PARASYMPATHATIC NERVOUS SYSTEM

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INTRODUCTION

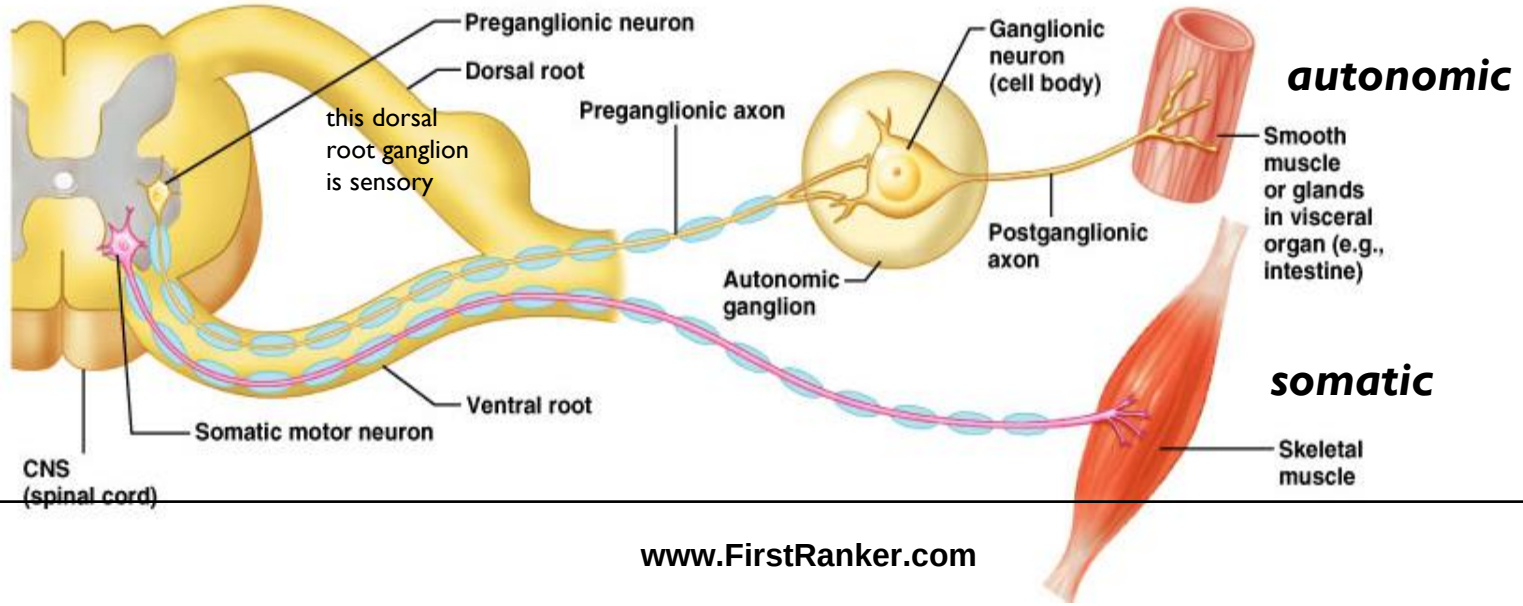
- ANS is the subdivision of the peripheral nervous system that regulates body activities that are generally ***not under conscious control***
- Composed of a special group of neurons serving:
  - Cardiac muscle (the heart)
  - Smooth muscle (walls of viscera and blood vessels)
  - Internal organs
  - Skin

DIFFERENCE BETWEEN THE MOTOR PATHWAYS OF THE VOLUNTARY SOMATIC AND AUTONOMIC NERVOUS SYSTEM

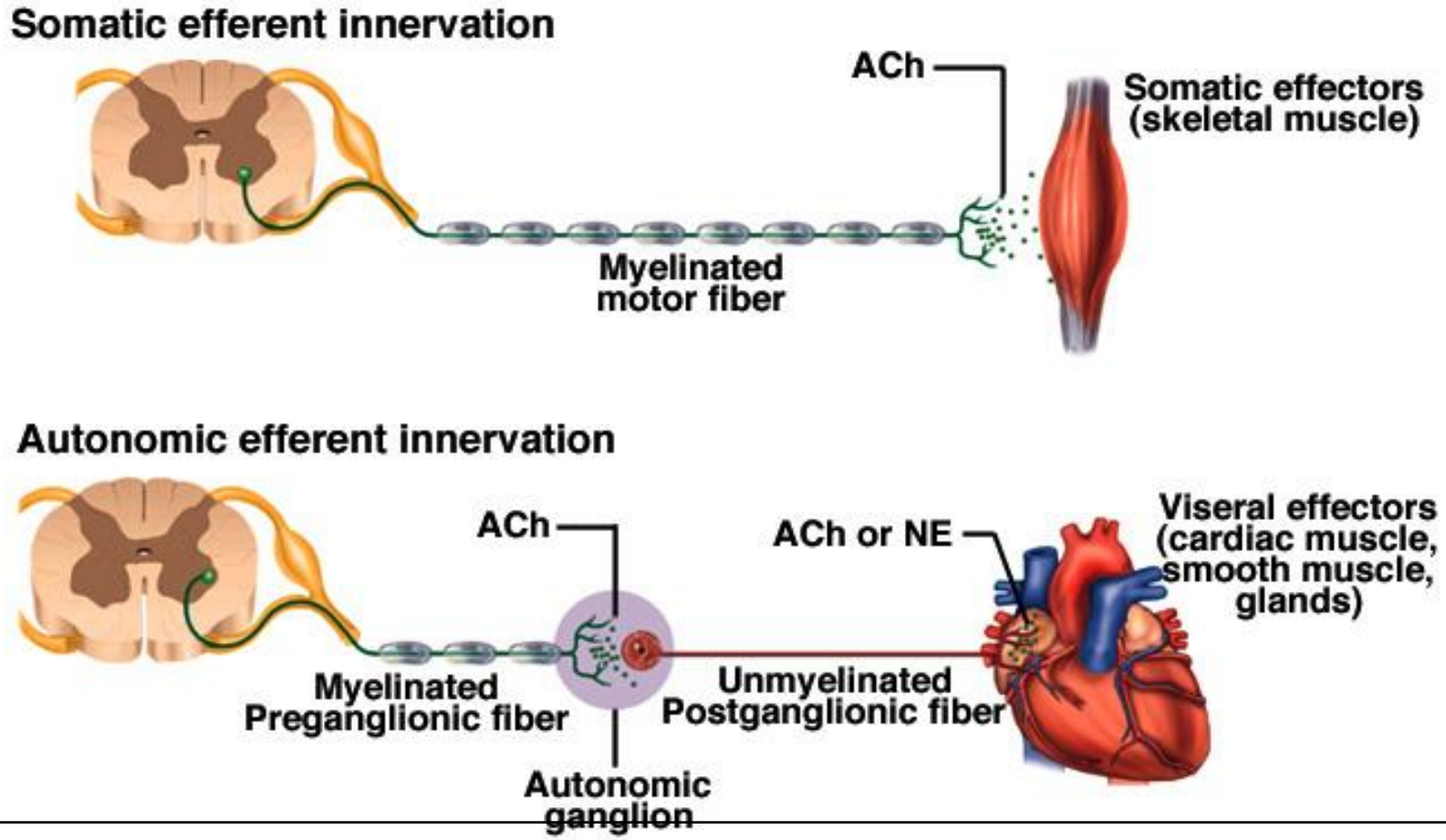
- Somatic division:
  - Cell bodies of motor neurons reside in CNS (brain or spinal cord)
  - Their axons (sheathed in spinal nerves) extend all the way to their skeletal muscles
- Autonomic system: chains of two motor neurons
  - 1st = preganglionic neuron (in brain or cord)
  - 2nd = gangionic neuron (cell body in ganglion outside CNS)
  - Slower because lightly or unmyelinated

- Axon of 1st (*preganglionic*) neuron leaves CNS to synapse with the 2nd (*ganglionic*) neuron
- Axon of 2nd (*ganglionic*) neuron extends to the organ it serves

Diagram contrasts somatic (lower) and autonomic:



SOMATIC VERSUS AUTONOMIC PATHWAYS



DIVISIONS OF THE AUTONOMIC NERVOUS SYSTEM

- Parasympathetic division
- Sympathetic division

Serve most of the same organs but cause opposing or antagonistic effects

Parasysmpathetic: routine maintenance

"rest &digest"

Sympathetic: mobilization & increased metabolism

"fight, flight or fright" or "fight, flight or freeze"

EFFERENTS

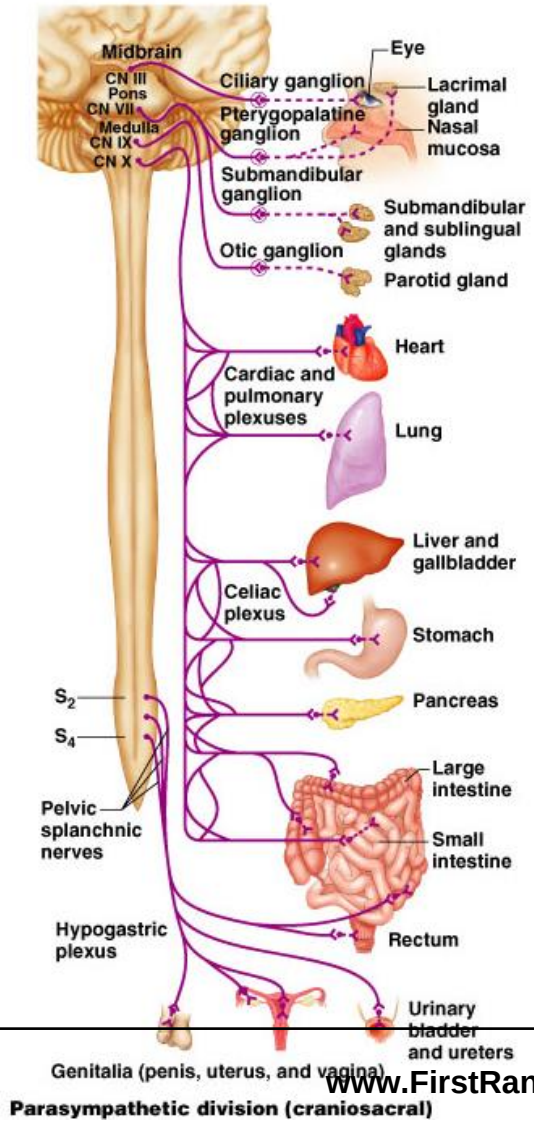
- Cranial Component

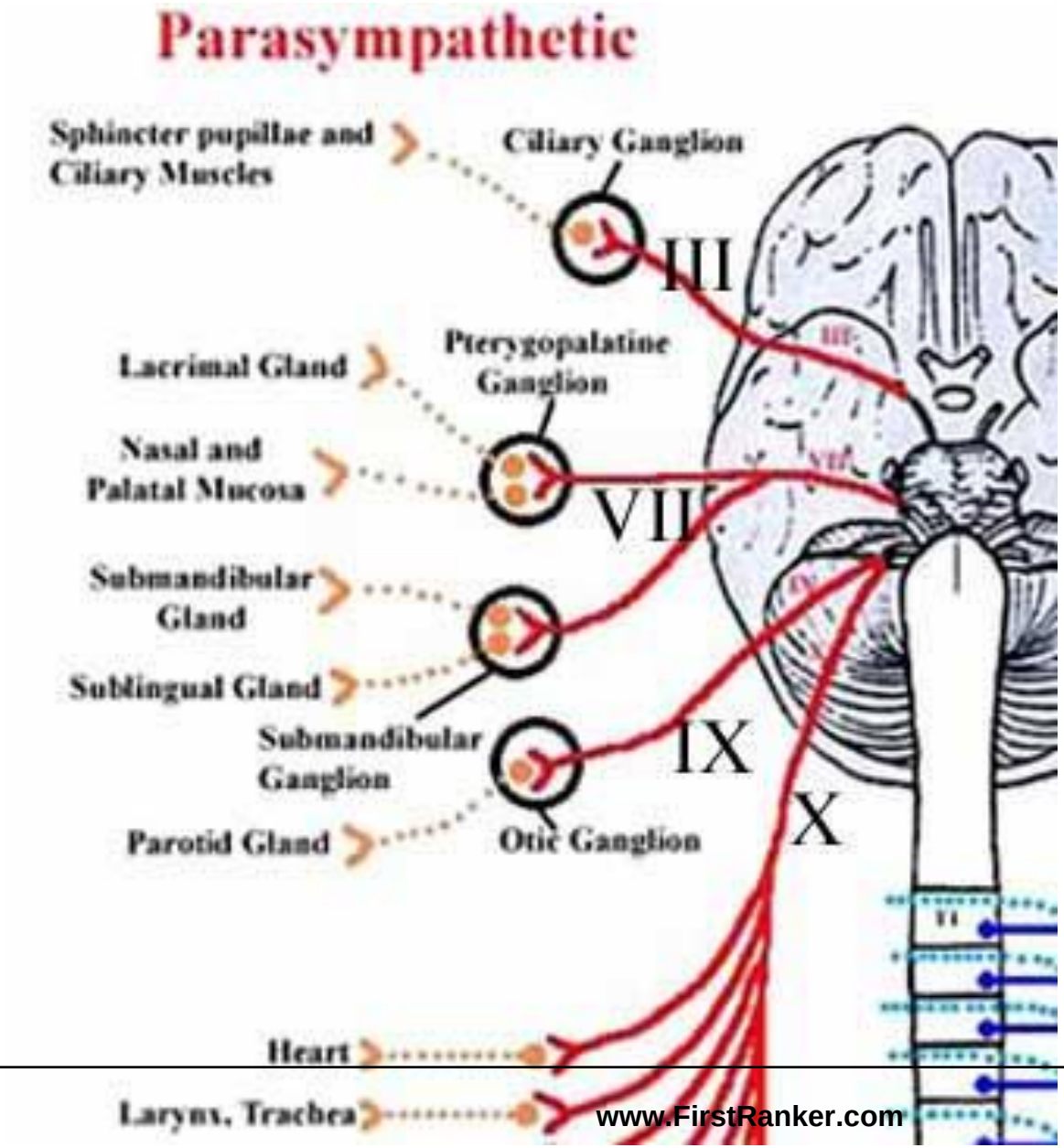
(form part of nuclei of occulomotor, facial ,glassopharyngeal and vagus nerves)

- Sacral component

in 2^{nd},3^{rd} and 4^{th} sacral segment

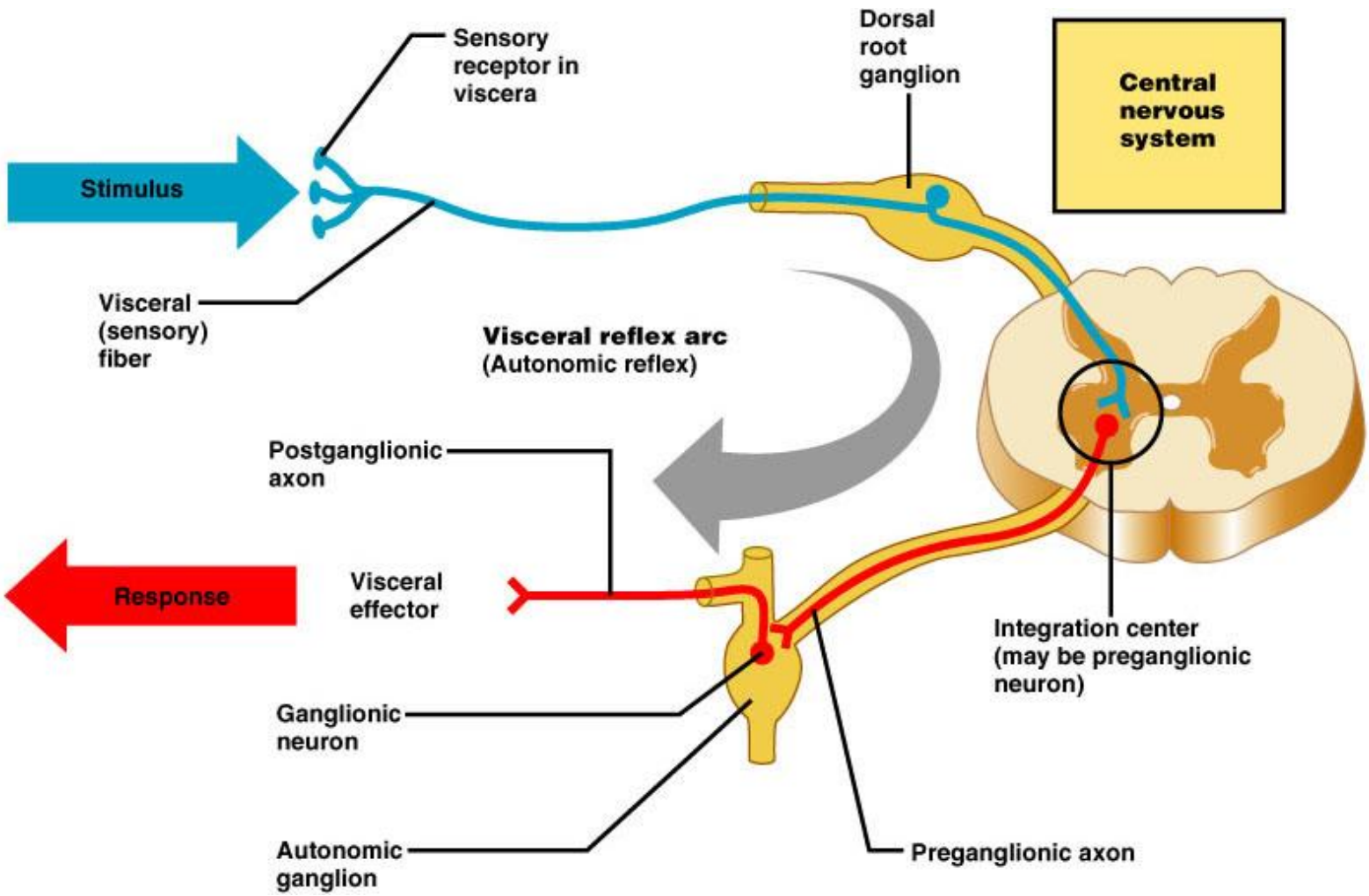
PARASYMPATHETIC





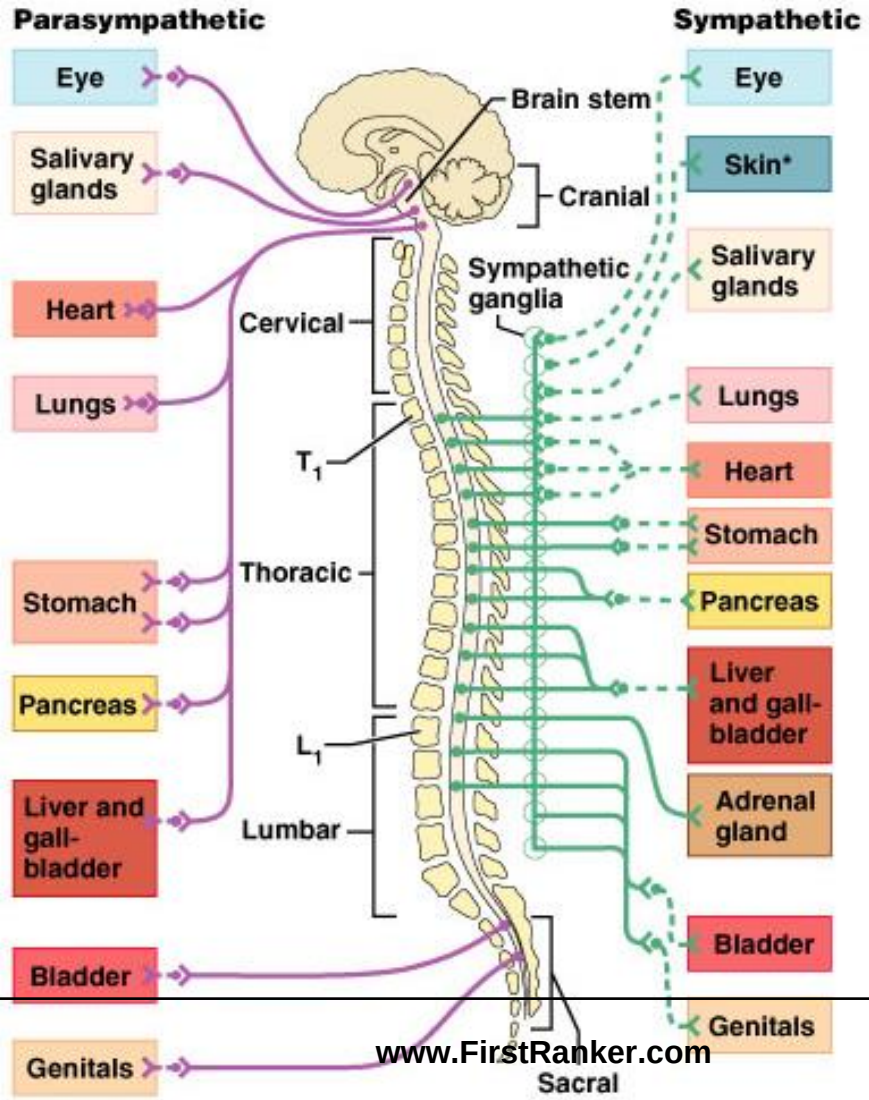
AFFERENTS

- The afferent myelinated fibers travel from the viscera to their cell bodies, located either in the **sensory ganglia of the cranial nerves** or in the **posterior root ganglia** of the sacrospinal nerves.



ANS

Parasympathetic: craniosacral



Sympathetic: thoracolumbar

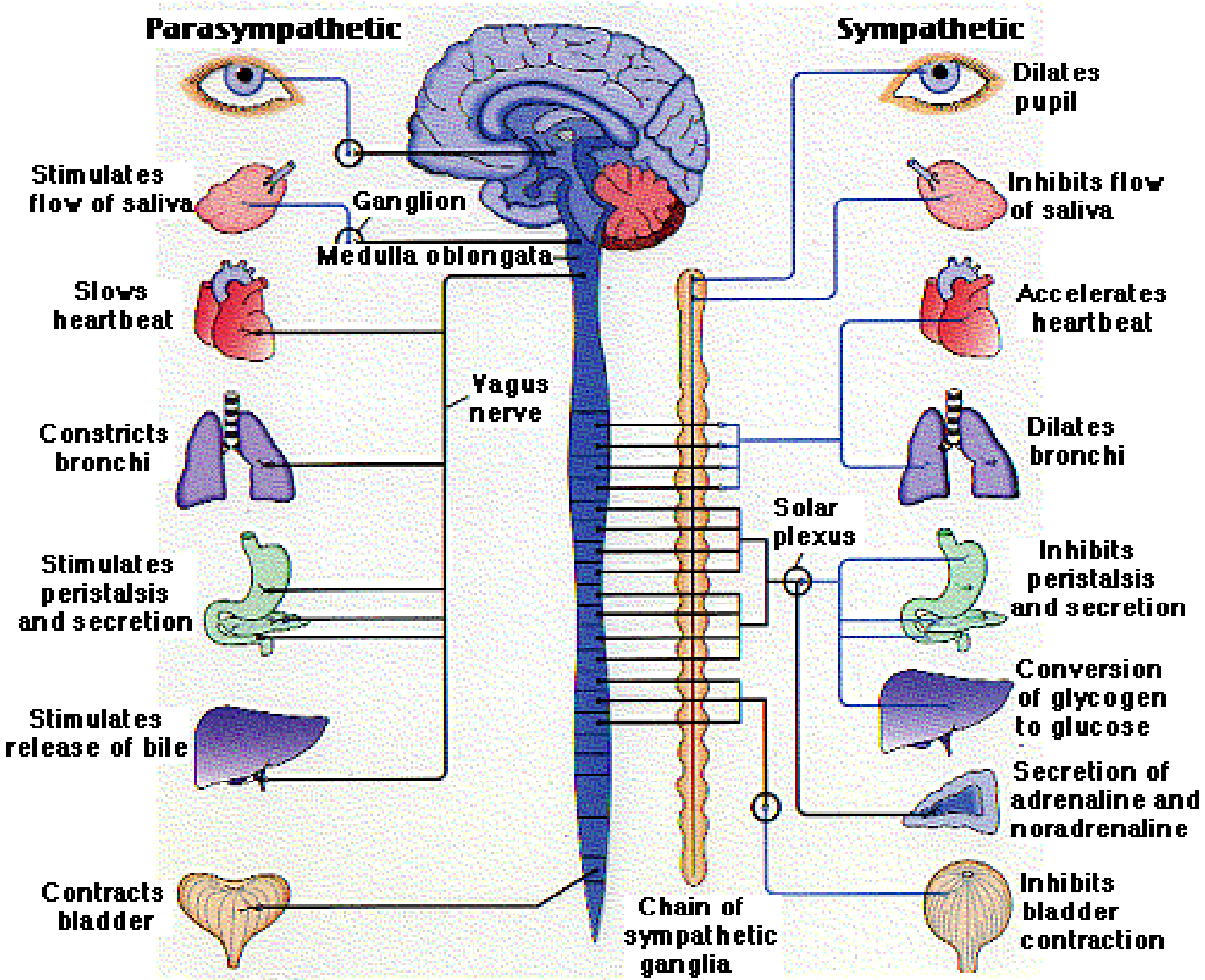
PARASYMPATHETIC NERVOUS SYSTEM

"rest & digest"

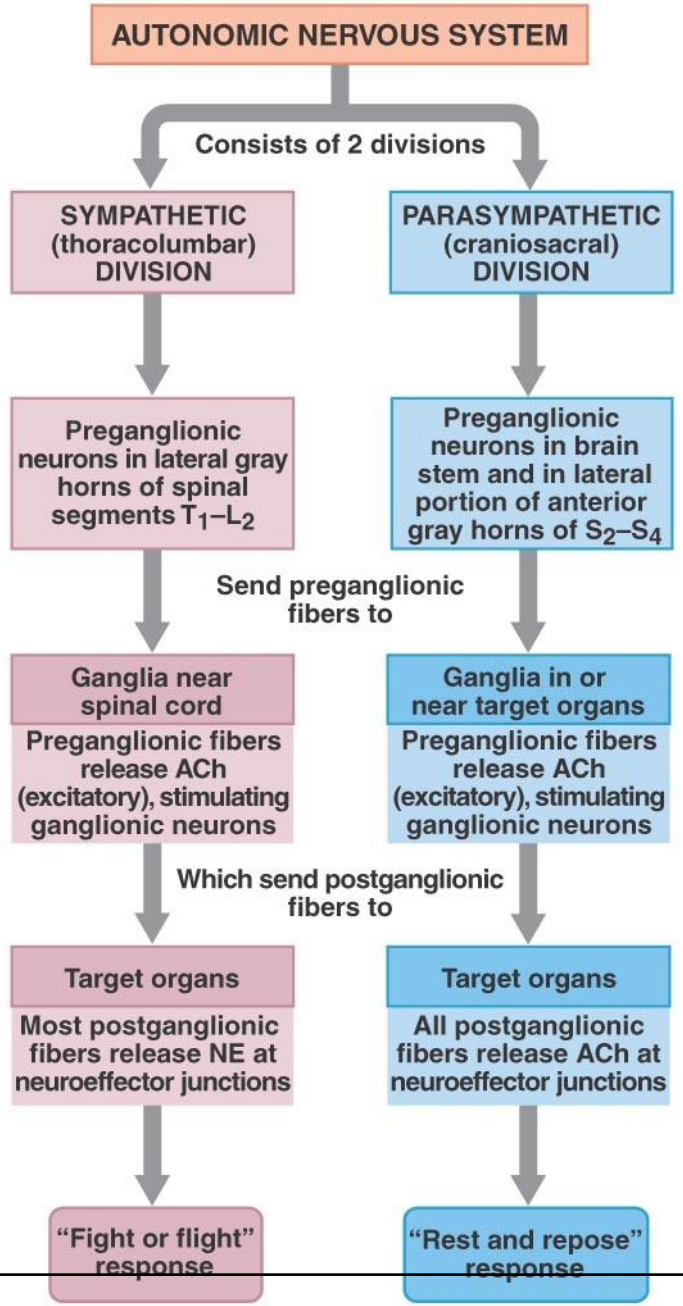
- Also called the ***craniosacral*** system because all its preganglionic neurons are in the brain stem or sacral levels of the spinal cord
  - Cranial nerves III, VII, IX and X
  - In lateral horn of gray matter from S2-S4
- Only innervate internal organs (not skin)
- ***Acetylcholine*** is neurotransmitter at end organ as well as at preganglionic synapse: "cholinergic"

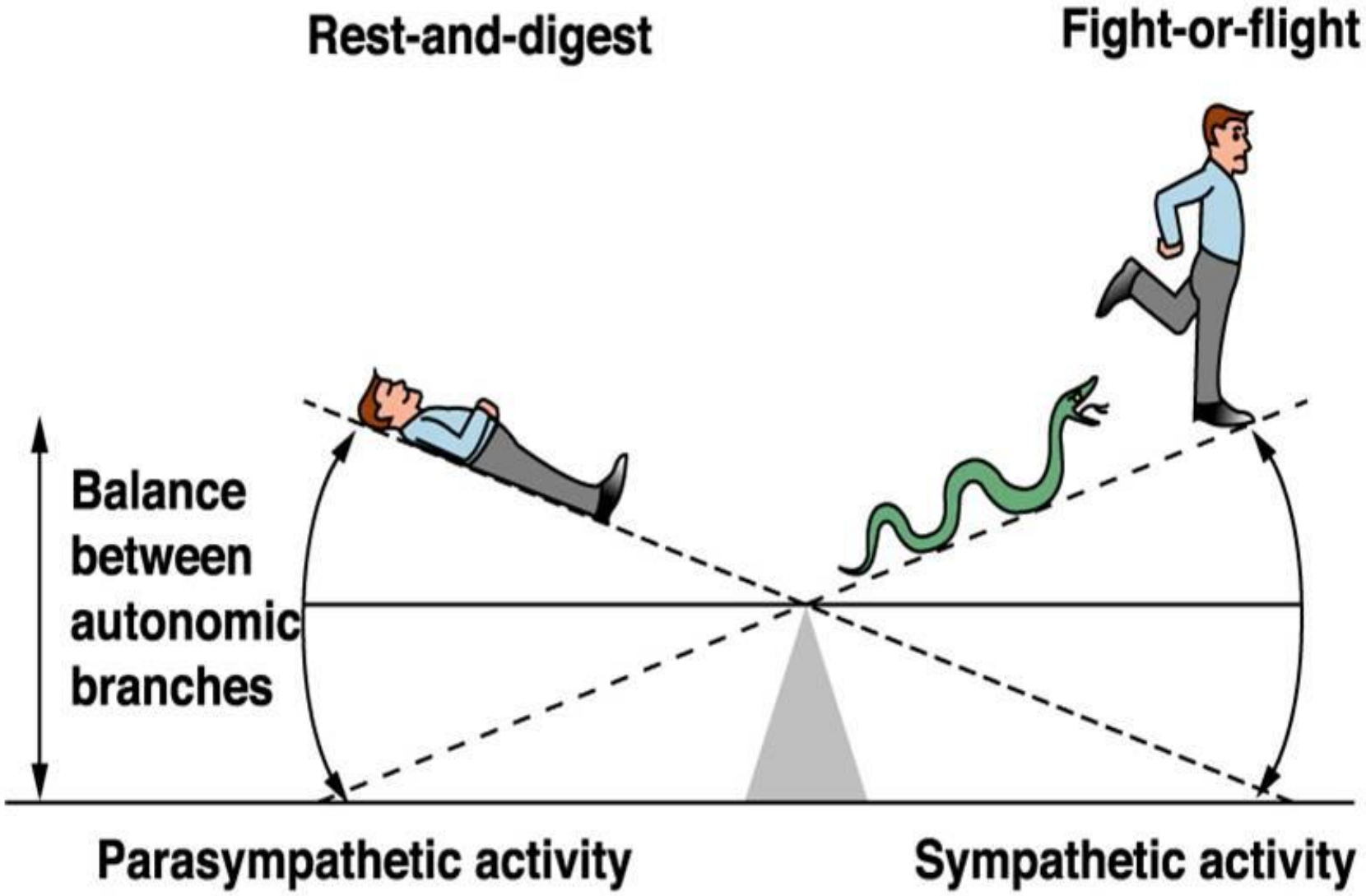
FUNCTIONS OF PNS

- Cranial outflow
  - III - pupils constrict
  - VII - tears, nasal mucus, saliva
  - IX – parotid salivary gland
  - X (Vagus n) – visceral organs of thorax & abdomen:
    - Stimulates digestive glands
    - Increases motility of smooth muscle of digestive tract
    - Decreases heart rate
    - Causes bronchial constriction
- Sacral outflow (S2-4): form pelvic splanchnic nerves
  - Supply 2nd half of large intestine
  - Supply all the pelvic (genitourinary) organs



Summary






Thank You