



## **Divisions of the nervous system**

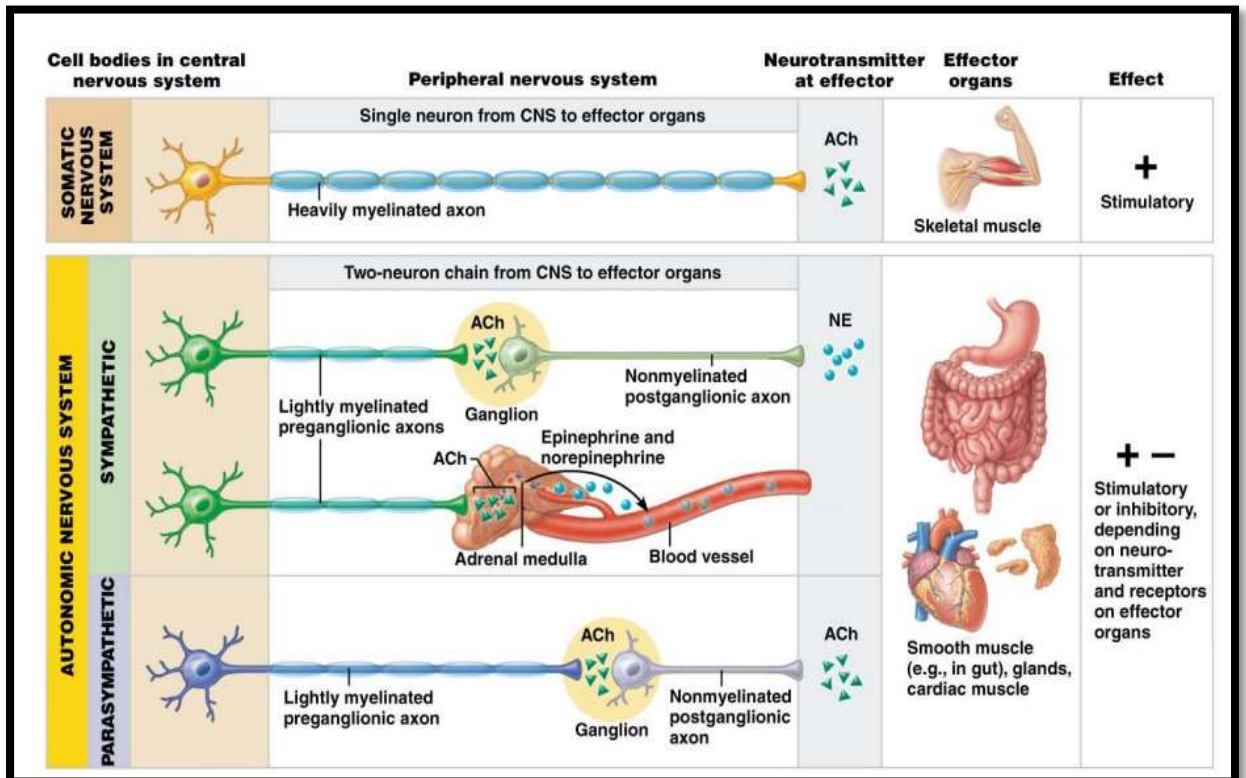
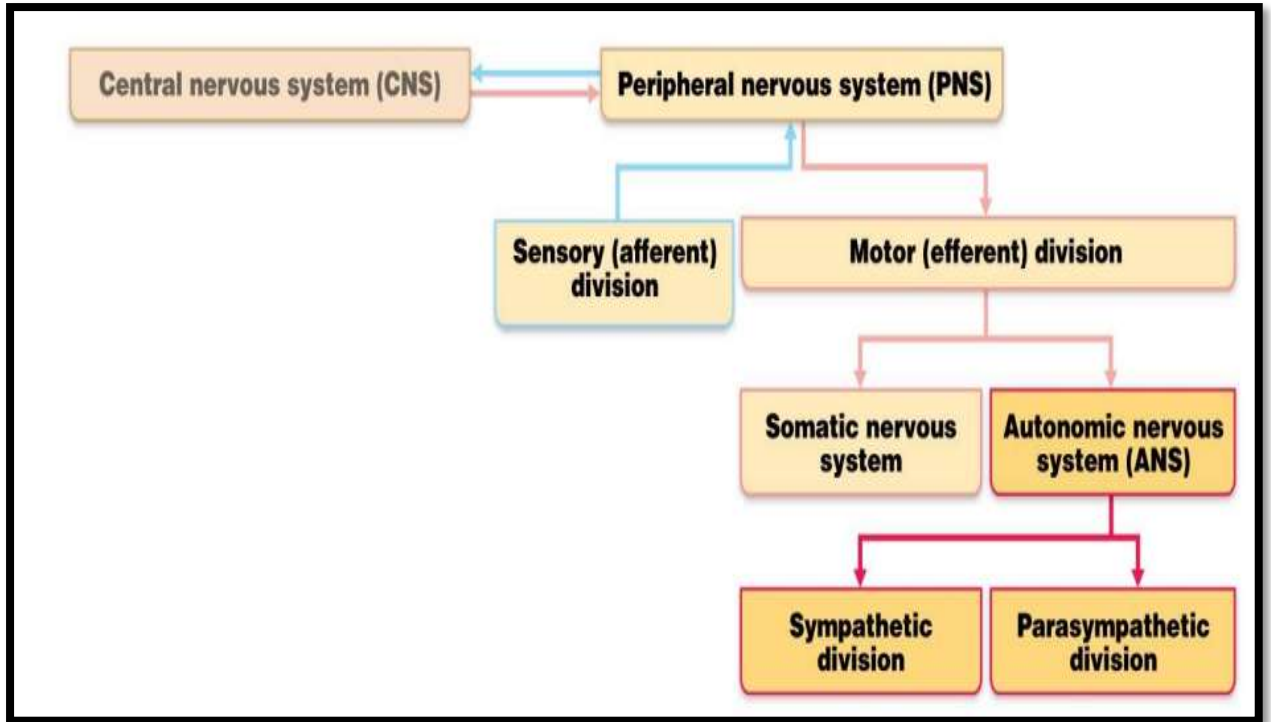
♣ The nervous system consists of the central nervous System (CNS) and the Peripheral Nervous System (PNS).

CNS is composed of the brain (located in the cranial cavity) and the spinal cord (located in the vertebral cavity), which serve as the main control centers for all body activities.

PNS is composed of nerves derived from the brain and spinal cord (12 pairs of cranial nerves and 31 pairs of spinal nerves) which serve as linkage between the CNS and the body.

PNS can be subdivided into sensory (afferent) nerves and motor (efferent) nerves. Sensory nerves send nerve impulse from the body to CNS to effector organs. Motor nerves are divided into the somatic nervous system (SNS) which regulates the voluntary contraction of the skeletal muscles, and autonomic nervous system (ANS) which regulates the involuntary control of smooth, cardiac muscles and glands.

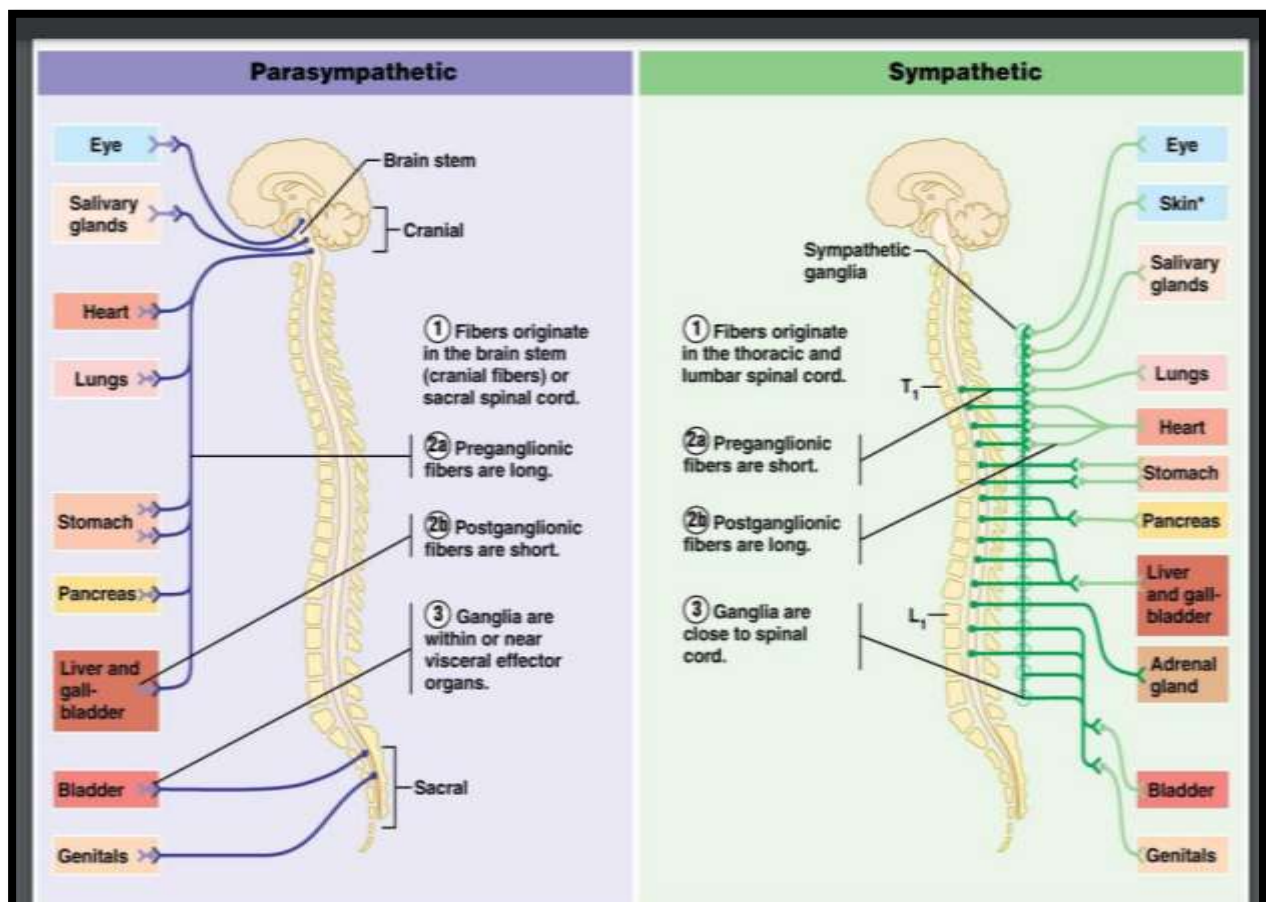
Finally, the ANS can be divided into sympathetic and parasympathetic branches where in general sympathetic nerves stimulate activities of the effect or organs (except digestive organs) and parasympathetic nerves inhibit activities of the effect or organs (except digestive organs).



ANS together with the endocrine system controls the body's internal organs .

- It innervates smooth muscles, cardiac muscle , and glands , controlling the circulation of blood , activity of the G.I . Tract and body temp .
- Characteristics :
  1. Innervates smooth muscle , cardiac muscle and glands of internal organs .
  2. Involuntary , are reflexes controlled .
  3. Two neuron chain
    - a. preganglionic neurons – originate in the brain or spinal cord .
    - b. postganglionic neurons – originate in the ganglion located outside the CNS .

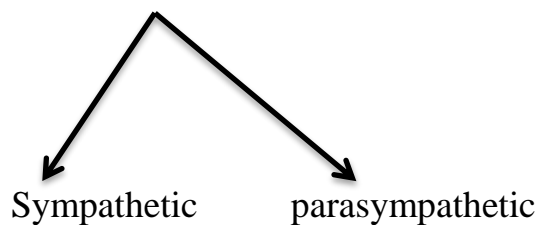
### Anatomy of ANS



### Two neuron chain:

- a. cell body of first neuron is in CNS.
- b. Axon of first neuron: preganglionic fibers synapse with soma of second neuron.
- c. second neuron is in ganglia outside the CNS (in PNS).
- d. Axon of second neuron: postganglionic fibers innervates effector organ.

Tow division



### Sympathetic Nervous System

Generally stimulates the effector organ (except in digestive tract) .It is activated in emergencies, flight– or– fight reaction, in the sense that the body can either quickly flee or "take a stand".

-The preganglionic fibers of the sympathetic nervous system produce Acetylcholine and are called **cholinergic** fibers.

-Most postganglionic fibers produce norepinephrine (noradrenalin) and are called adrenergic fibers (exceptions are the sweat glands and blood vessels in skin).

-Location of ganglia is within a few cm of CNS, along the vertebral column (Para vertebral and prevertebral [collateral] ganglia).

-Sympathetic fibers originate from the thoracolumbar region of the spinal cord (T1 – L2 ).

-Short preganglionic fibers.

- Long postganglionic fibers.

-Postganglionic fibers are distributed throughout the body.





and consequently the excretion of waste products. - The chemical transmitter at both pre and postganglionic synapses in the parasympathetic system is Acetylcholine (Ach)