

THE NERVOUS SYSTEM

Functions of the Nervous System

The **nervous system** is a network of communication used by body parts to maintain homeostasis and bodily functions.

The nervous system gathers information from inside and outside of the body, responds to the information that it gathers and helps to maintain homeostasis.

- A change in the environment causes an organism to react called a **stimulus**.
- The nervous system will then examine the information from the stimulus and produce a **response**.
- Homeostasis is maintained by the nervous system responding

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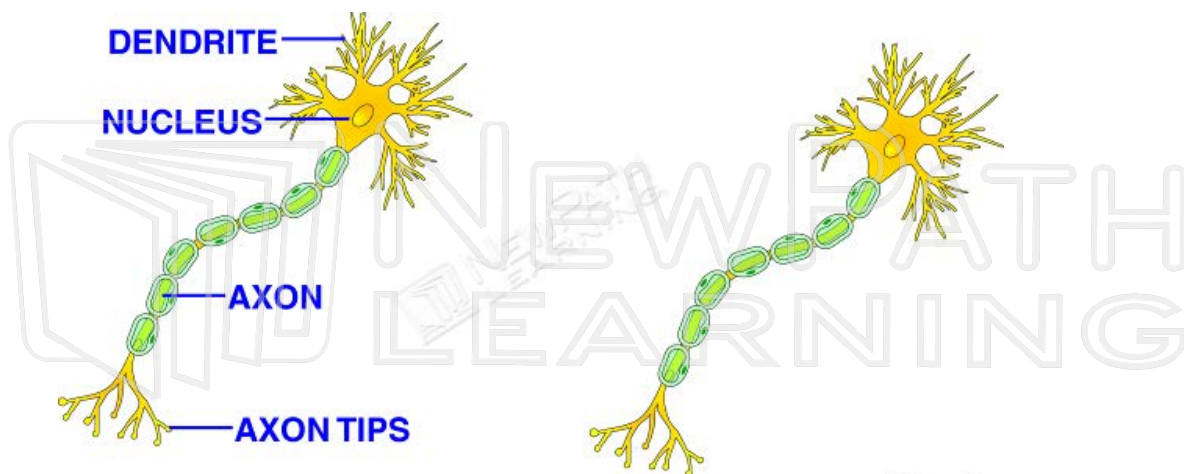
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axon carries messages away from the cell body of a neuron.



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There is only one axon attached to each neuron. Both axons and dendrites are called nerve fibers. Nerve fibers are wrapped together like a rope that is made of many thin strings and covered in connective tissue and called a **nerve**.

Three types of neurons

There are three different types of neurons: sensory neurons, interneurons, and motor neurons. The three different types of neurons will work together to carry messages all throughout the nervous system.

- The **sensory neuron** picks up the stimulus from inside or outside of the body and turns it into a nerve impulse. Every nerve impulse begins in the **dendrites** of a neuron and move rapidly along the cell until it reaches an **axon** tip.
- There is a small space or gap in between the axon tip and the

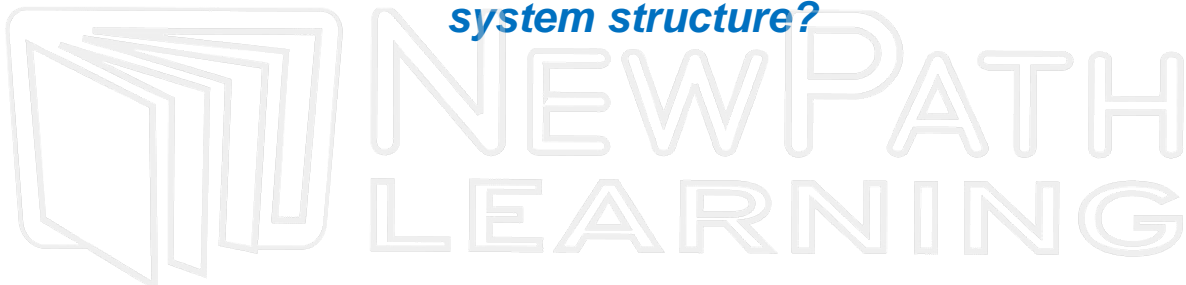


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Lesson Checkpoint:

Where does every nerve impulse begin in the nervous system structure?



The Central Nervous System

All of the information inside and outside of the body is brought to the central nervous system. The **central nervous system** controls the functions of the body.

Organs of the Central Nervous System

The **brain and the spinal cord** are the organs of the central nervous system. Notice that the organs of the central nervous system are located in the center of the body.

- The **brain** is located within the skull and controls most of the functions of the body.
- The **spinal cord** is located in the center of the back. It links the brain to the majority of the nerves in the peripheral nervous system.

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Cerebrum: The largest portion of the brain is the cerebrum and is located at the top of the brain. The cerebrum interprets information from the senses, controls the skeletal muscles, and carries out processes like judging, remembering, and learning.

The cerebrum is divided into the right and left cerebrum. Each half has its own functions. The right cerebrum receives impulses from the skeletal muscles on the left side of the body and the left cerebrum receives impulses from the right.

Cerebellum: The cerebellum helps to keep your balance by coordinating muscle movements.

Brainstem: The brainstem controls the involuntary muscles of the body, such as your heart.

The Spinal Cord

The spinal cord is housed within the vertebral column. The spinal cord connects the brain with the peripheral nervous system. The spinal cord is also protected by connective tissue and fluid.

Lesson Checkpoint:
Which part of your brain controls your decision-making process?

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Nerves from the peripheral nervous system come in pairs. There are identical nerves on each side of the body. Nerve impulses are able to travel in both directions, which increases the speed of response from the brain. There are two different types of nerves that make up the peripheral nervous system.

Two types of nerves

They are the somatic nervous system and the autonomic nervous system. The **somatic nervous system** controls voluntary movements. The **autonomic nervous system** controls involuntary movements.

Reflexes

A **reflex** is a rapid action that occurs without control, automatically. As we have already learned, the brain controls the movement of skeletal muscles.

In certain instances, the spinal cord causes the skeletal muscles to contract. This speeds up reactions that may cause damage to the body.

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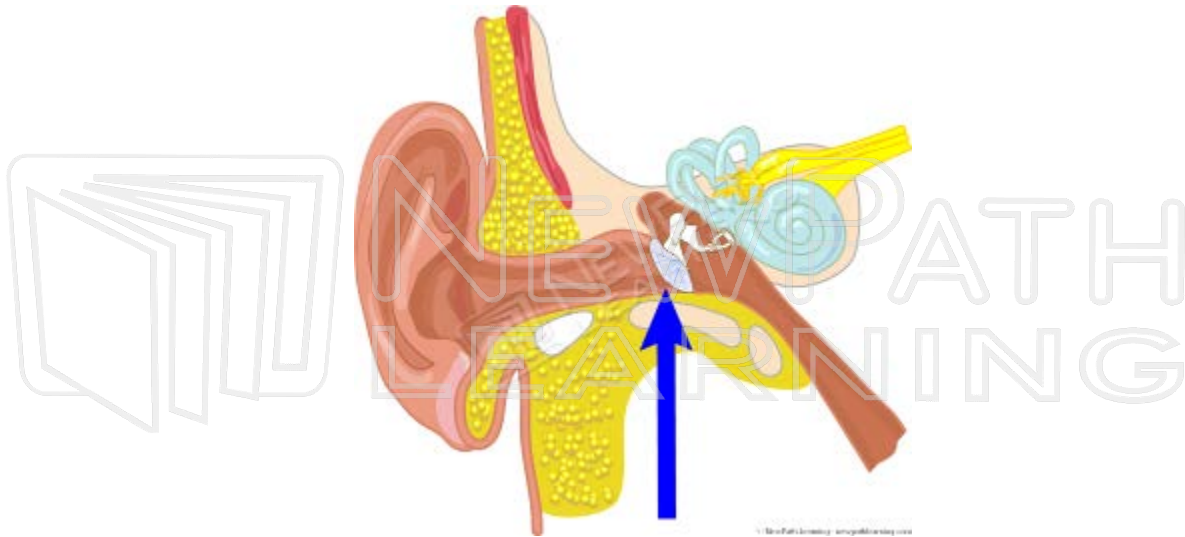
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funnel. At the end of the ear canal is a structure that catches the sound called the eardrum.



- The **eardrum** is a membrane that vibrates when sound waves enter the ear.



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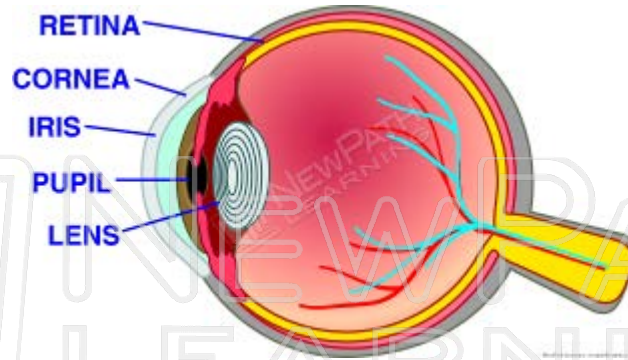
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The eyes are sense organs that respond to variations in light. The nerve impulses created by the eyes are sent to the brain where they are interpreted into sight.

- Light enters the eyes through the **cornea**, which is a clear tissue covering the front of the eye.
- The light continues until it reaches the opening that lets light into the eye called the **pupil**.
- The amount of light that enters the eye is controlled by the circular muscles of the **iris**. After the light passes through the pupil, it enters a flexible structure that focuses light called the **lens**.
- The light then moves through a gel like substance until it reaches the **retina**. The retina is a layer of receptor cells that line the back portion of the eye.



Smell: There are receptors in the nose that react with chemicals within the air. When you smell something, chemicals have reacted with those receptors and the information about the smell is sent to the brain where it is processed. The human nose is able to tell the difference between more than 50 different odors.

Task



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