Functions of the Nervous System:

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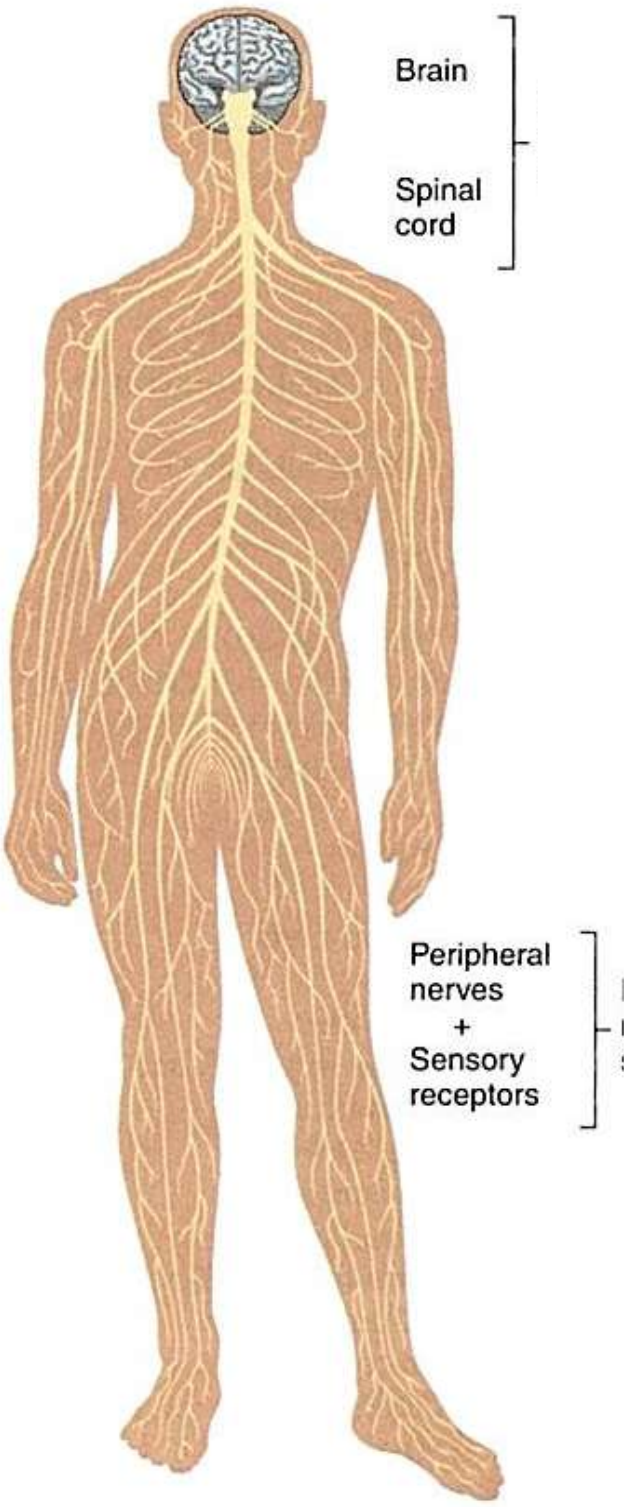
Structures of the Nervous System:

Brain, Spinal Cord, Nerves, and Sensory Organs

- **Central Nervous System (CNS) -**
- **Peripheral Nervous System (PNS)** -
- **Autonomic Nervous System (ANS)** -



The Nerves -

1. One or more bundles of neuron cells
2. Connect the brain and the spinal cord with other parts of the body

a. Tract -	
- Ascending tracts	carry impulses _____ the brain
- Descending tracts	carry impulses _____ from the brain
b. Ganglion –	
c. Plexus -	
d. Innervation -	
e. Receptors -	
f. Stimulus -	
g. Impulse -	

The Neurons - basic cell of the nervous system

1. **Types of Neurons: - ACE:**

Table 10.1

TYPES OF NEURONS

Afferent neurons (**AF**-er-ent)
Also known as **sensory neurons,** they emerge from the skin or sense organs and carry impulses toward the brain and spinal cord.

Connecting neurons Also known as **associative neurons,** they carry impulses from one neuron to another.

Efferent neurons (**EF**-er-ent)
Also known as **motor neurons,** they carry impulses away from the brain and spinal cord and toward the muscles and glands.

2. **Neuron Parts:** consists of cell body, several dendrites, single axon, and terminal fibers

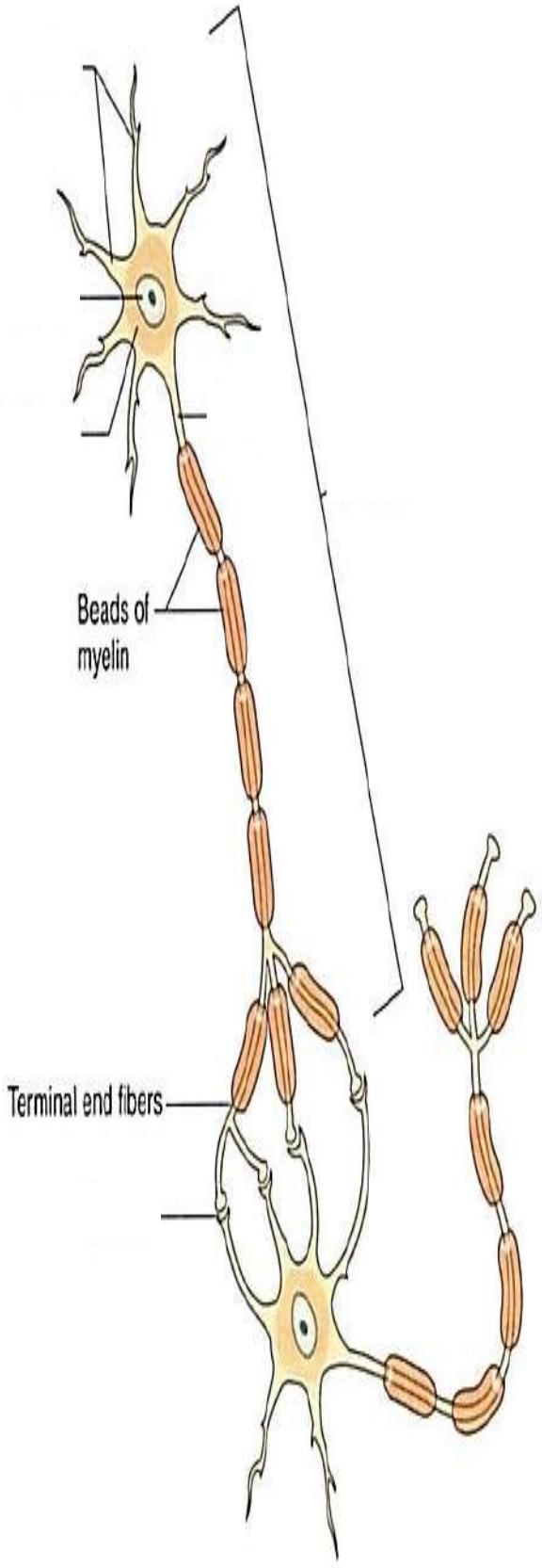
a. Dendrites -	
b. Axon - i. Protected by a fatty tissue covering: **myelin**	
c. Terminal end fibers -	
d. Synapse -	
e. Neurotransmitters - At least 30 neurotransmitter have been identified	

Table 10.2

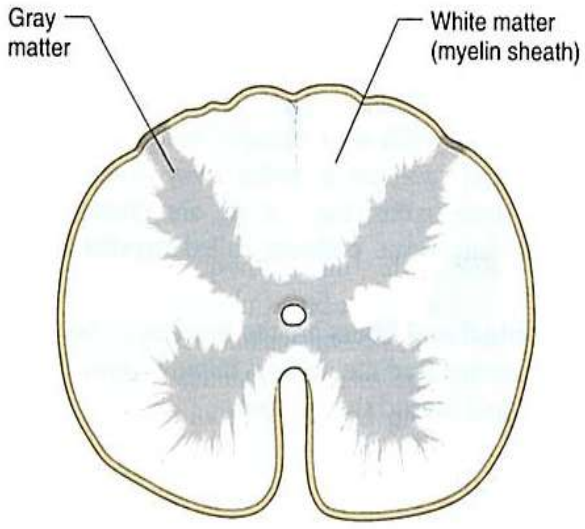
EXAMPLES OF NEUROTRANSMITTERS AND THEIR FUNCTIONS

Acetylcholine (**ass**-eh-til-**KOH**-leen)	Released at some synapses in the spinal cord and at neuromuscular junctions; influences muscle action.
Dopamine (**DOH**-pah-meen)	Released within the brain; is thought to cause some forms of psychosis and abnormal movement disorders such as Parkinson's disease.
Endorphins (en-**DOR**-fins)	Released within the spinal cord in the pain condition pathway; inhibit the conduction of pain impulses and act as natural pain relievers.
Serotonin (**sehr**-oh-**TOH**-nin or **seer**-oh-**TOH**-nin)	Released in the brain; has roles in sleep and pleasure recognition.

Neuroglia -

Myelin Sheath - white protective covering over some nerve cells including parts of the spinal cord, white matter of the brain, and most peripheral nerves.

- **White matter** -
    - **Myelinate -** having a myelin sheath
- **Gray matter** -



The Central Nervous System: (CNS)

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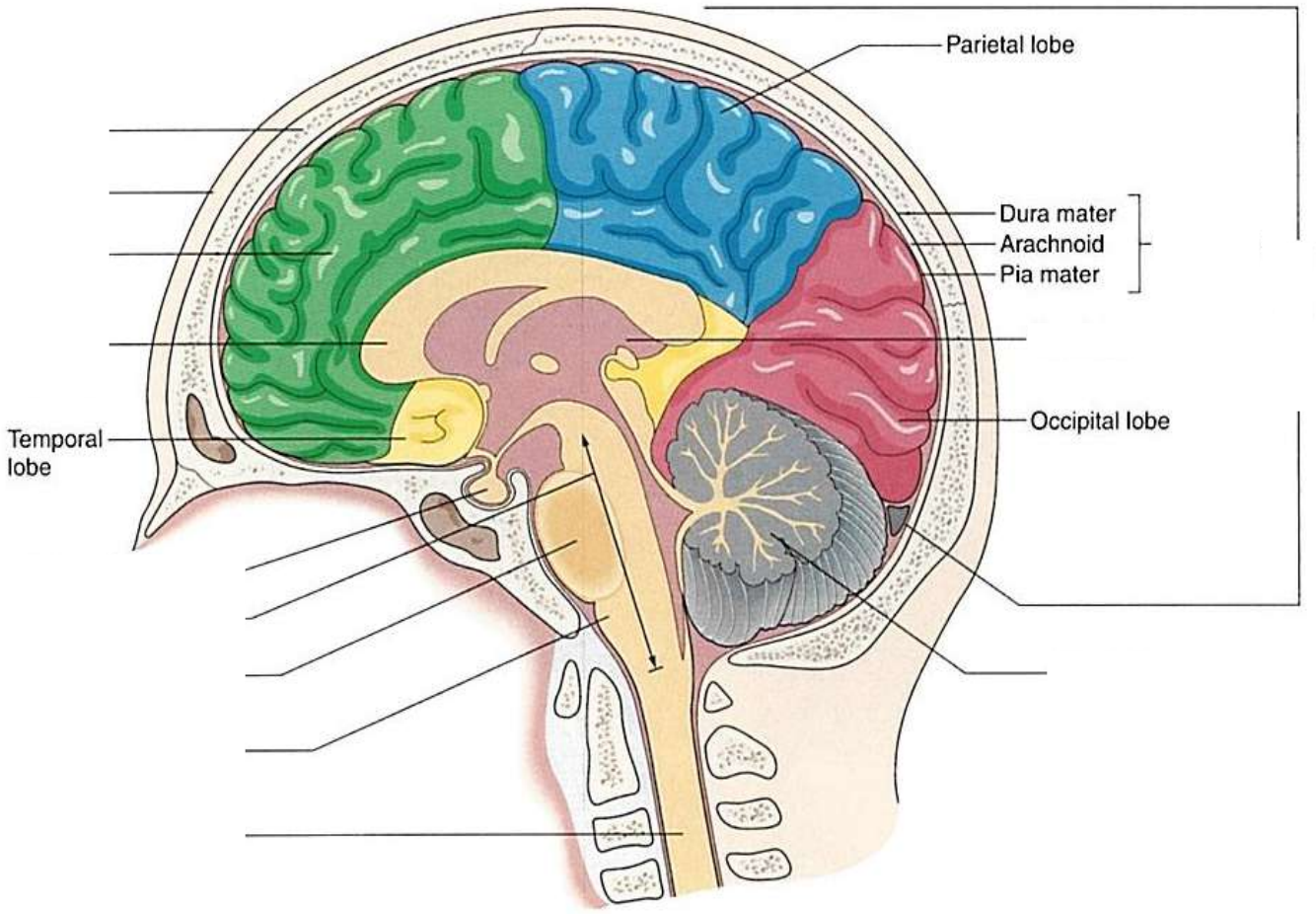


The Meninges - _____ layers of connective tissue membrane that enclose the brain and spinal cord

1. Dura Mater -

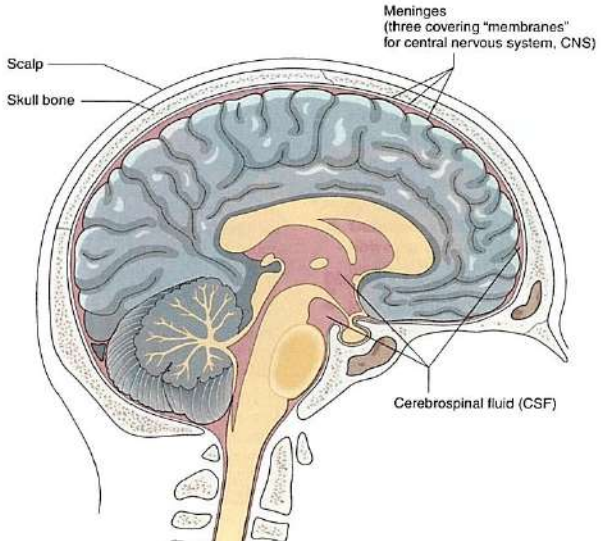
- **Epidural Space -**
  - Contains fat and supportive connective tissues to cushion the dura mater
- **Subdural Space** –

2. Arachnoid Membrane - 2nd layer surrounding the brain and spinal cord

- Resembles:
- Loosely attached to the other meninges to allow space for fluid between the layers
- **Subarachnoid Space** -
  - Contains **cerebrospinal fluid**

3. Pia Mater - 3rd layer of the meninges

- Delicate connective tissue with a rich supply of _____



Cerebrospinal Fluid - (CFS)

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-
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The Cerebrum - largest and uppermost portion of the brain

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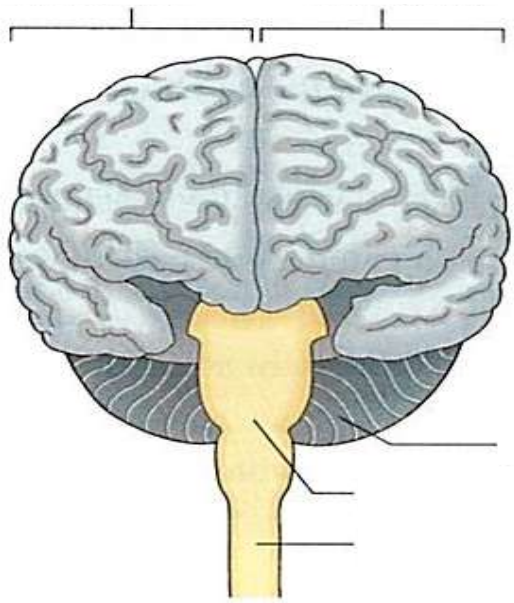
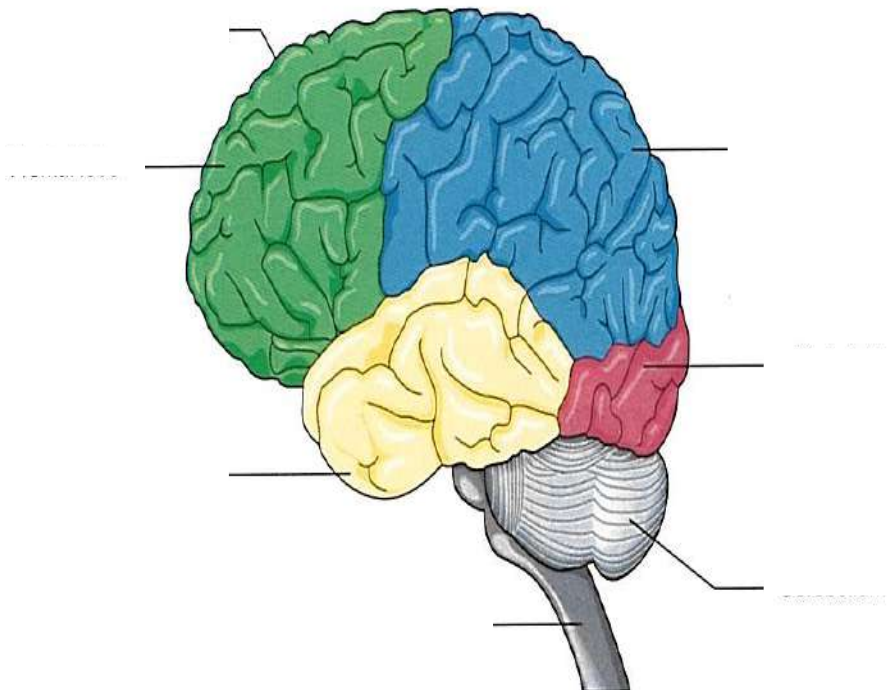
Cerebral -	
Cerebral Cortex - ■ Outer layer of the cerebrum and is arranged in folds	
Cerebral Hemispheres - ○ Connected at the lower midpoint by the **corpus callosum**	

The Lobes of the Brain - divided into 4 lobes

Frontal lobe –	
Parietal lobe –	
Occipital lobe –	
Temporal lobe –	

The Ventricles –

- _____ of them
- Within the _____ region of the _____
- Contains _____ _____ _____

The Thalamus - Located below the cerebrum

-

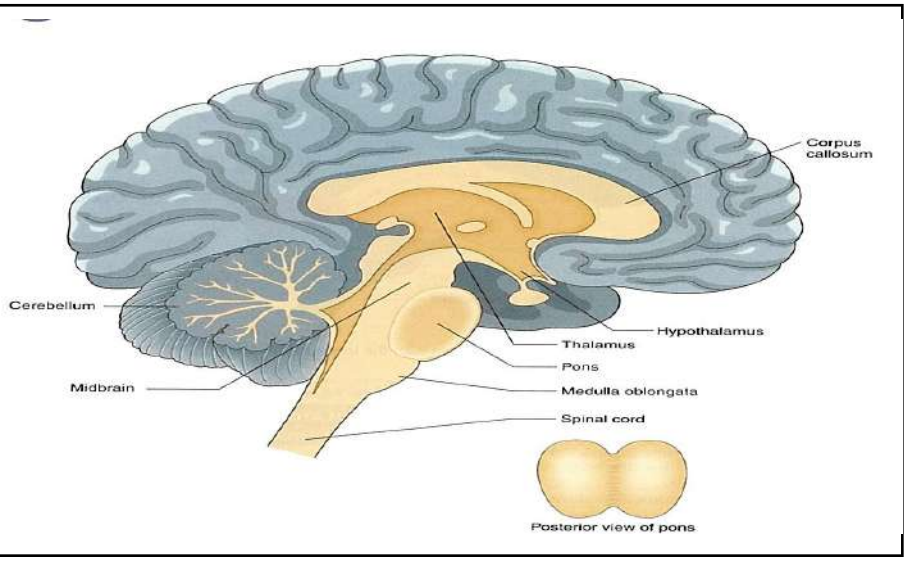
The Hypothalamus - below the thalamus

-

REGULATORY FUNCTIONS OF THE HYPOTHALAMUS

1. Regulates and integrates the autonomic nervous system, thereby controlling heart rate, blood pressure, respiratory rate, and digestive tract activity.
2. Regulates emotional responses and behavior.
3. Regulates body temperature.
4. Regulates food intake by controlling hunger sensations.
5. Regulates water balance and thirst.
6. Regulates sleep-wakefulness cycles.
7. Regulates endocrine system activity.

The Cerebellum - 2nd largest part of the brain; located at the back of the _____ below the _____ part of the _____

•	
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The Brainstem - stalklike portion of the brain that connects the _____

_____ with the _____ _____

- Made up of the _____. _____, and the _____ _____
- **The Midbrain** -
    - Conduction pathways to and from higher and lower centers
- **The Pons** - means bridge
    - Base of the brain
    -
- **The Medulla Oblongata** - located at the lowest part of the brainstem
    -

The Spinal Cord - pathway for _____ going to and from the _____

-
- Protected by **CFS** and surrounded by the **3 meninges**
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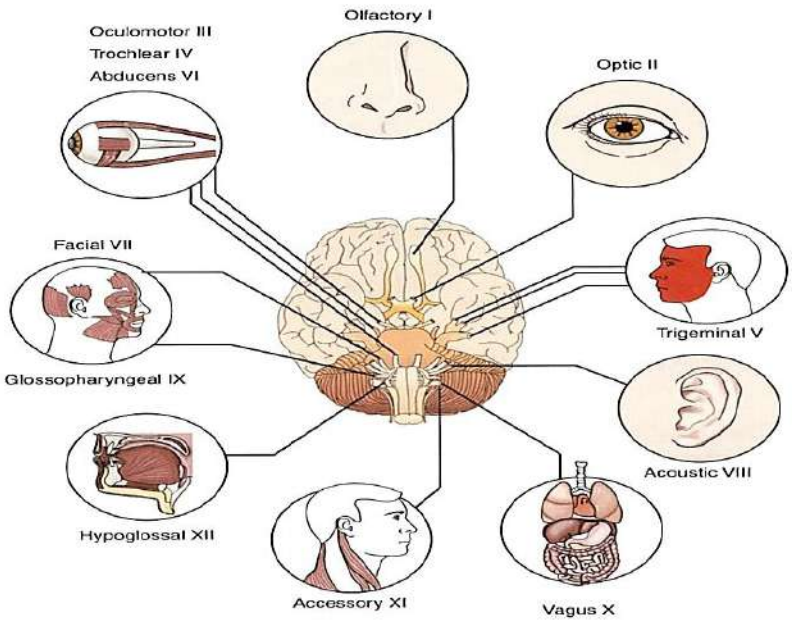
The Peripheral Nervous System:

Consists of the cranial nerves and the spinal nerves

The Cranial Nerves - _____ pairs that originate from the undersurface of the brain • •	

The Nervous System

The Spinal Nerves - _____ pairs

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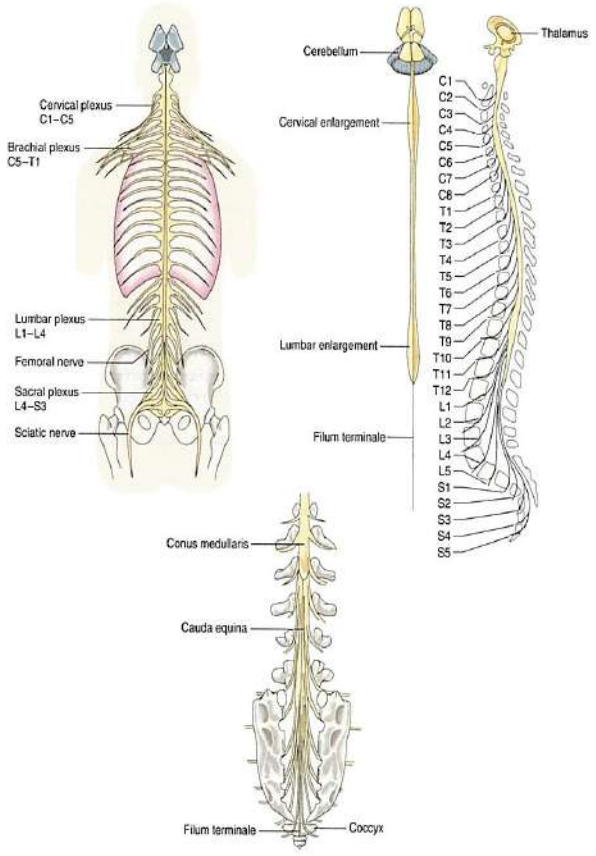

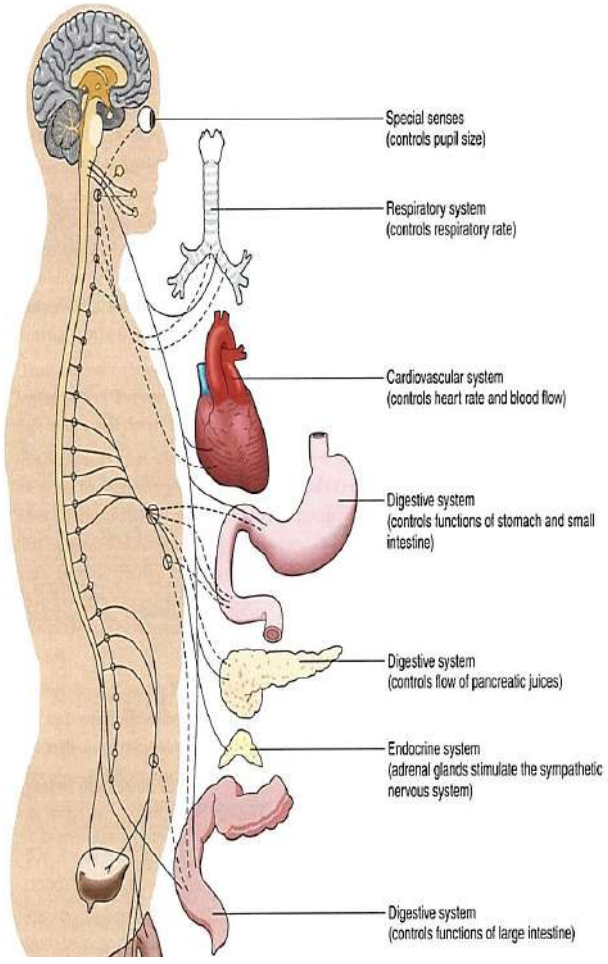

The Autonomic Nervous System: (ANS)

Controls the involuntary actions of the body

1.
2.

- Both help to maintain **Homeostasis**

Contrasting Actions

Sympathetic

Prepares the body for emergency and stressful situations by increasing the breathing rate, heart rate, and blood flow to muscles

Parasympathetic

Returns the body to normal after a stressful response. It also maintains normal body functions during ordinary circumstances that are not emotionally or physically stressful