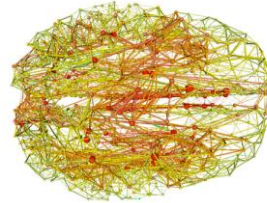
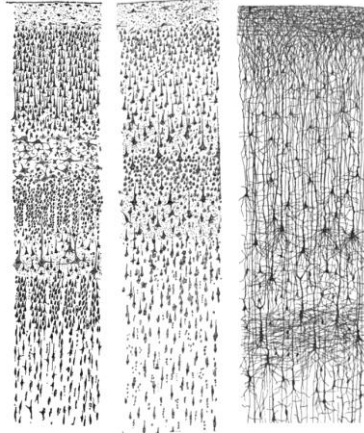
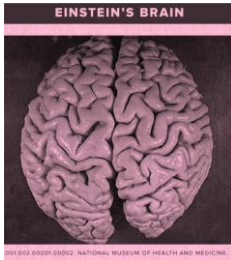


# Welcome to Clinical anatomy of the head, neck and neuronal pathways

## Lecture #13

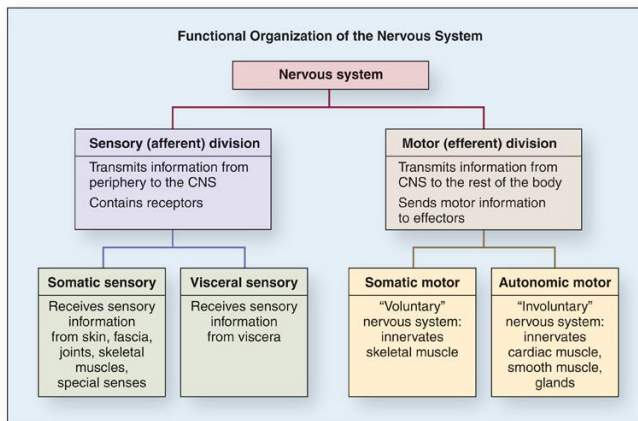


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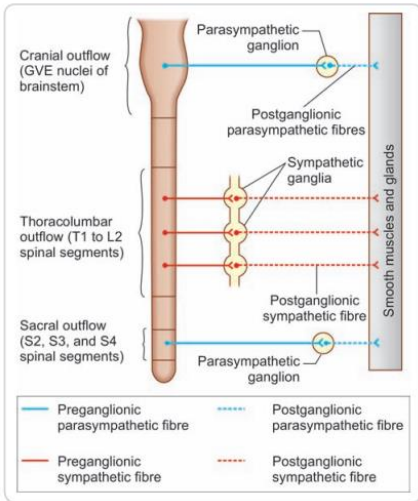
# Arrangement and function of the autonomic nervous system



Functions:

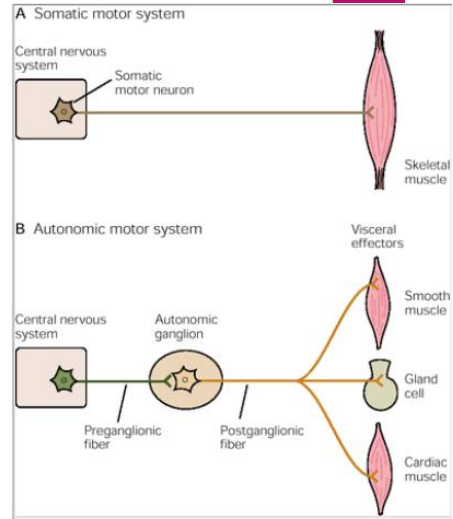
- Contraction and relaxation of smooth muscles
- Function of all exocrine glands
- Heart rate
- Some metabolic processes

### Autonomic Nervous System



**Sympathetic:**  
 Thoracolumbar outflow  
 T1-L2

**Parasympathetic:**  
 Craniosacral outflow  
 CN III, VII, IX, X & S2-S4



### Autonomic Nervous System

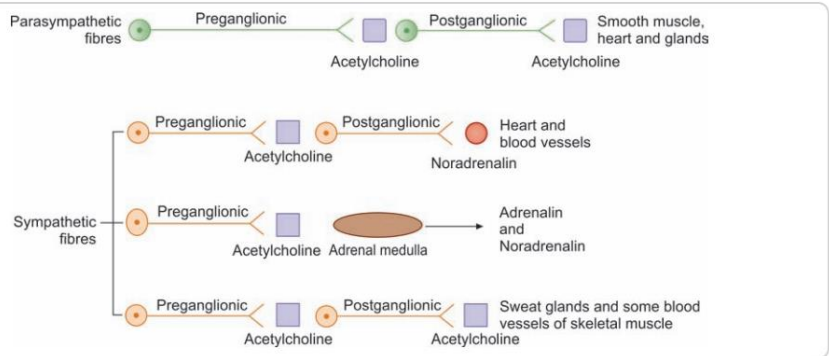
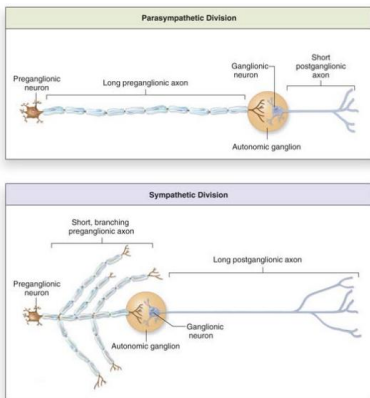


Figure 14.8: Neurotransmitters of autonomic neurons

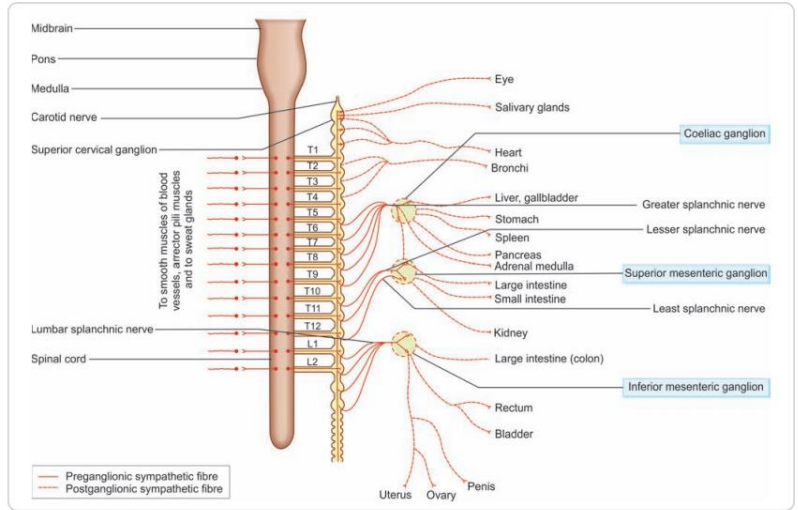
## Sympathetic Nervous System

Catabolic reaction (activities that are mobilized during emergency and stress situations)

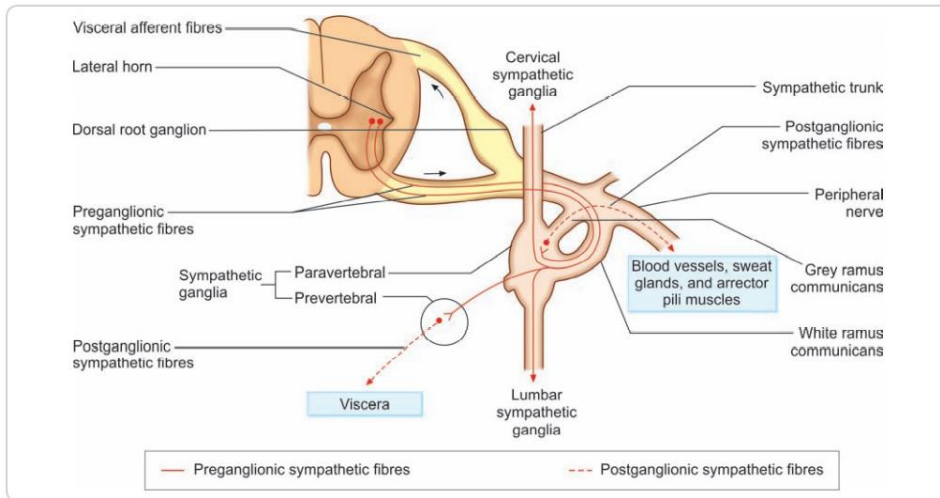
### Fight or Flight

Generalized reaction of body

- Coronary artery
- Increase heart rate
- Bronchodilation
- Mydriasis
- Sweat secretion
- Glycemia



### Anatomical Organization of the Sympathetic Preganglionic and Postganglionic Axons



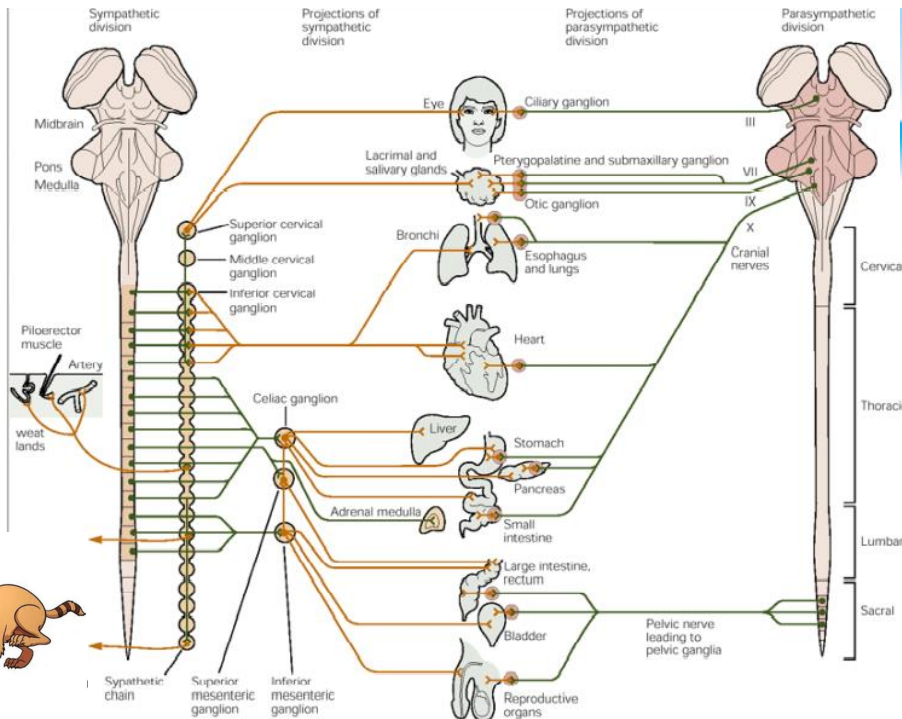
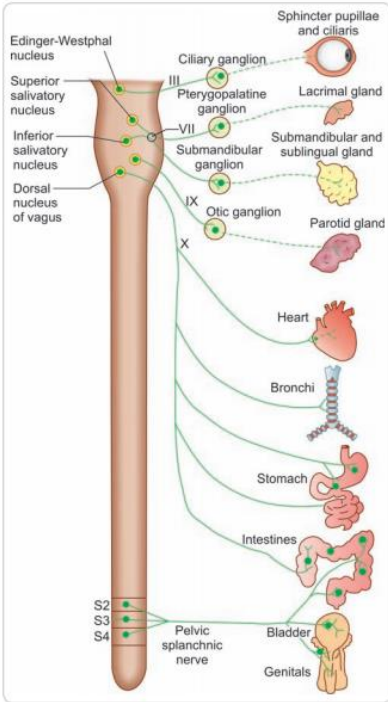
## Parasympathetic Nervous System

Anabolic reactions (activities associated with conservation and restoration of body resources)

Rest and Digest

Localized reaction of body

- Decrease heart rate
- Bronchoconstriction
- GIT activation
- Miosis

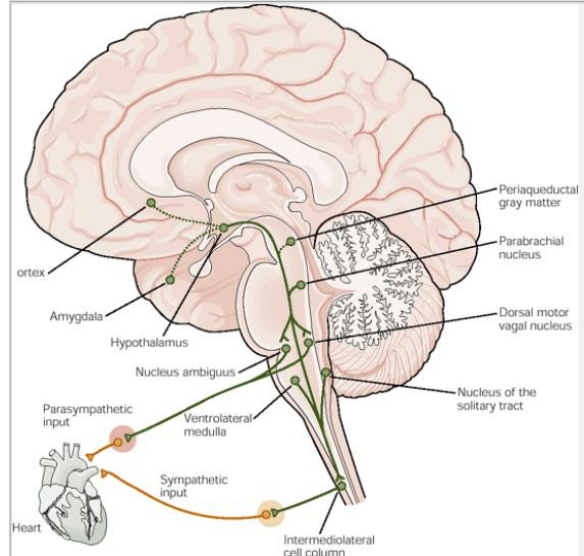
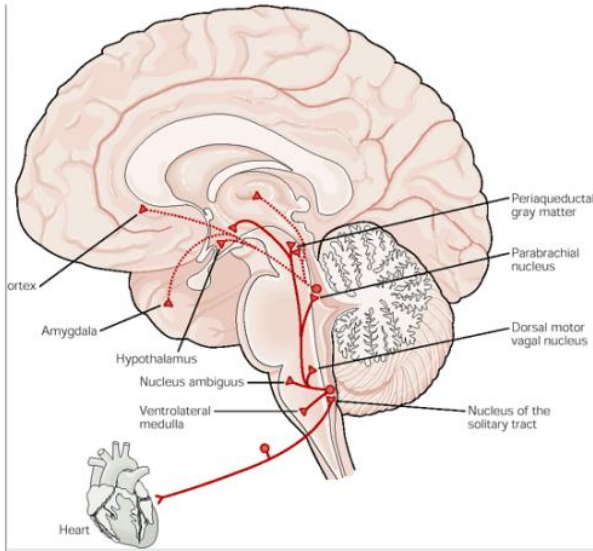


### Central parts of Autonomic Nervous System



Pathways distributing visceral sensory information in the brain

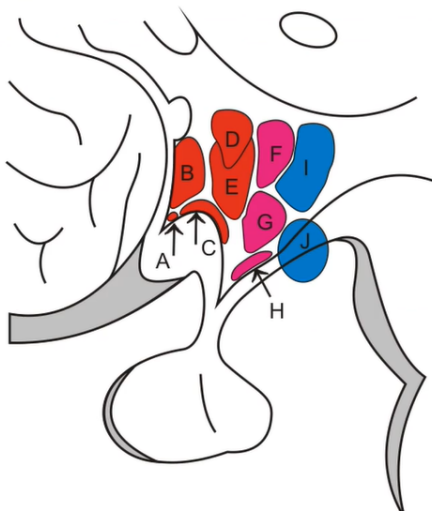
Pathways that control autonomic responses



### Central parts of Autonomic Nervous System



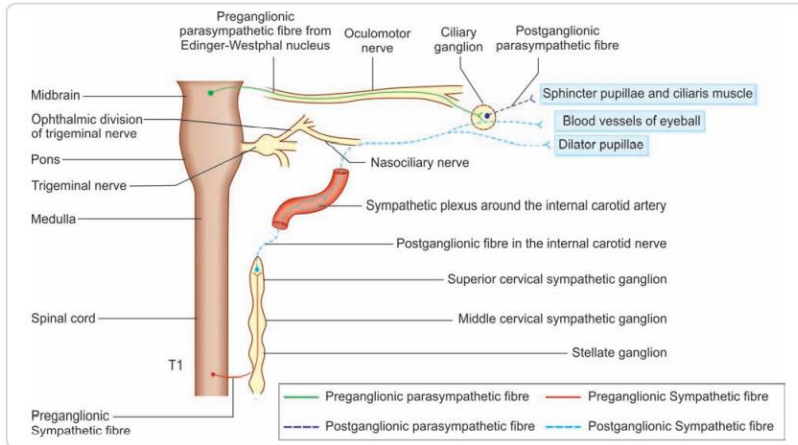
Hypothalamus (subsystem of limbic brain = visceral brain)



Ncll. hypothalamici ant.  
control parasympaticus  
(fasciculus longitudinalis dorsalis)

Ncll. hypothalamici medii  
Control the sympaticus  
(over RF, tr. tegmentalis centralis)

## Innervation of the Eye



The sphincter pupillae is supplied by parasympathetic nerves.

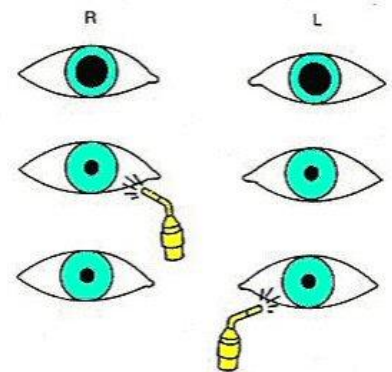
The dilator pupillae is supplied by sympathetic nerves.



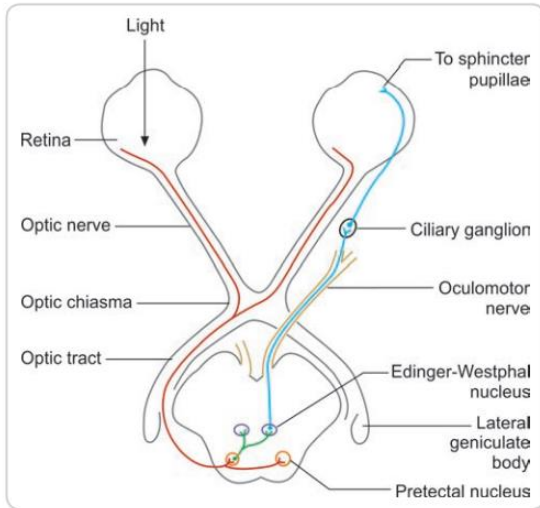
## Pupillary Light Reflex

A reflex that controls the diameter of the pupil, in response to the intensity of light (luminance) that falls on the retina of the eye

- **mydriasis:** dilation of the pupil
- **miosis:** constriction of the pupil
  - direct response
  - consensual response
  - anisocoria



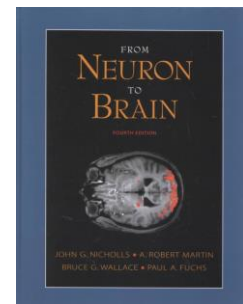
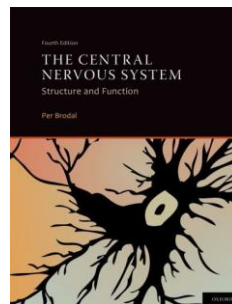
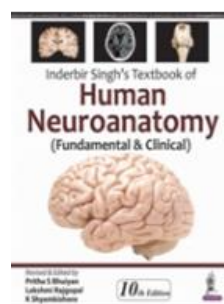
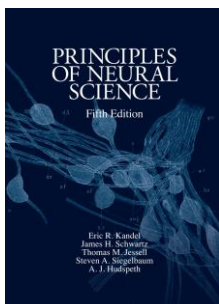
## Accommodation Reflex



- Changing the radius of curvature of the lens to focus the world on the retina.
- Accommodation reflex involves convergence (voluntary), pupillary constriction and accommodation (involuntary).

Edinger-Westphal nuclei → oculomotor nerve → ciliary ganglion → short ciliary nerves → sphincter pupillae and ciliaris

## Reading list



*Thank you very much for your attention*

