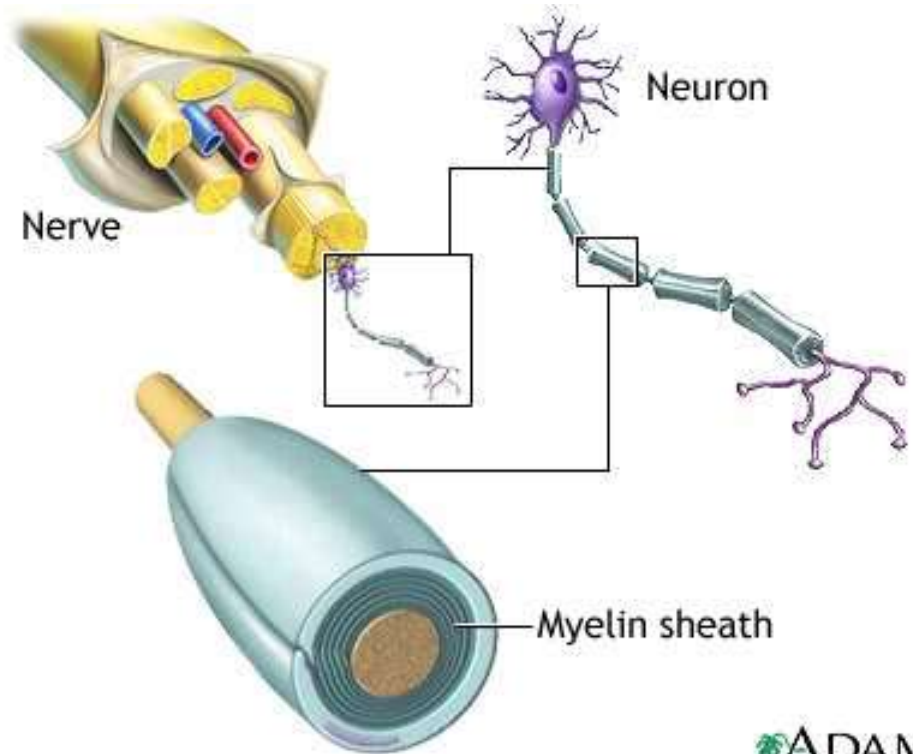


Spinal Cord and PNS

EQ: Compare and contrast the 2 divisions of the peripheral nervous system.

Nerves

- A bundle of neurons found outside the CNS
- 3 Main Types
 - Sensory (afferent)
 - Motor (efferent)
 - Mixed (carry both)

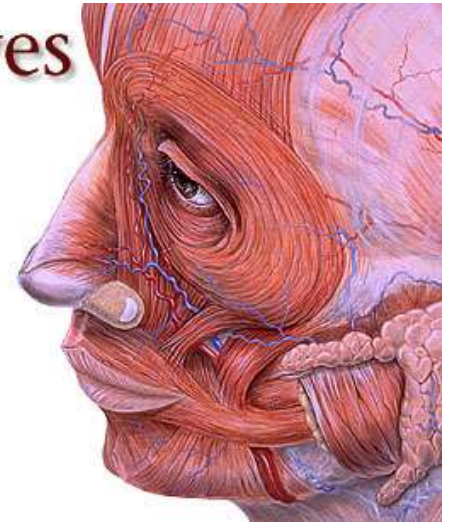


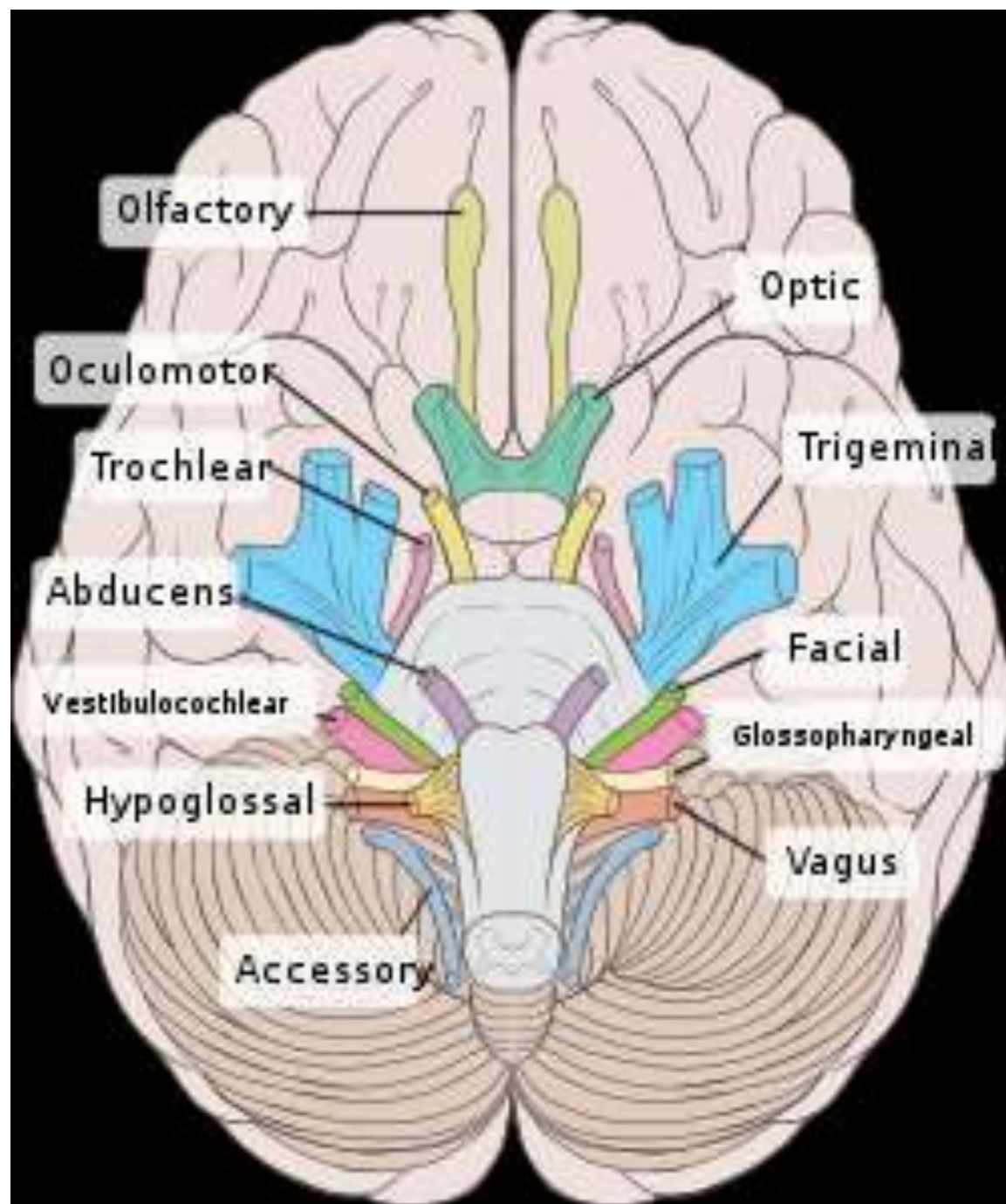
Cranial Nerves

- 12 pairs
- They serve the head and neck (for the most part)
- Most are mixed nerves

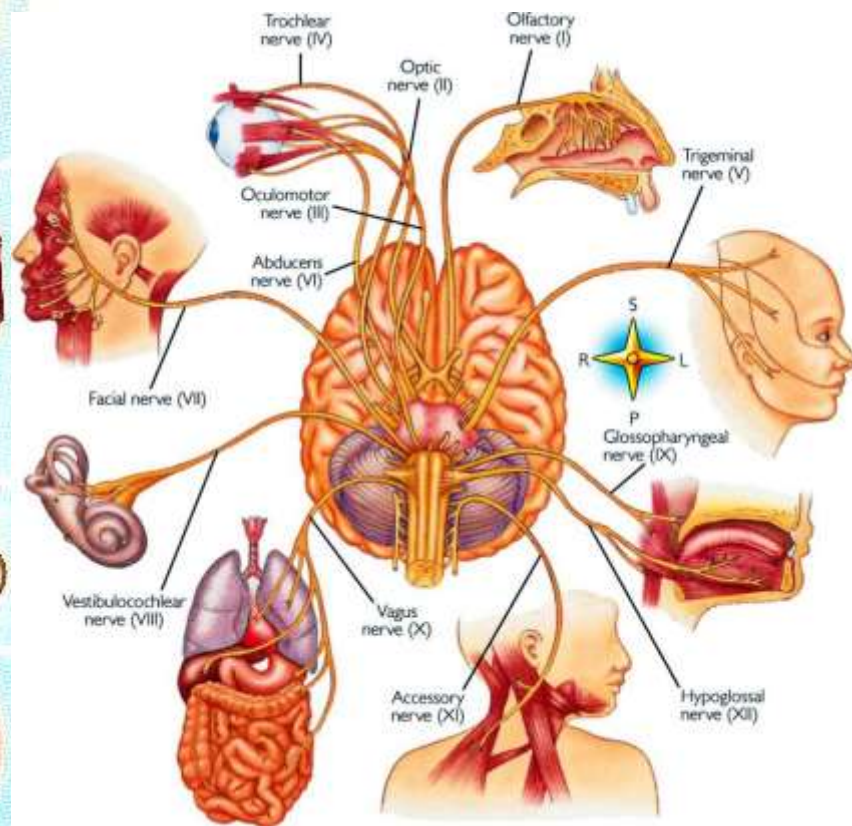
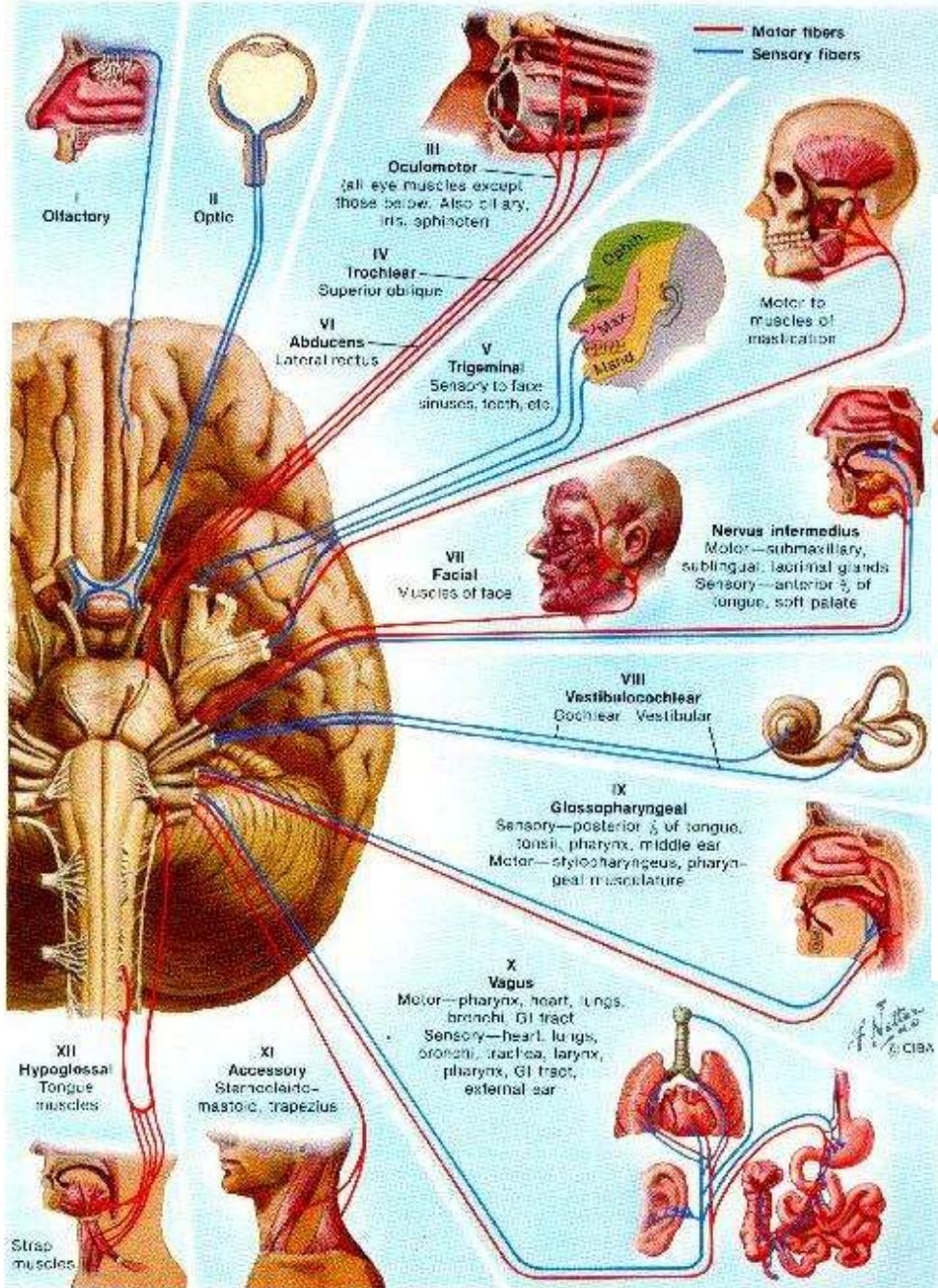
Cranial Nerves

- I Olfactory
- II Optic
- III Oculomotor
- IV Trochlear
- V Trigeminal
- VI Abducens
- VII Facial
- VIII Vestibulocochlear
- IX Glossopharyngeal
- X Vagus
- XI Accessory
- XII Hypoglossal



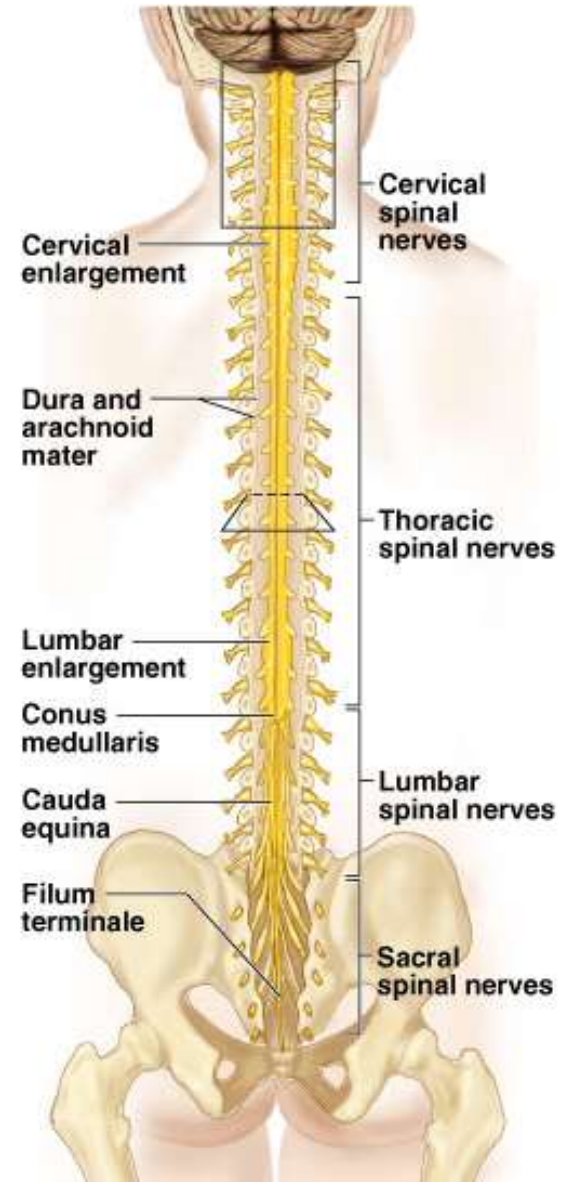


Cranial Nerves: Distribution of Motor and Sensory Fibers



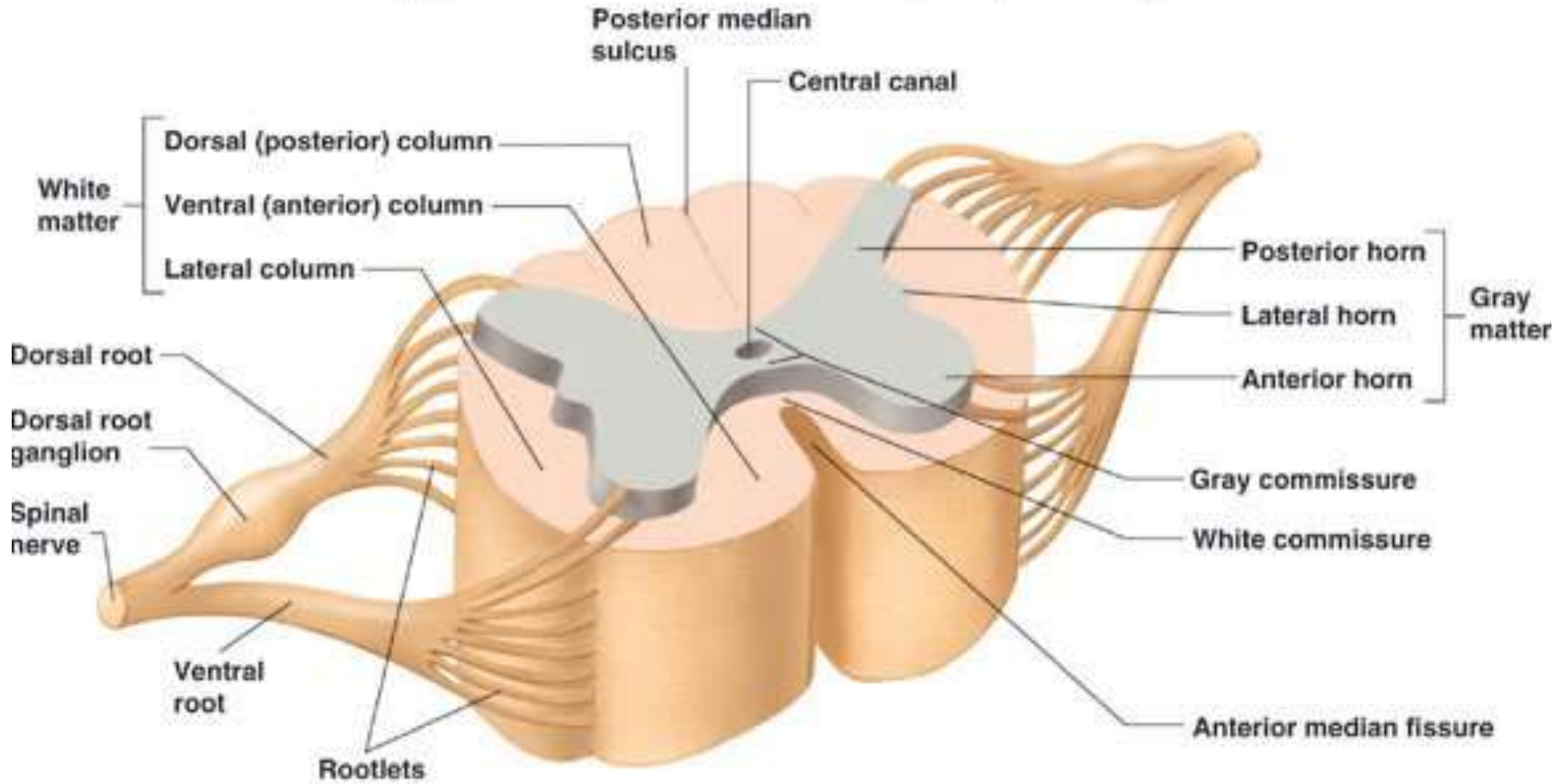
The Spinal Cord

- The spinal cord functions as a two-way pathway for nerve impulses to and from the brain
- The spinal cord runs from the base of the brain to L1 or L2
- 31 pairs of spinal nerves branch out from the cord to serve all parts of the body



Cross Section of Spinal Cord

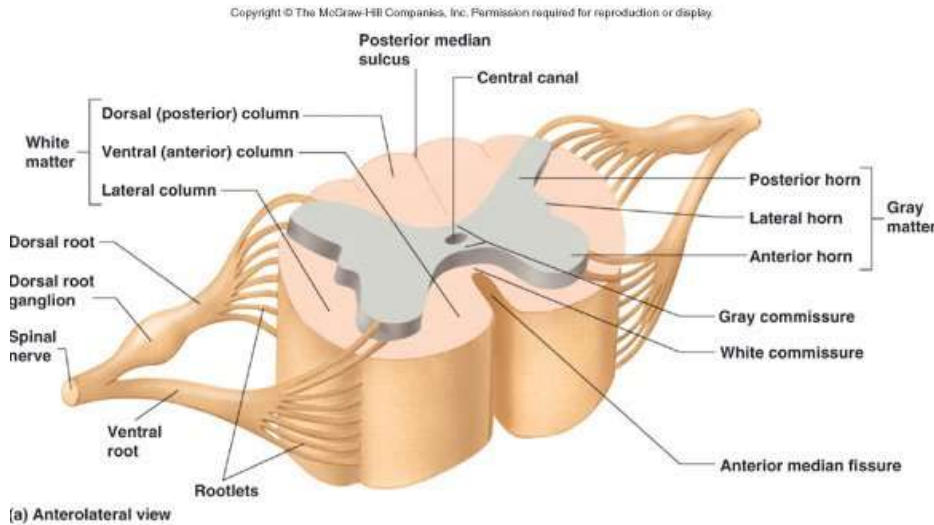
Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



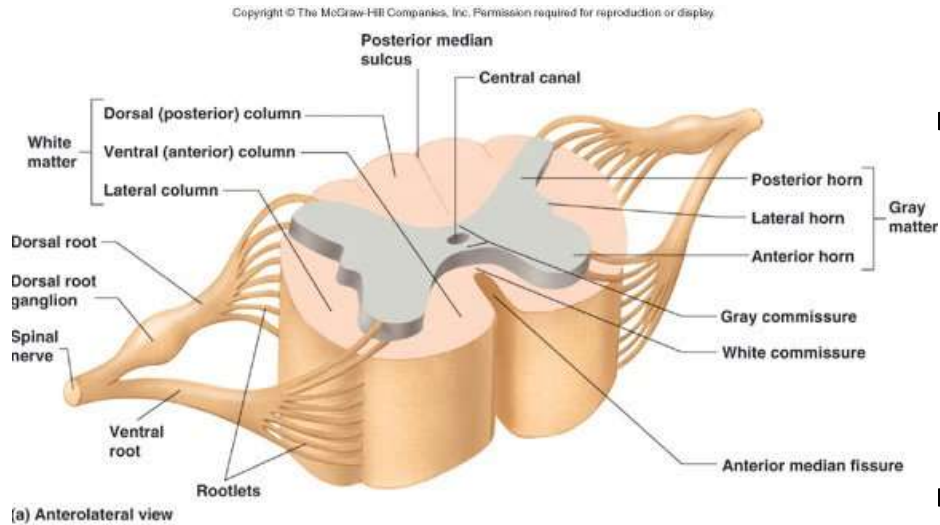
(a) Anterolateral view

The Grey Matter Horns

- Posterior (dorsal) horns – interneurons(sensory)
- Anterior (ventral) horns – some interneurons but mostly somatic motor neurons
- Lateral horns – contain autonomic nerve fibers



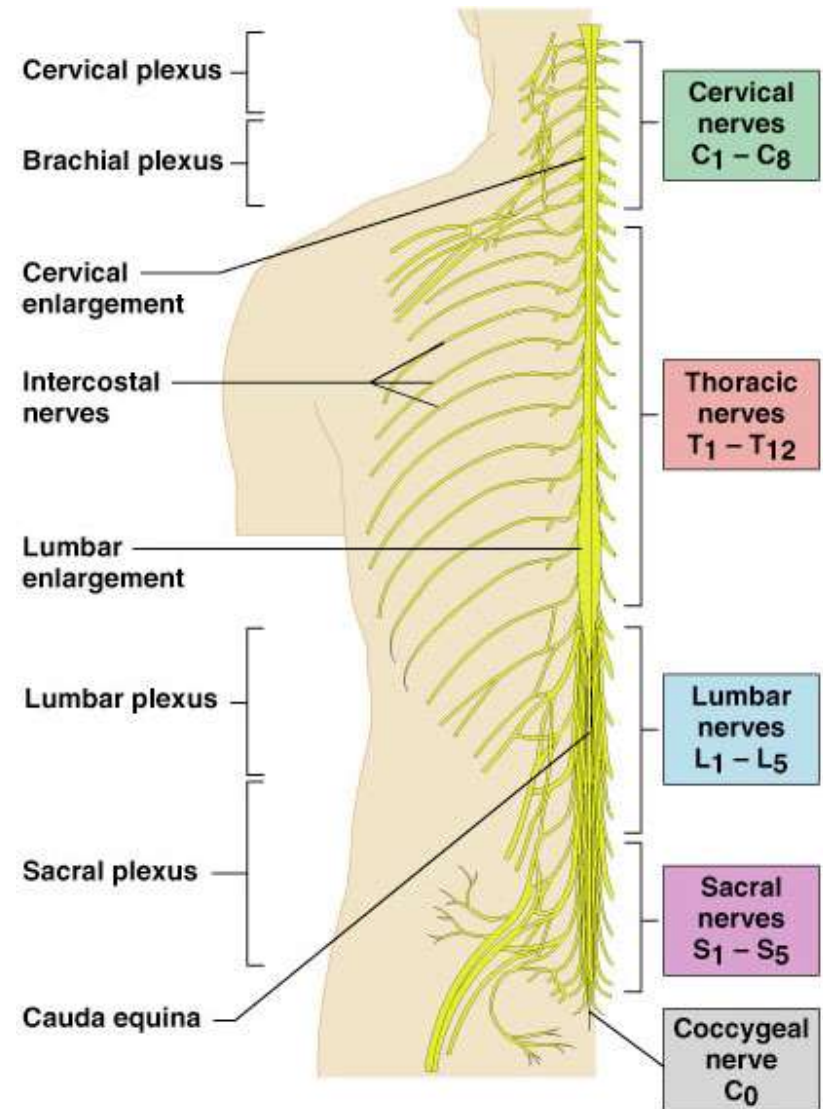
The White Matter Columns



- Posterior (dorsal) columns – interneurons(sensory)
- Anterior (ventral) columns – some interneurons but mostly somatic motor neurons
- Lateral columns – contain both

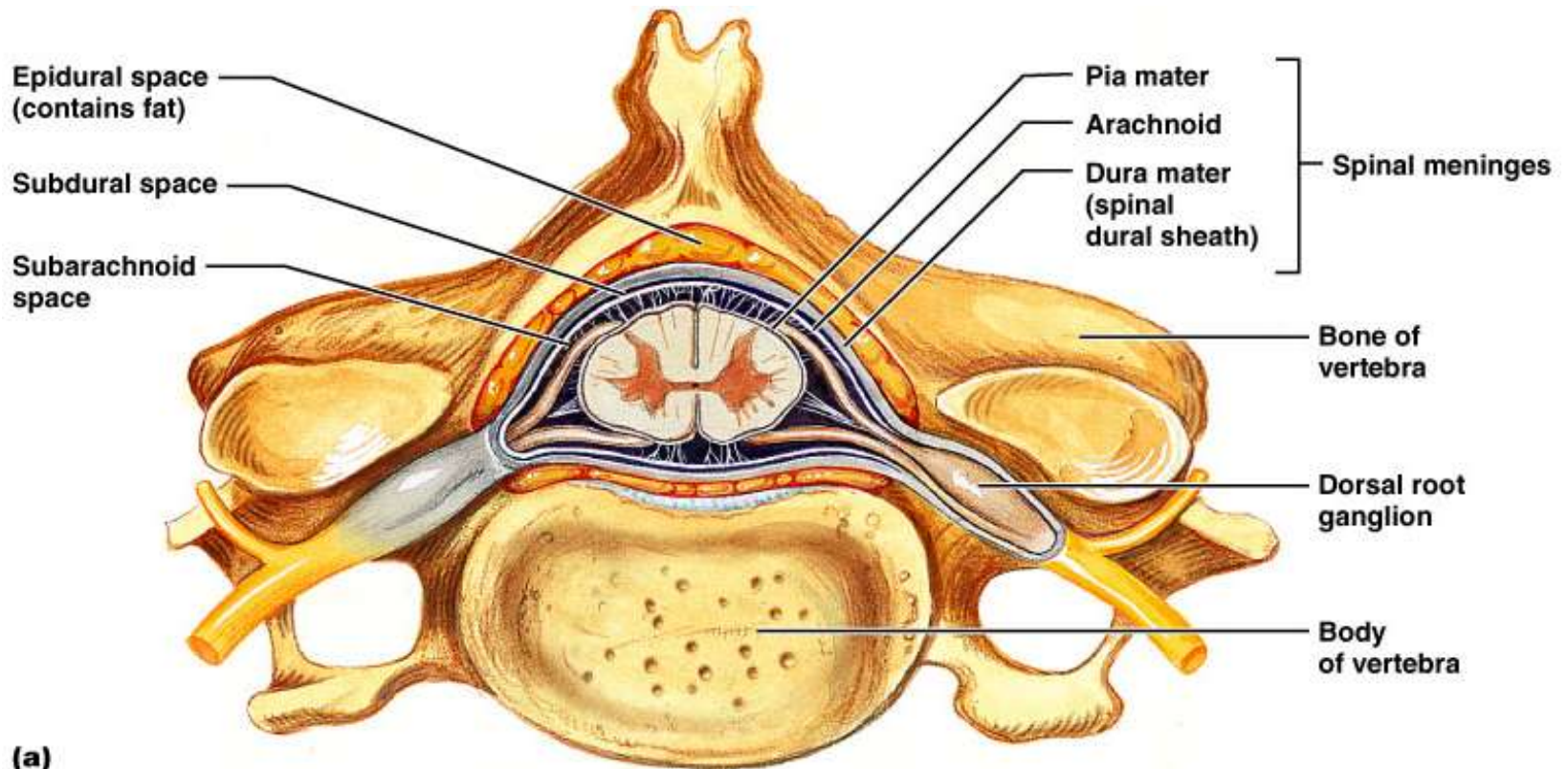
Spinal Nerves – The Peripheral NS

- 31 pairs of spinal nerves supply all of the body except head
- Each nerve is named according to its nearby vertebra



Spinal Nerves

- Each spinal nerve is formed from two roots
 - Dorsal root – sensory roots and ganglia
 - Ventral root – motor roots
- A dorsal root and a ventral root fuse laterally (on the side) to form spinal nerves



Autonomic and Somatic Motor Systems

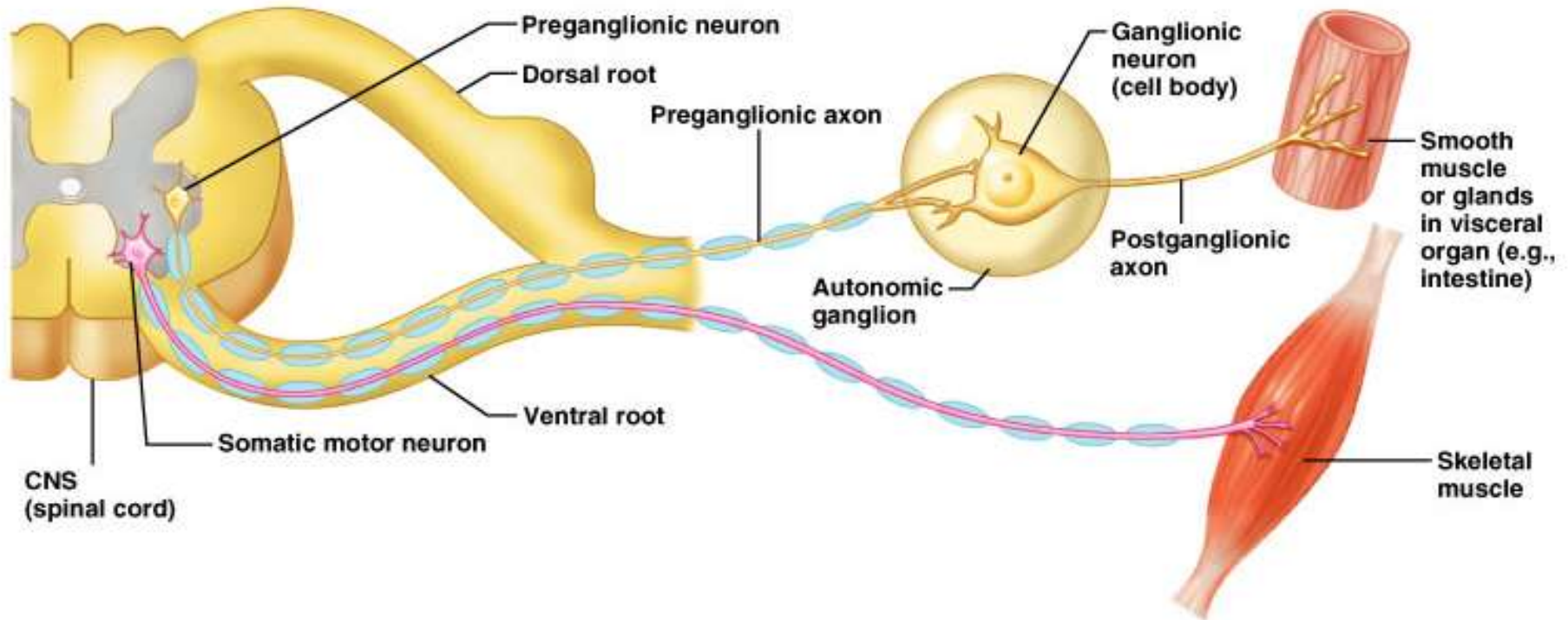
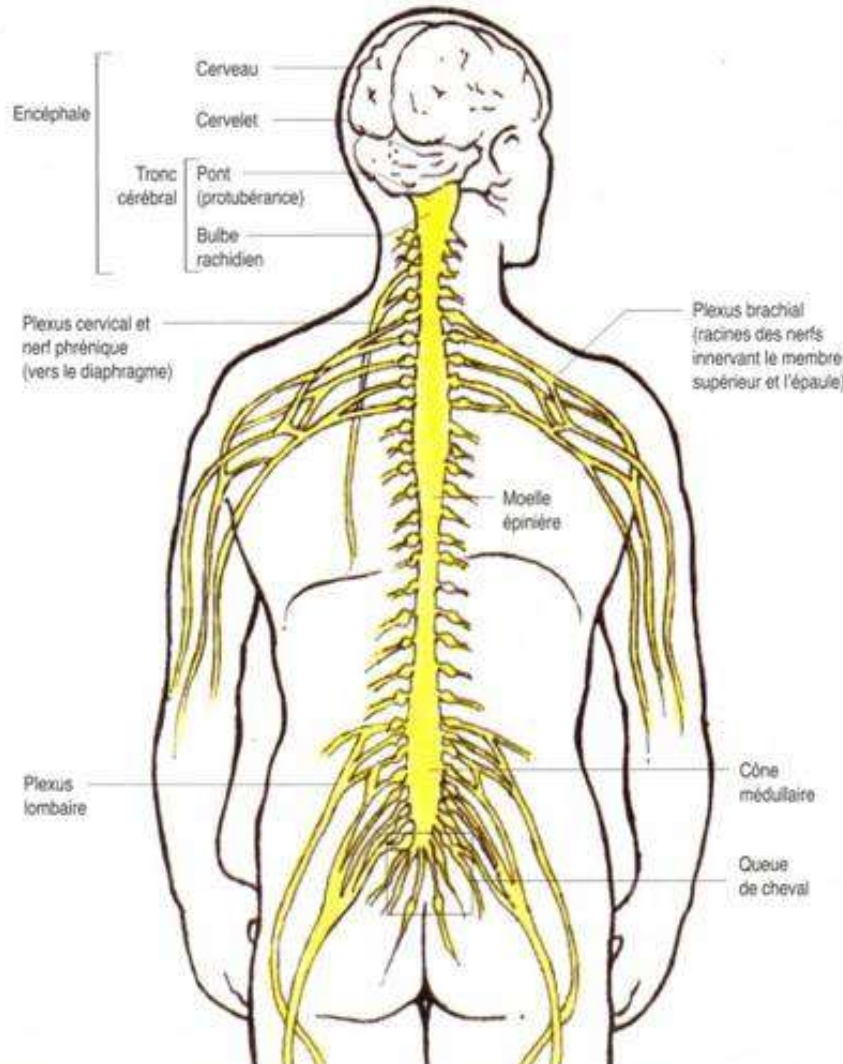


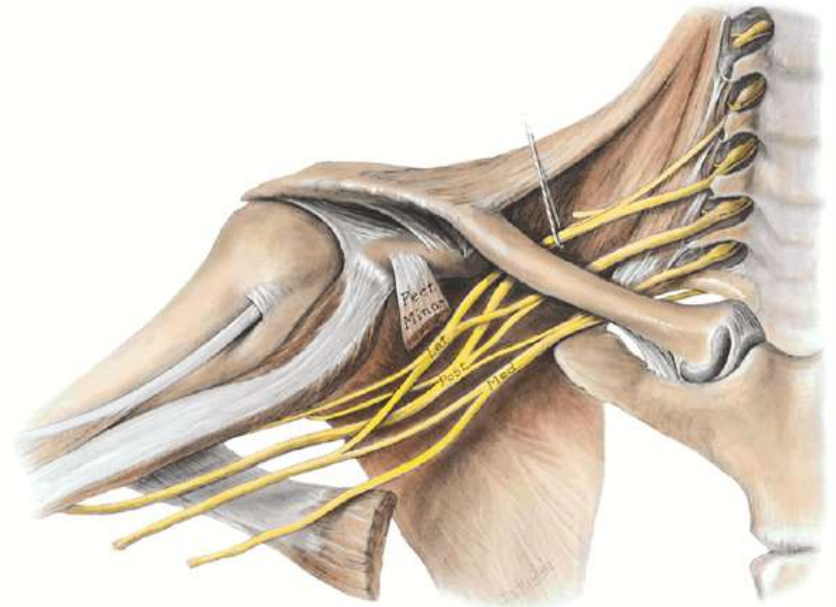
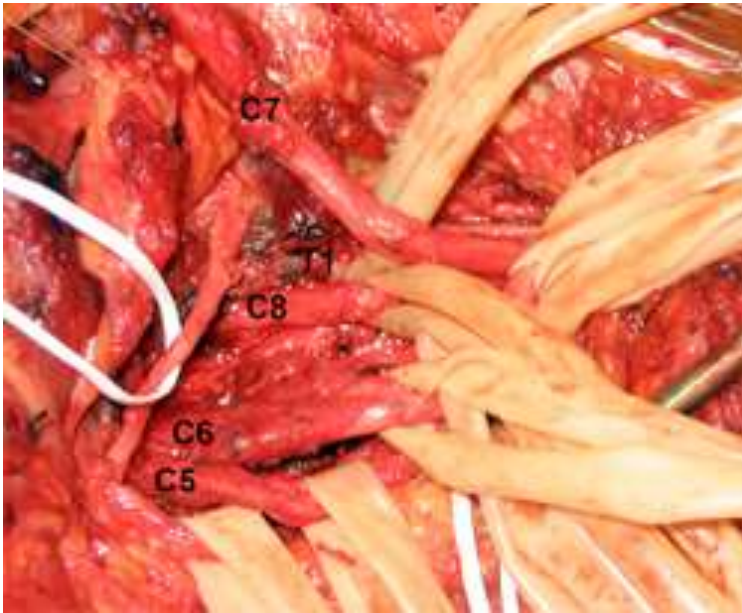
Figure 15.2

Nerve Plexuses

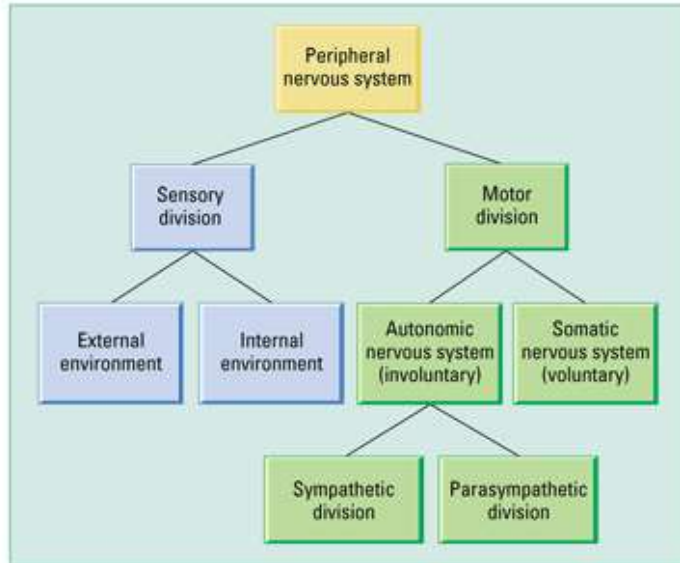


- Complex network of mixed nerves
- 4 Plexuses
 - Cervical
 - Brachial
 - Lumbar
 - Sacral

The Brachial Plexus



Autonomic Nervous System



- The ANS is a subdivision of the PNS that automatically controls body functions
- It is divided into two parts
 - Sympathetic System
 - Parasympathetic System

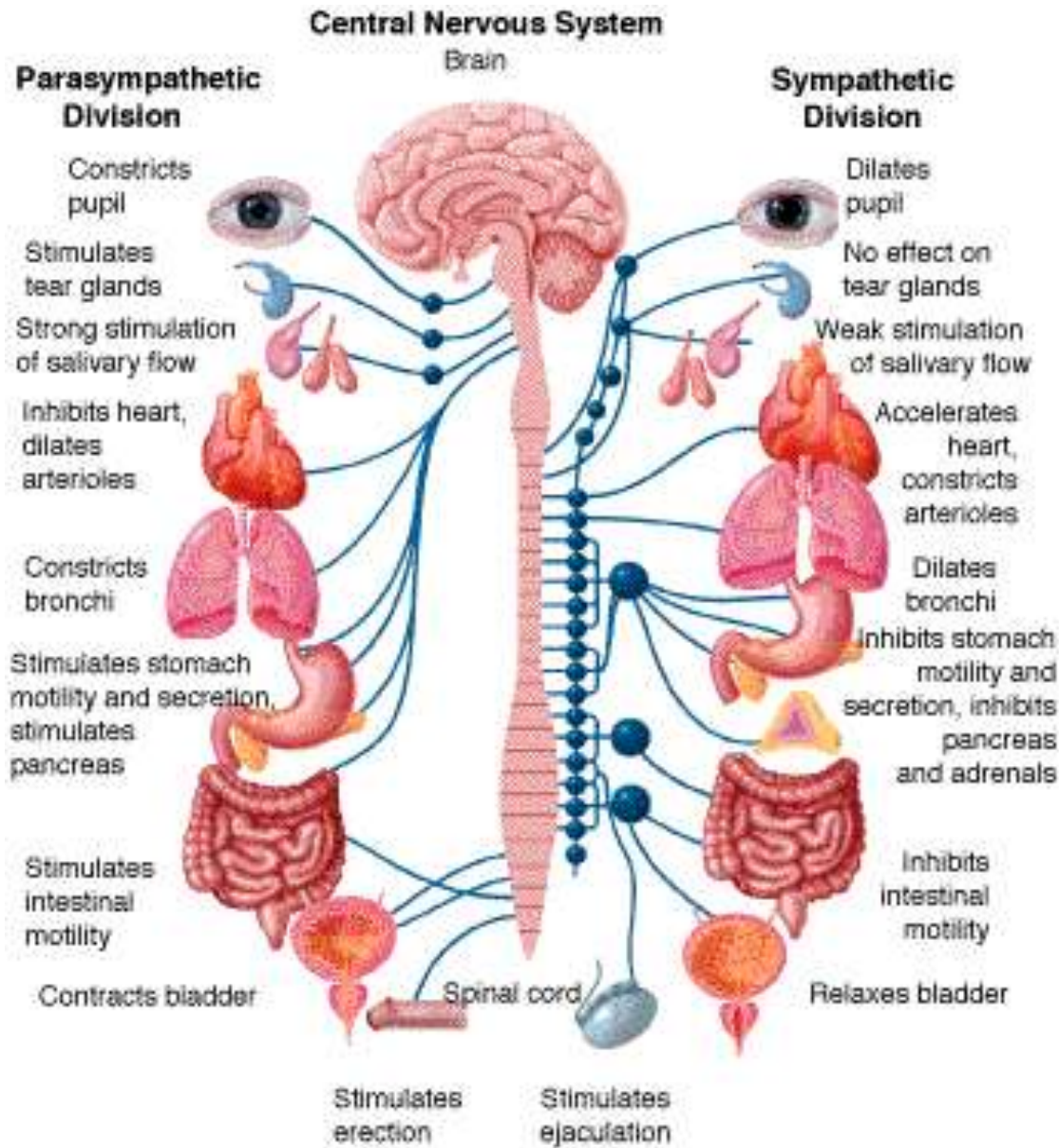
Autonomic Nervous System

Sympathetic system

- Heart and blood pressure increases
- Respiration accelerates, blood sugar is released from the liver
- Adrenalin, noradrenalin are released from the adrenal glands.
- **Fight or flight**

Parasympathetic system

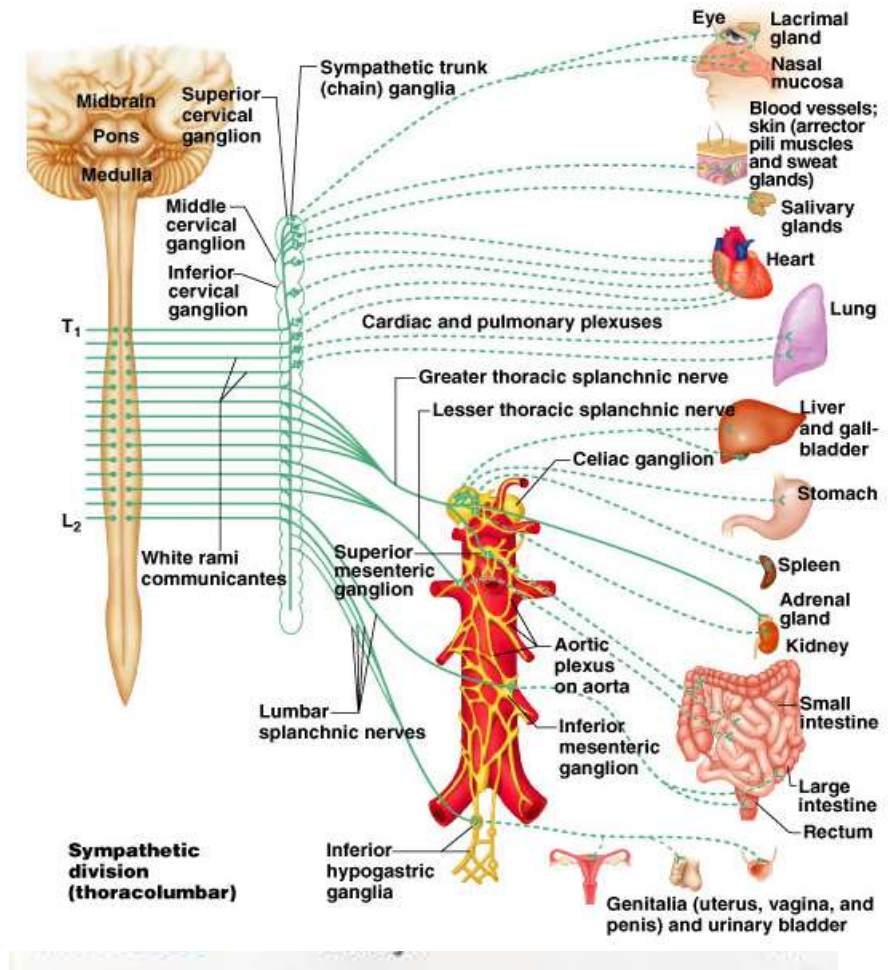
- Heartbeat slows
- Blood pressure reduces
- Respiration levels
- Your body experiences visceral responses typical of periods of rest and relaxation.
- **Rest and digest**



- Sympathetic – “fight, flight, or fright”
 - Activated during exercise, excitement, and emergencies
- Parasympathetic – “rest and digest”
 - Concerned with conserving energy

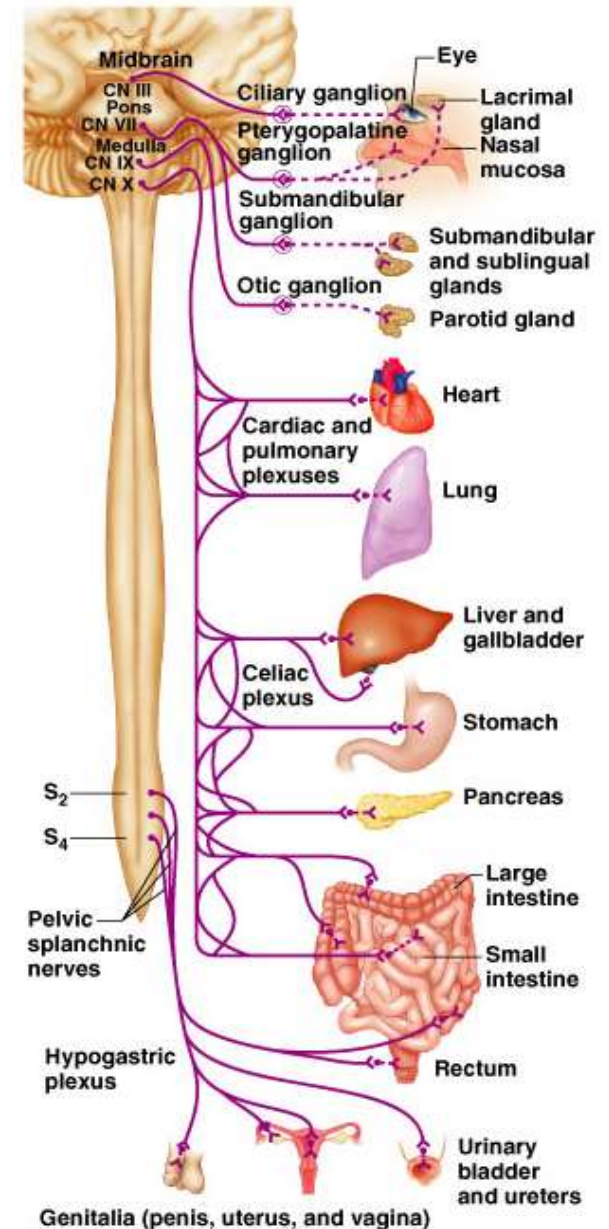
Sympathetic Division (Fight or Flight)

- We are excited
- Emergency situations
- Increased heart rate, blood pressure, dilation of blood vessels, removal of blood from digestive organs (butterfly effect in stomach when nervous)



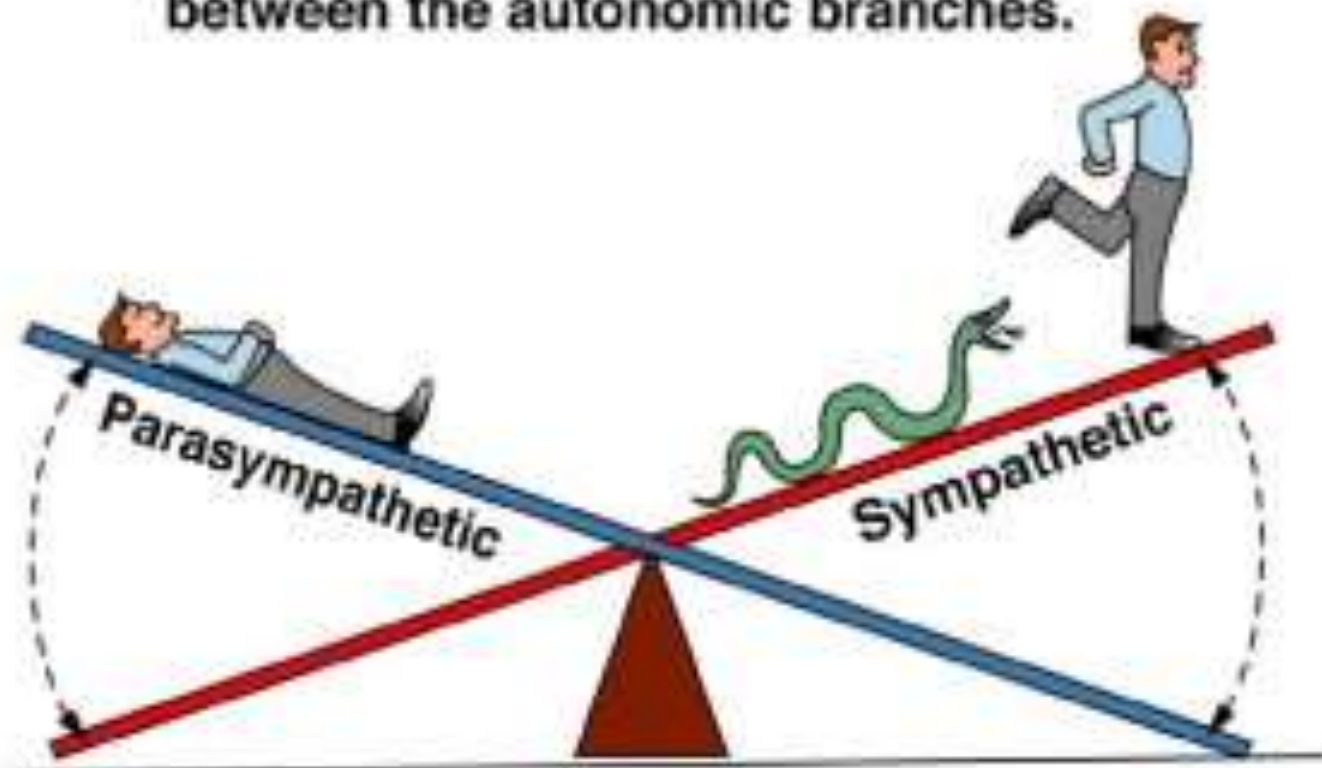
Parasympathetic Division (Resting & Digesting)

- Normal digestion
- Removal of feces & urine
- Low respiratory and blood pressure
- Pupils constricted



Parasympathetic division (craniosacral)

Homeostasis is a dynamic balance between the autonomic branches.



**Rest-and-digest:
Parasympathetic
activity dominates.**

**Fight-or-flight:
Sympathetic activity
dominates.**