Department of biology

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(animal physiology)

Stage (-3-)

LEC- ((8))

Nervous System

By

Dr. Nadhema Bahaa Wetwet

Nervous System

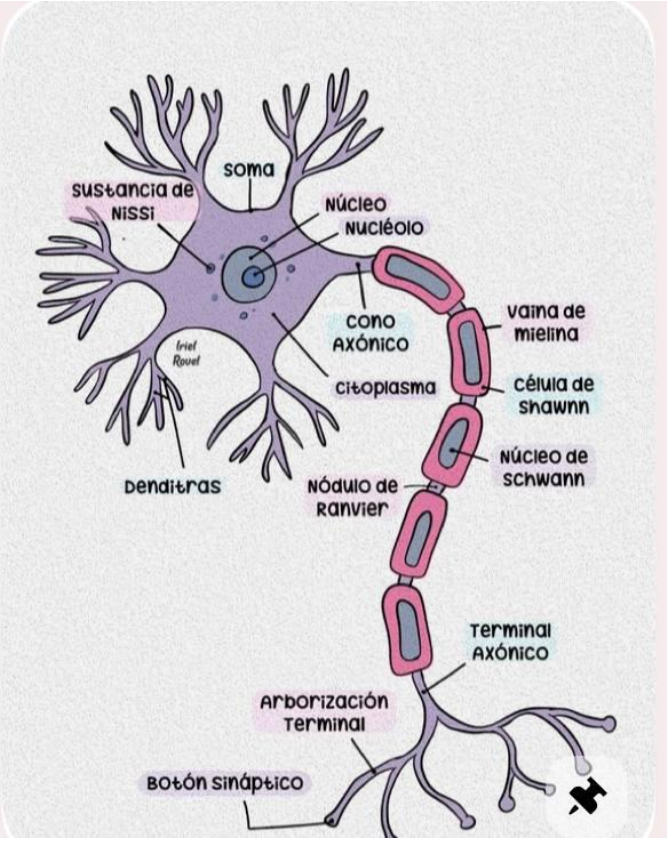
• The nervous system controls and coordinates functions throughout the body and responds to internal and external stimuli. Nearly all multicellular organisms have communication systems.

• Specialized cells carry messages from one cell to another. Smooth and efficient communication through the body.

• Messages carried by nervous system are electrical signals called impulses. Cells that transmit these impulses are called **neurons** (basic units of nervous system).

3 types of neurons:

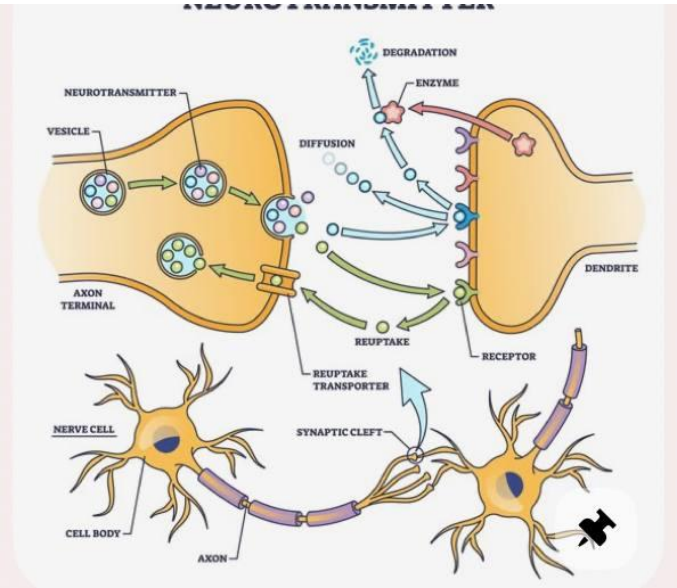
- **Sensory:** carry impulses from sense organs (eyes, ears, etc) to the spinal cord and brain.
- **Motor:** carry impulses from the brain and spinal cord to muscles and glands
- **Interneurons:** connect sensory and motor neurons and carry impulses between them.



Nerve Impulse

An impulse begins when a neuron is stimulated

by another neuron or the environment.



Synapse

The location (Space between neurons) where a neuron can transfer an impulse to another cell. Neurotransmitters are chemicals used by neurons to transmit an impulse across the synapse.

Human Nervous System :

Divided into two major divisions:

1) **Central Nervous System (CNS)** (Brain and Spinal Cord):

   Relays messages, processes info and analyzes information.

2) **Peripheral Nervous System (PNS)** (Motor and sensory nerves):

   Receives information from the environment and relays commands from the CNS to organs and glands.

Central Nervous System

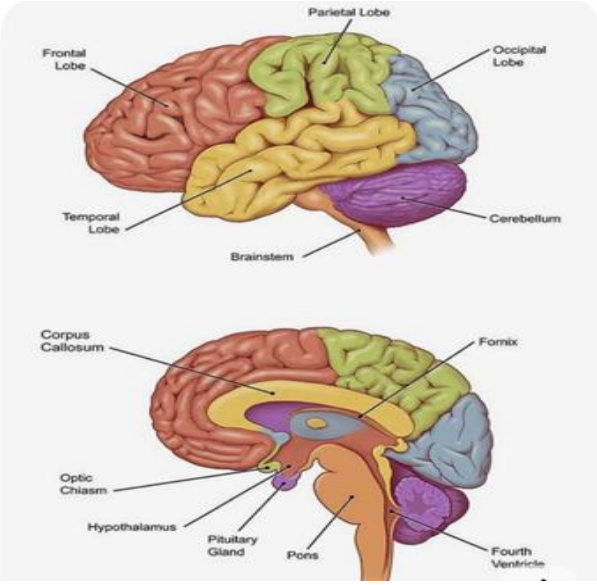
a) Brain

– Cerebrum

– Cerebellum

– Brain Stem

– Thalamus and hypothalamus



Brain Made of 50-100 billion neurons and divided in to 4 lobes or regions:

- **Frontal Lobe** : memory, judgment, inhibitions, personality
- **Temporal Lobe** : Long term memory, auditory processing
- **Occipital Lobe** : Vision processing
- **Parietal Lobe** : Sensory integration

b) Spinal Cord

- Main communications link between the brain and the rest of the body.

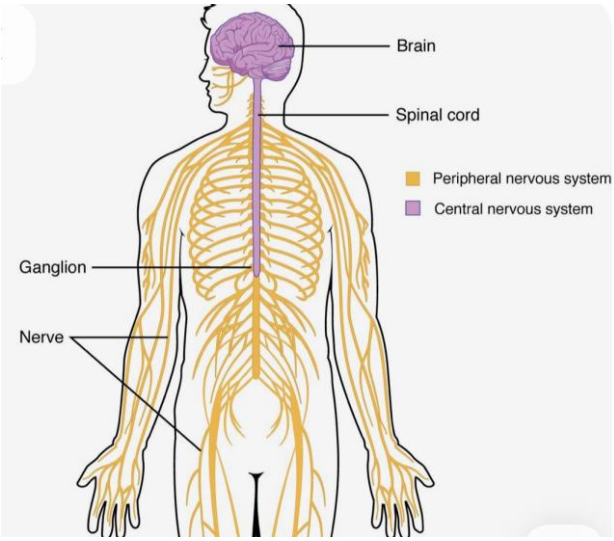
- Certain kinds of information (reflexes) are processed in spinal cord.
- Reflex is a quick, automatic response to a stimulus, allows your body to respond to danger immediately without thinking.

Peripheral Nervous System

Lies outside of CNS and consists of all the nerves and cells that are not a part of the brain or spinal cord.

Divided into 2 divisions:

- **Sensory**
- **Motor**



✓ **Sensory division:** transmits impulses from sense organs to the CNS.

✓ **Motor division:** transmits impulses from CNS to muscles and glands.

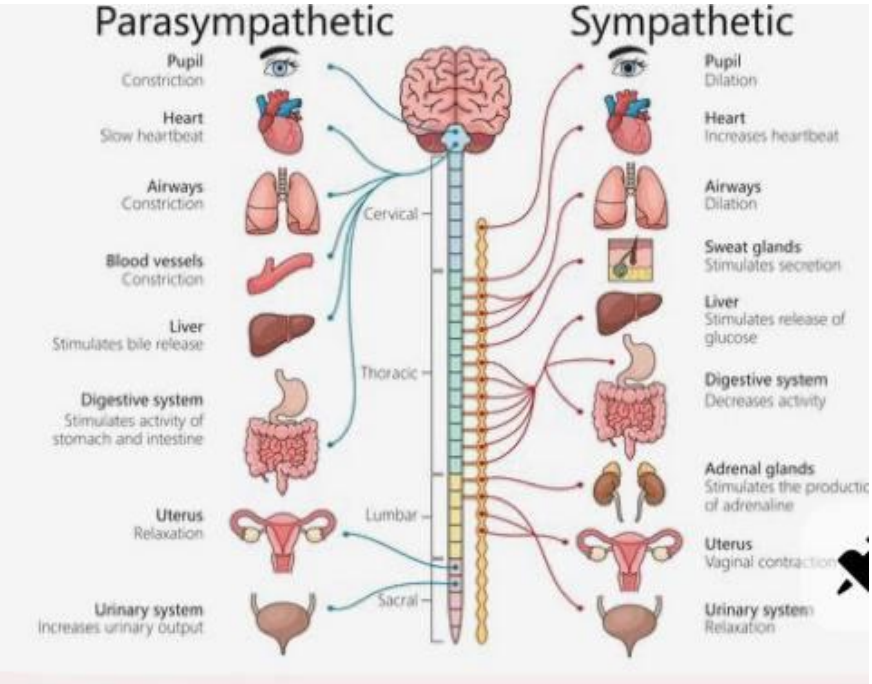
1. **somatic nervous system**- regulates conscious controlled activities.

2. **autonomic nervous system**- regulates activities that are automatic or involuntary.

Divided into

-Sympathetic

-parasympathetic nervous system.


Parasympathetic
Pupil
Constriction
Heart
Slow heartbeat
Airways
Constriction
Blood vessels
Constriction
Liver
Stimulates bile release
Digestive system
Stimulates activity of stomach and intestine
Uterus
Relaxation
Urinary system
Increases urinary output
Cervical
Thoracic
Lumbar
Sacral
Sympathetic
Pupil
Dilation
Heart
Increases heartbeat
Airways
Dilation
Sweat glands
Stimulates secretion
Liver
Stimulates release of glucose
Digestive system
Decreases activity
Adrenal glands
Uterus
Relaxation

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