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.

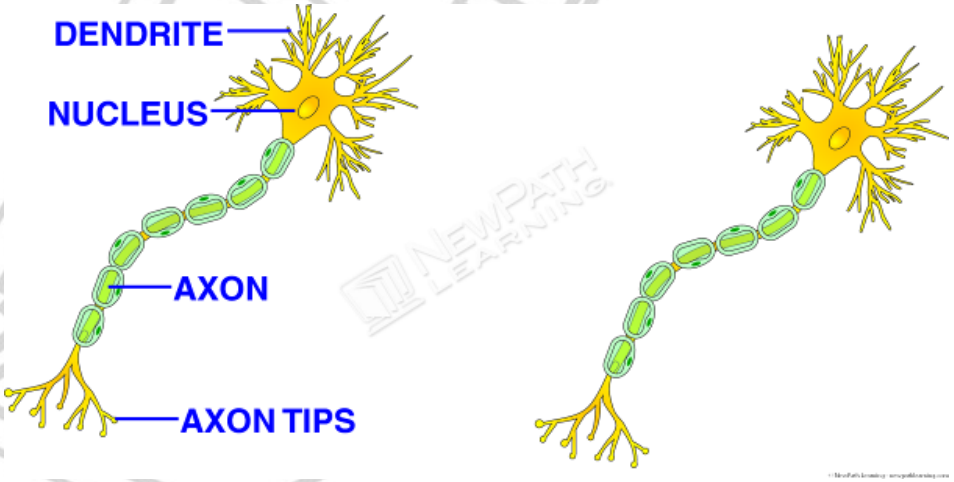
The nervous system gathers information from inside and outside of the body, responds to the information that it gathers and helps to maintain homeostasis.

- 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 and making the necessary changes to adjust to the environment.

There are two parts to the nervous system: the central nervous system an[illegible]ne the structures [illegible]ems.

Neuron [illegible]

The nervou[illegible]**s**.
The messa[illegible]s. The structure o[illegible]es of neurons. [illegible]There are threadlike structures that surround the cell body called dendrites. A **dendrite** carries messages to the cell body of a neuron. Another threadlike structure attaches to the cell body called an axon. The **axon** carries messages away from the cell body of a neuron.



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 dendrite, neuron, muscle, or other cell the axon is connected to called a **synapse**.
- The nerve impulse must cross the synapse in order to pass the impu[PREVIEW] mpulse reac[Please login or register to download the printable version of this study guide.] hat allows the i[www.newpathlearning.com] **neu**[] on to neur[]
- The [] ons until it reac[] located in the b[] s on to other neurons.
- A **motor neuron** receives a nerve impulse from another neuron and sends the message to a muscle, causing it to contract.

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.

Impulses from the peripheral nervous system travel through the spinal cord to get to the brain. The brain responds with an impulse that travels back through the spinal cord and out into the peripheral nervous sy

The Brain

There are and they are all inte ive tissue, and fluid t maged. There are are the cerebrum, cerebellum, and brainstem.

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.

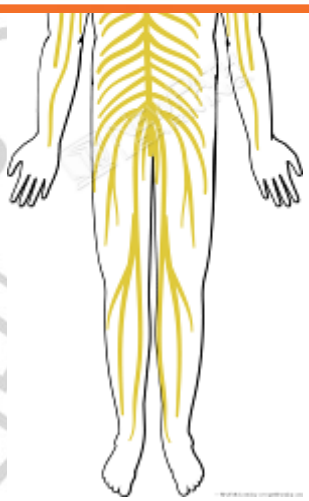
The Spinal Cord

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?

Peripheral Nervous System

The peripheral nervous system consists of all of the nerves that branch throughou



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.

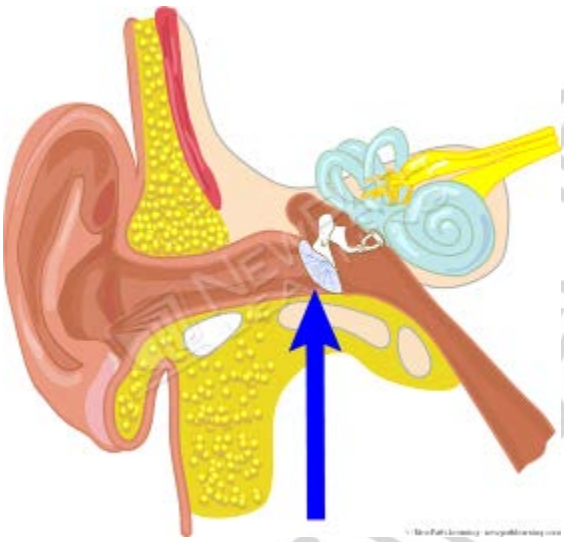
The senses

Hearing: The stimulus of sound is picked up by the ears, which respond to

The Ears: ck up vibrations rs is converted is interprete that an object mal a circular arrangeme

There are three parts that make up the ear: the outer ear, middle ear, and inner ear.

- The outer ear is the portion that is visible and is shaped like a funnel. At the end of the ear canal is a structure that catches the sound called the eardrum.

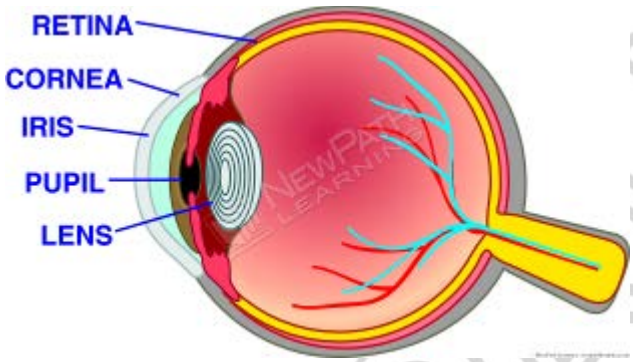


- The **eardrum** is a membrane that vibrates when sound waves reach it. The eardrum is a structure that separates the outer and middle ear.
- Within the middle ear are structures called the hammer, anvil, and stirrup, which are the smallest bones in the body. These stru ear to a stru
- The uid and resp id moves with

Balance: rcular canals. The **semicircular canals** are structures that give an individual their sense of balance.

Sight: 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.

Taste: The sense of taste also depends on chemicals.

- When something is eaten, the **saliva** begins to break the molecules down.
- The ith the chen e buds on the t pecific place ocated.
- The erpreted.

Touch: Th eptors pick up informa temperature.