched than axons. Axons and dendrites are bundled together into what are called nerves. These nerves send signals between the brain, spinal cord, and other body organs via nerve impulses. Neurons are classified as either motor, sensory, or interneurons. Motor neurons carry information from the central nervous system to organs, glands, and muscles. Sensory neurons send information to the central nervous system from internal organs or from external stimuli. Interneurons relay signals between motor and sensory neurons.

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