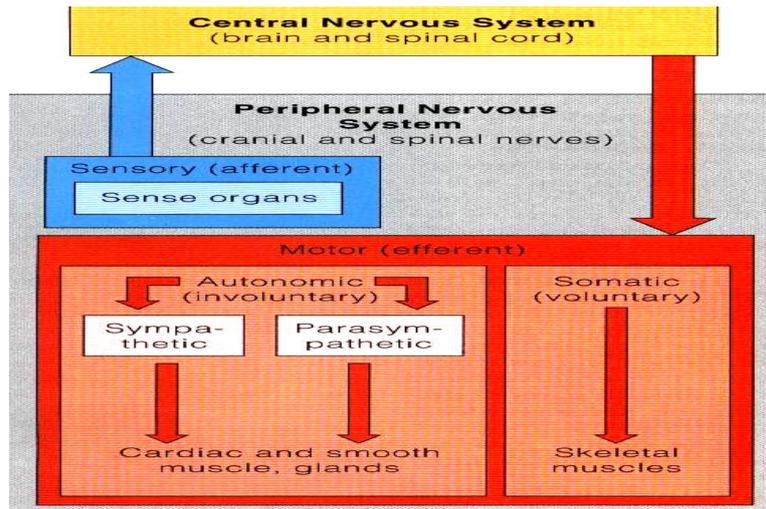


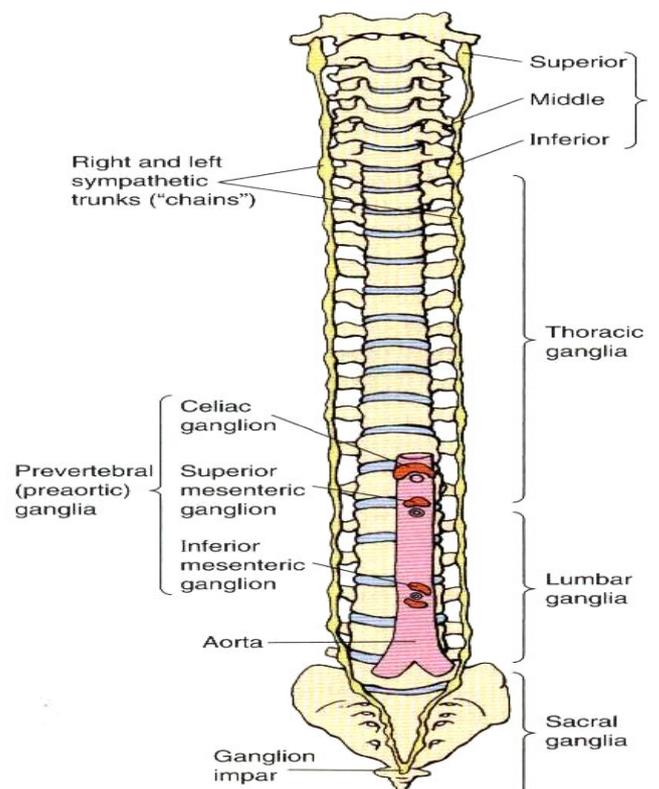
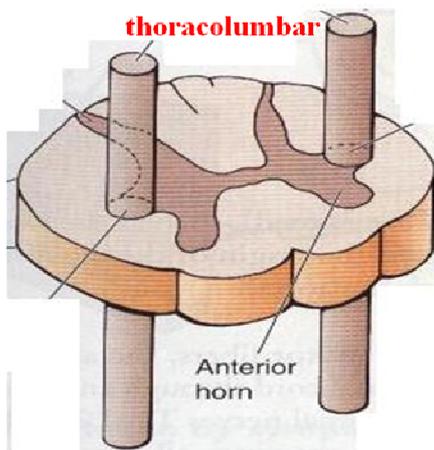
AUTONOMIC NERVOUS SYSTEM



- The ANS is described as the **visceral nervous system** or **visceral motor system** consists of motor fibers that stimulate visceral organs, smooth/cardiac muscle and secretory glands.
- The efferent nerve fibers and ganglia of the ANS are organized into two systems or divisions :
 - **Sympathetic** (thoracolumbar) division.
 - **Parasympathetic** (craniosacral) division.
- Conduction of impulses from the CNS to the effector organ involves a series of two neurons.
- The cell body of the 1st neurone is located in the spinal cord or brain stem whilst that of 2nd neurone is located in the autonomic ganglion.

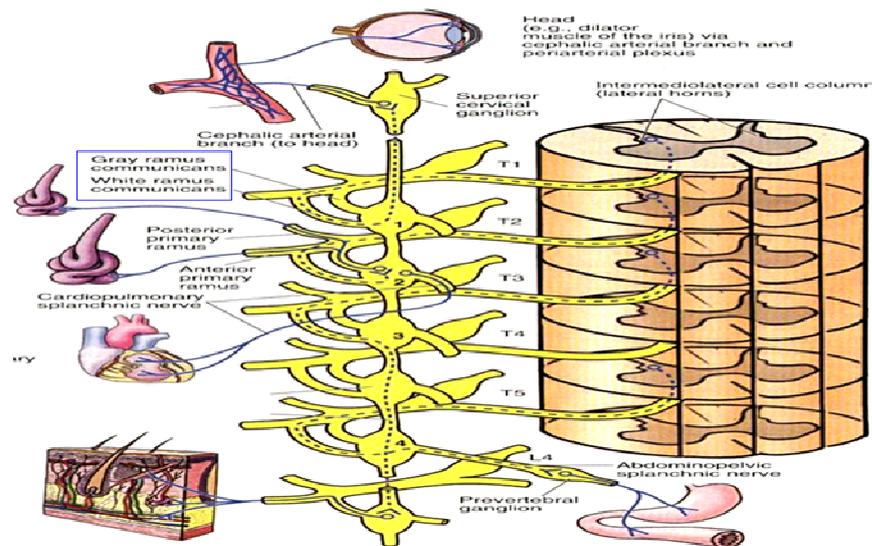
THE SYMPATHETIC (THORACOLUMBAR) DIVISION :

- Preganglionic sympathetic neurones are located exclusively in the thoracic and upper two or three lumbar segments of the spinal cord in the lateral horn grey matter (**Lateral horn**).

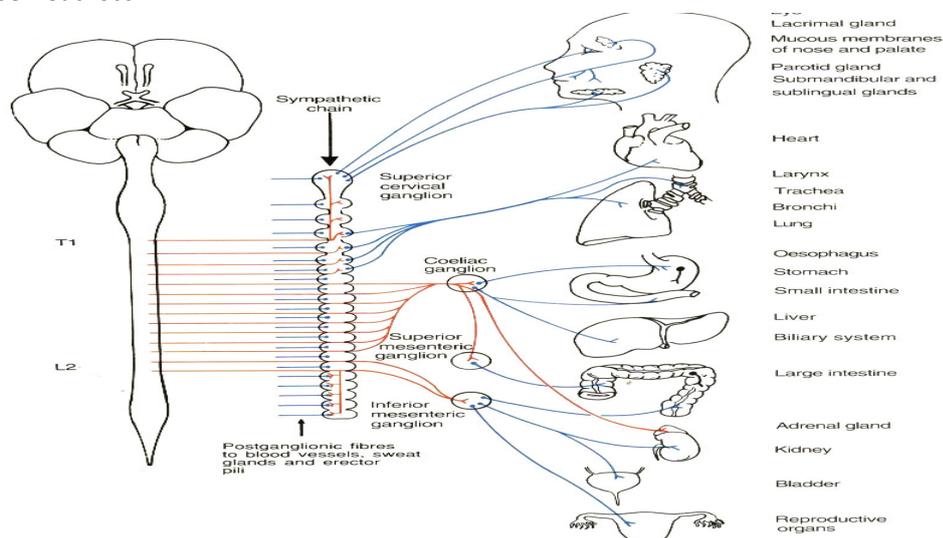


- Postganglionic sympathetic neurones have their cell bodies in one of two locations :
 - **Paravertebral (sympathetic chain).**
 - **Prevertebral (preaortic ganglia).**

- Ganglia of the sympathetic chain are linked to those spinal nerve which contain sympathetic outflow by two small nerves, the **rami communicantes**.
- Preganglionic fibres pass into the chain via the white ramus communicantes, so called because the fibres are myelinated.

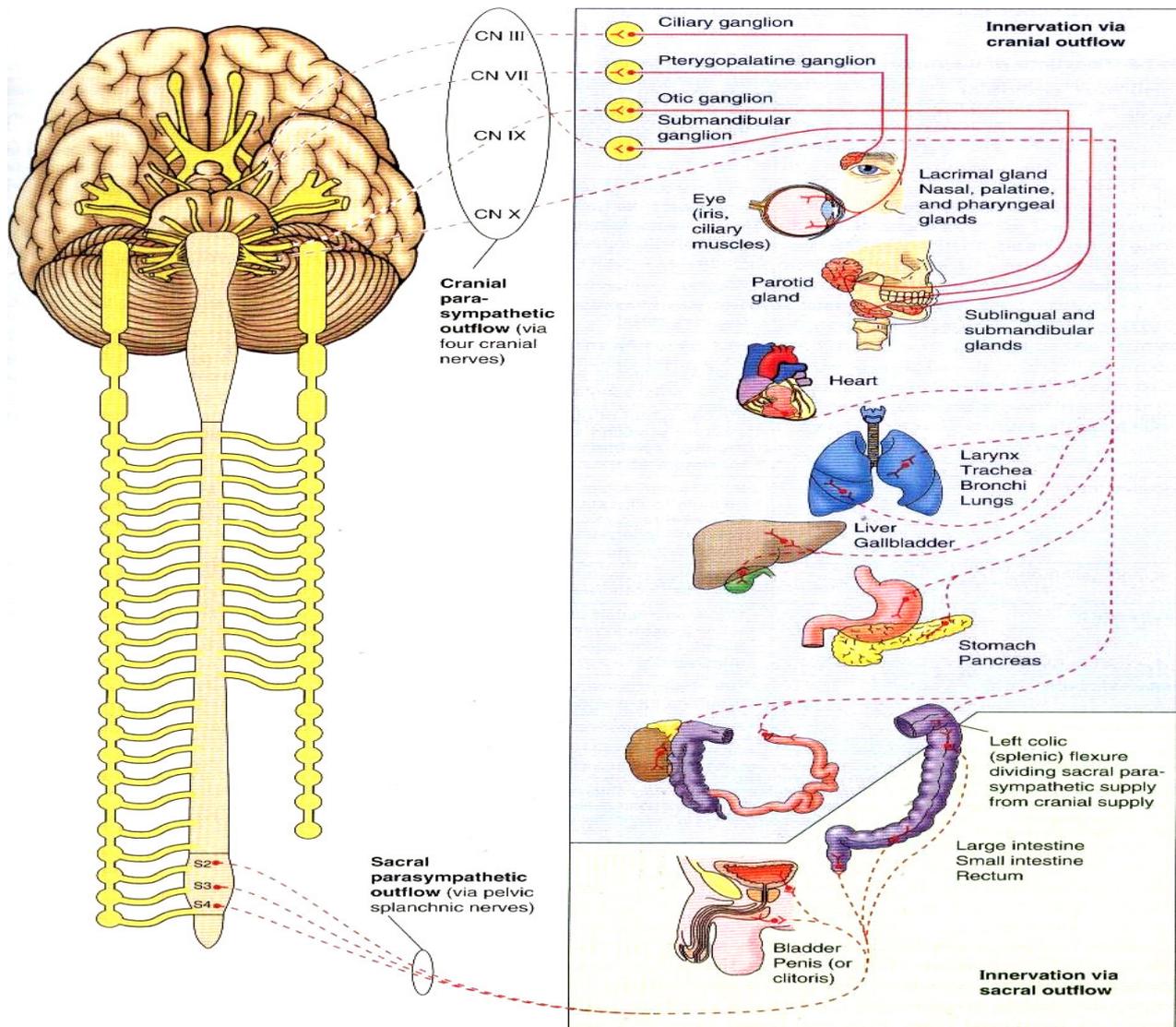


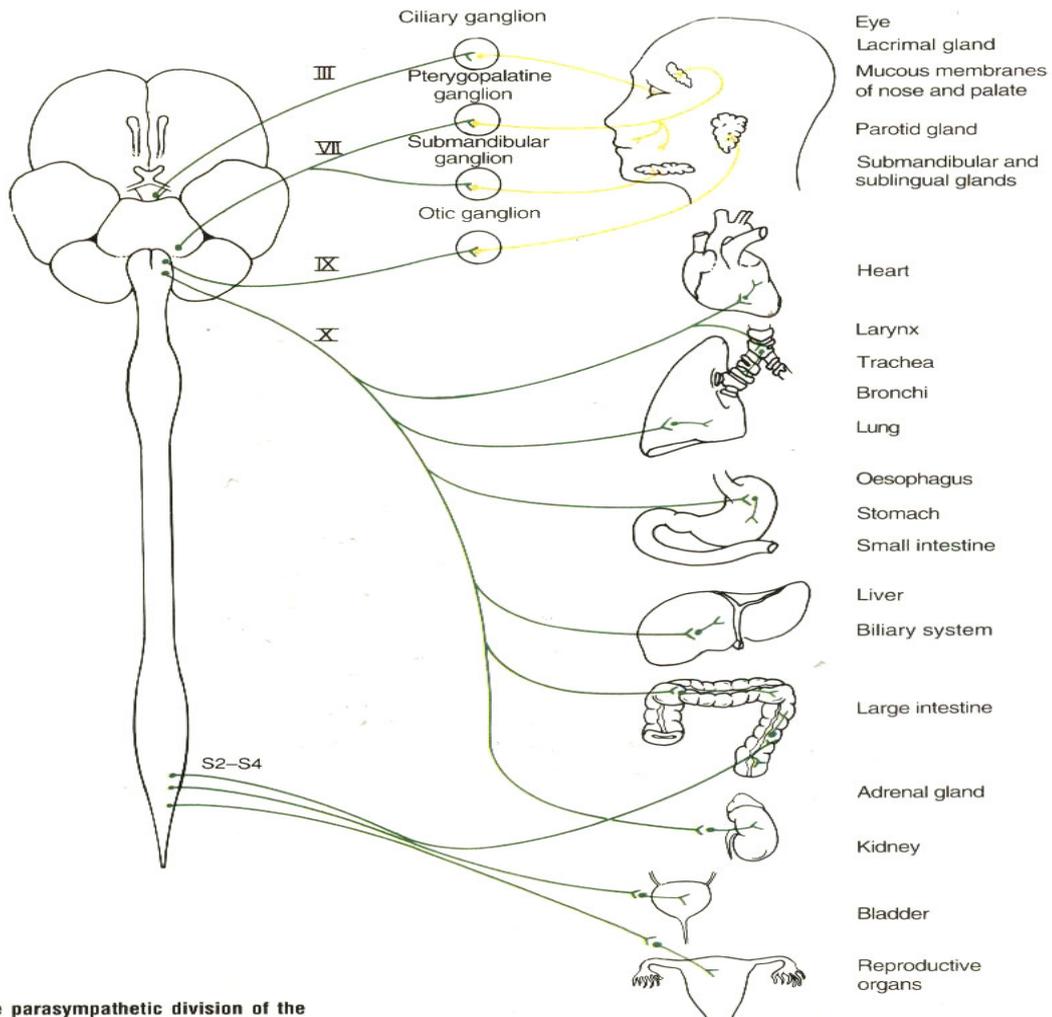
- Those fibres concerned with innervation of structures in the head and thorax terminate in synaptic contact with postganglionic cell bodies in the sympathetic chain.
- The postganglionic fibres return to the spinal nerve via the grey ramus communicantes, so called because the fibres are unmyelinated.
- Those preganglionic fibres concerned with innervation of pelvic and abdominal viscera pass uninterrupted through the sympathetic chain and travel to the plexuses where their corresponding postganglionic cells are located.
- The neurotransmitter released by preganglionic sympathetic neurones is acetylcholine.
- The transmitter of postganglionic sympathetic cells is generally noradrenaline (norepinephrine), although the cells innervating sweat glands are cholinergic.
- The adrenal medulla is an exceptional organ in that it is directly innervated by preganglionic sympathetic neurones.
- The effects of sympathetic nervous system activity are most apparent under conditions of stress, excitement or fear and are classically referred to as the 'fight or flight' response.
- The heart rate and blood pressure are increased.
- The bronchi are dilated to increase airflow to and from the lungs.
- Vasodilatation in skeletal muscles allows the increased blood flow required for energetic activity, while gastrointestinal blood flow and motility are decreased.
- Metabolic changes occur, such as an increase in blood glucose, to support high energy utilisation and sweating occurs to increase heat loss.



THE PARASYMPATHETIC (CRANIOSACRAL) DIVISION :

- Preganglionic parasympathetic neurones are located in the brain stem & the spinal cord. Within the brain stem such cells lie in cranial nerve nuclei associated with **oculomotor, facial, glossopharyngeal & vagus nerves** and provide innervation for structures of the head, thorax and abdomen.
- Within the spinal cord, preganglionic parasympathetic neurones lie in the 2nd, 3rd & 4th sacral segments and provide innervation for pelvic viscera.
- The cells of postganglionic parasympathetic neurones lie in ganglia that are located close to the structure which innervate.
- Within the alimentary canal, these neurones contribute to the myenteric (**Auerbach's**) and submucosal (**Meissner's**) plexuses. These plexuses are also referred to as the '**enteric nervous system**'.
- The neurotransmitter released by both preganglionic and postganglionic parasympathetic neurones is acetylcholine.





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FUNCTIONS OF ANS :

Autonomic nervous system		
Structure	Sympathetic effect	Parasympathetic effect
Iris of eye	Constricts pupil	Dilates pupil
Ciliary muscle of eye	Relaxes	Contracts
Salivary glands	Reduces secretion	Increases secretion
Lacrimal gland	Reduces secretion	Increases secretion
Heart	Increases rate and force of contraction	Decreases rate and force of contraction
Bronchi	Dilates	Constricts
Gastrointestinal tract	Decreases motility	Increases motility
Sweat glands	Increases secretion	
Erector pili muscles	Contracts	

SELF QUIZ

- All of the following are parasympathetic ganglia EXCEPT :
 - a. Ciliary ganglion.
 - b. Superior cervical ganglion.
 - c. Otic ganglion.
 - d. Submandibular ganglion.
 - e. Pterygopalatine ganglion.



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THE END OF ANATOMY ...BEST WISHES...

LoveTomy Team 426

Team leader : Dr. hams

Omar Bin Husain

Dr. noop

Dr. S

Abo Slo7

Cute Killer

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M.A.M

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