

# **Parasympathetic and parasympathetic ganglia of head and neck**

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# Session ILOs

**By the end of this lecture, the student should be able to:**

- 1. Outline the anatomy of autonomic nervous system**
- 2. describe the distribution and function of  
parasympathetic**
- 3. describe the parasympathetic ganglia of head and neck**

# Autonomic Nervous system

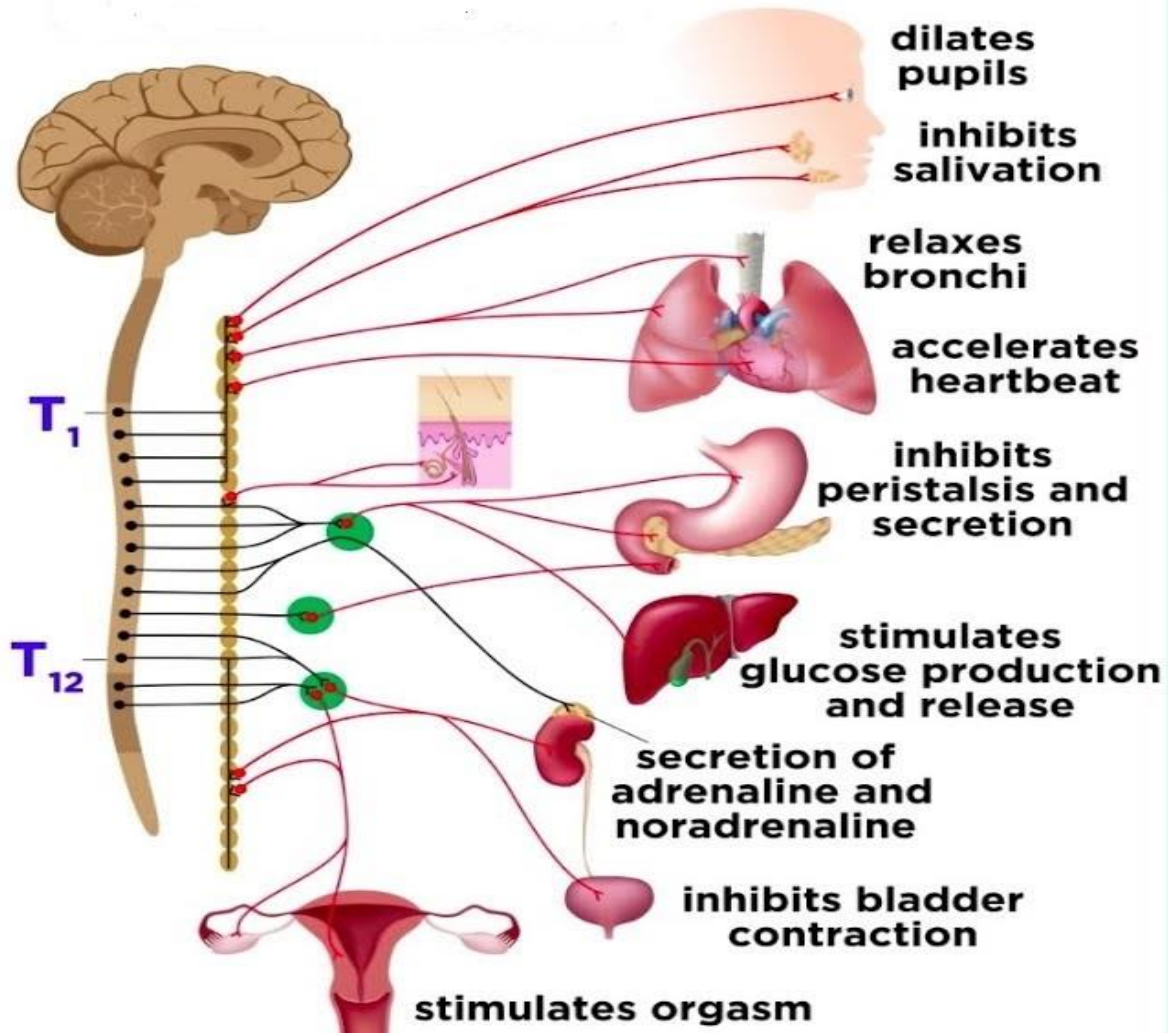
## Sympathetic

- Thoracolumbar
- Consists of fibers which accompany **all thoracic and 1,2,3 lumbar nerves.**
- They communicate with 2 sympathetic chains on either sides of vertebral column

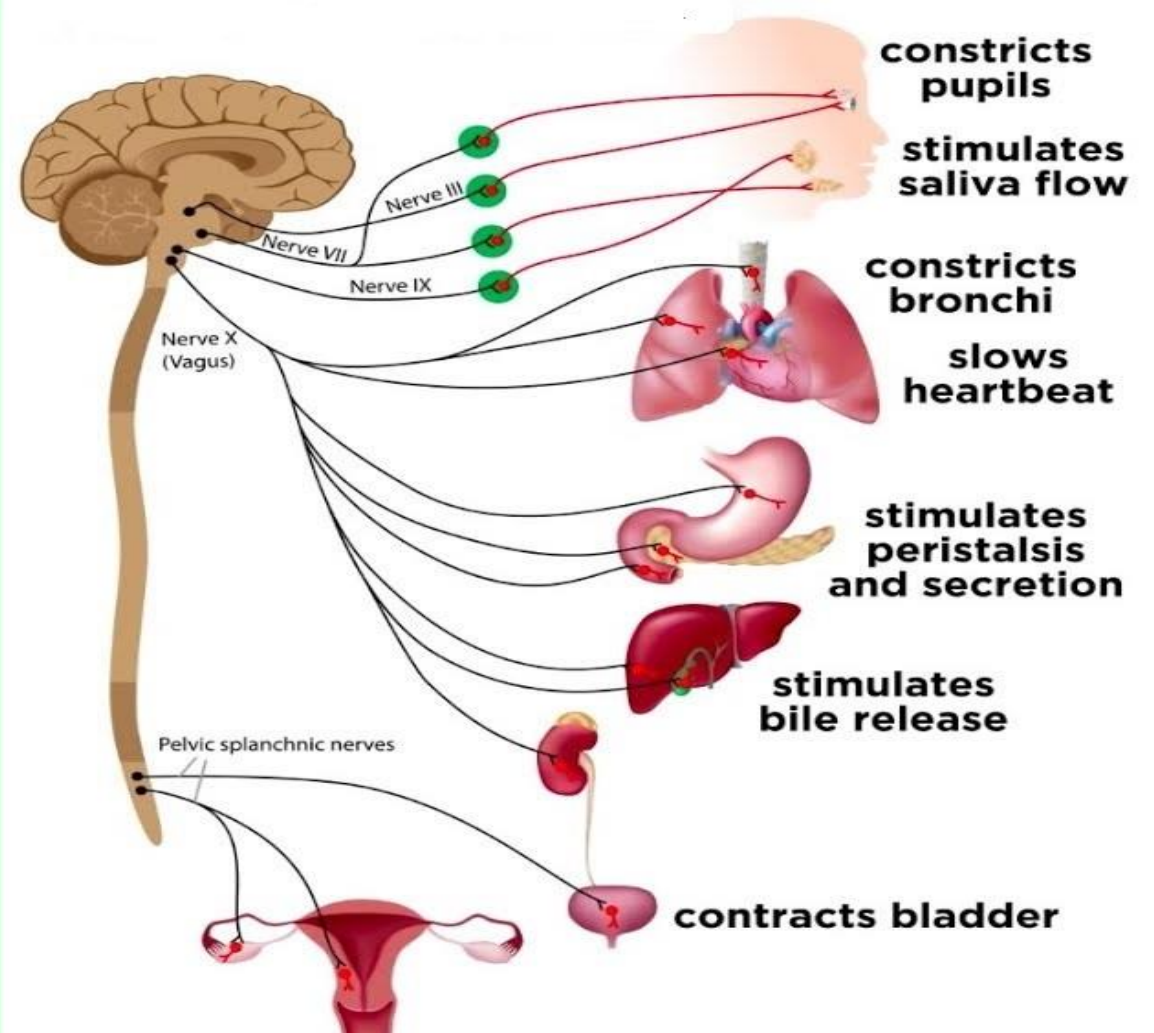
## Parasympathetic

- Craniosacral
- Consists of fibers accompany **3,7,9,10 cranial nerves and 2,3,4 sacral nerves (Pelvic Splanchnic nerve).**
- They have ganglia in the effector organs.

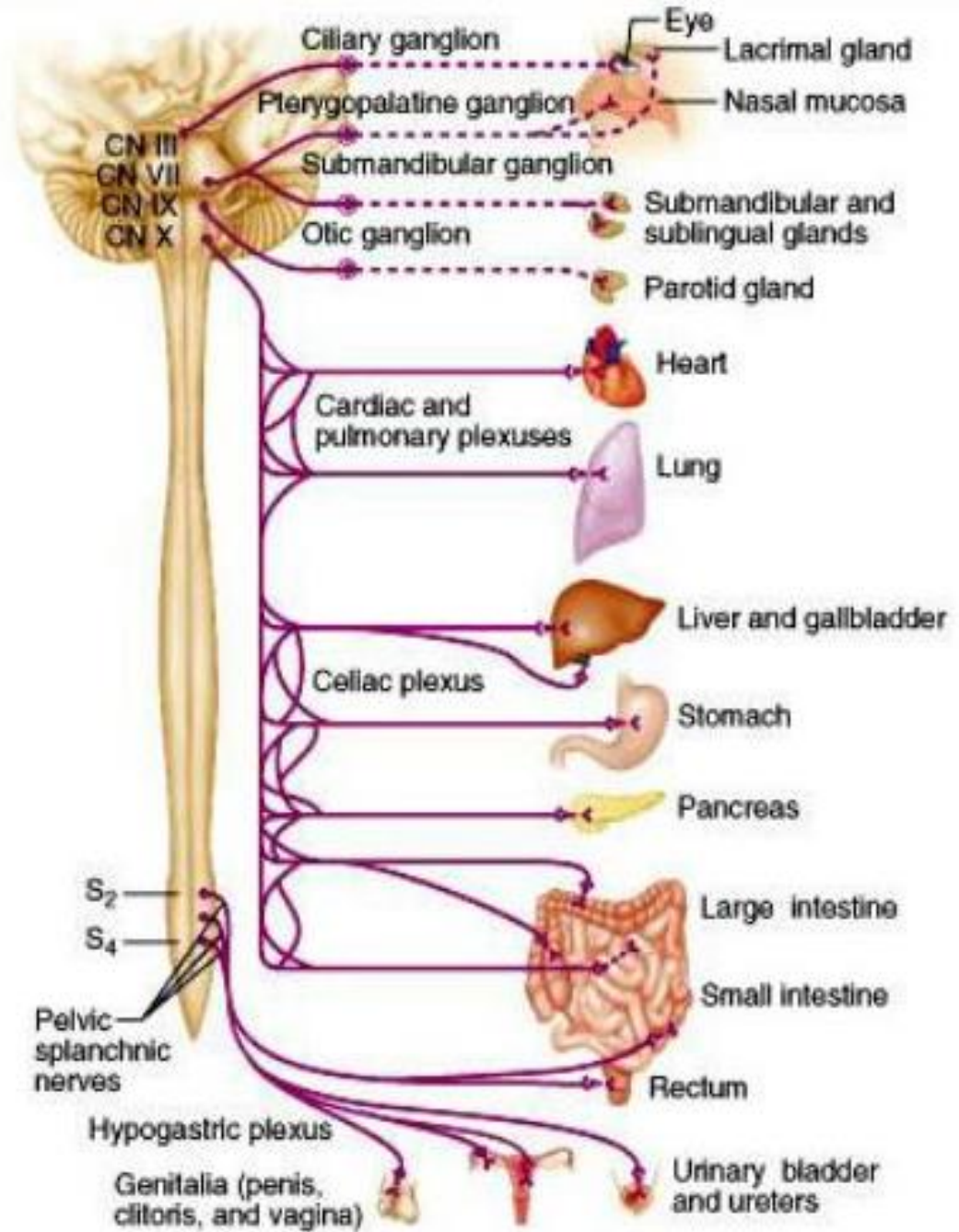
# Sympathetic



# Parasympathetic

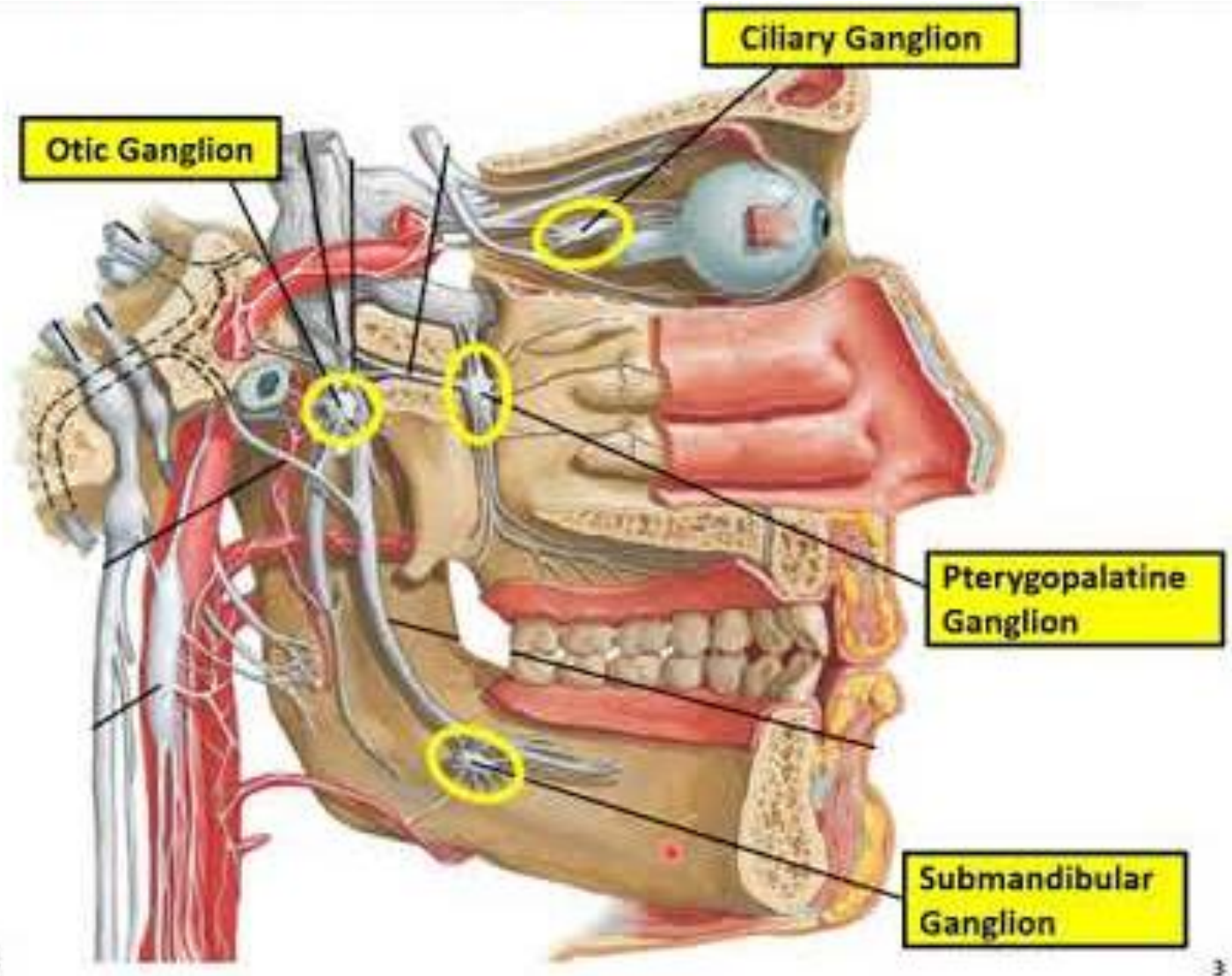


# Parasympathetic distribution



# Parasympathetic ganglia of head and neck

1. Ciliary
2. Otic
3. Pterygopalatine
4. Submandibular



# Ciliary Ganglion

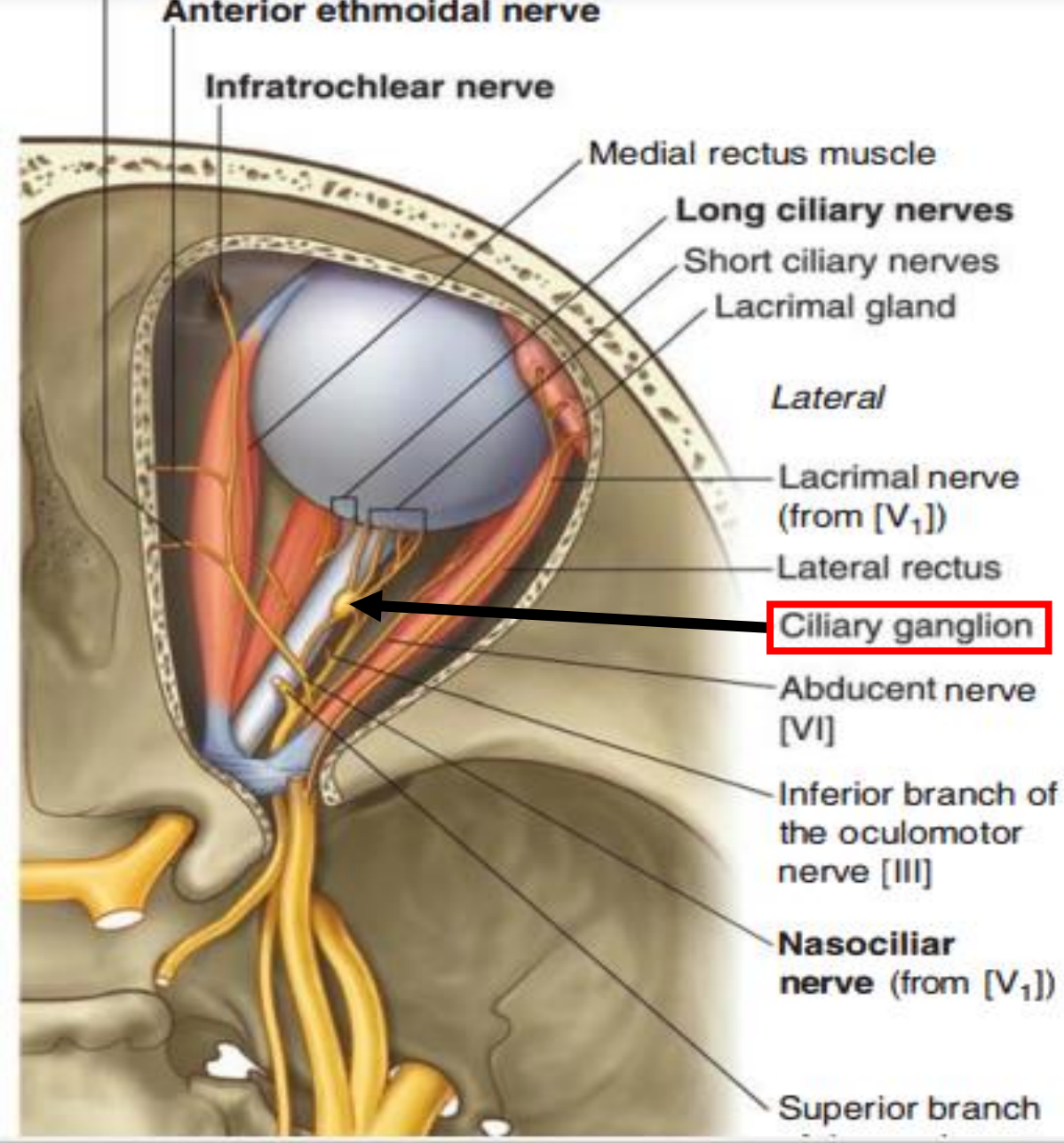
## Definition:

- It is a parasympathetic ganglion which lies in the orbital fat lateral to the optic nerve.
- It is about the size of pin's head.

## Roots:

### 1. Sensory root:

- Comes from the nasociliary nerve.
- The fibers pass through the ganglion without relay



## Roots:

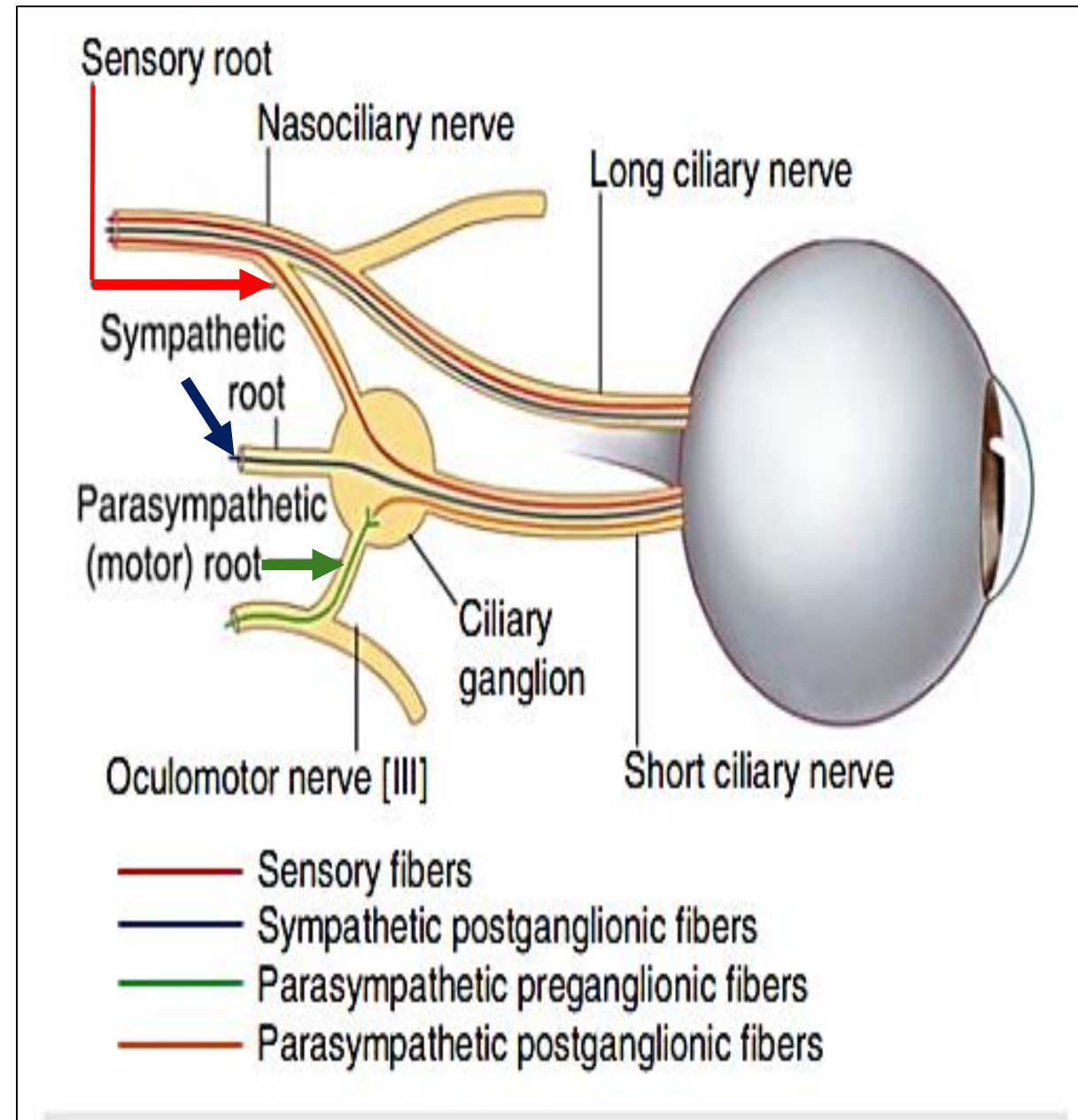
# Ciliary Ganglion

### 2. Sympathetic root:

- Comes from the plexus around the internal carotid artery (postganglionic fibers).
- They traverse the ganglion without relay.
- They reach the eye through the short ciliary nerve to supply the dilator pupillae muscle and the blood vessels of eye.

### 3. Parasympathetic root:

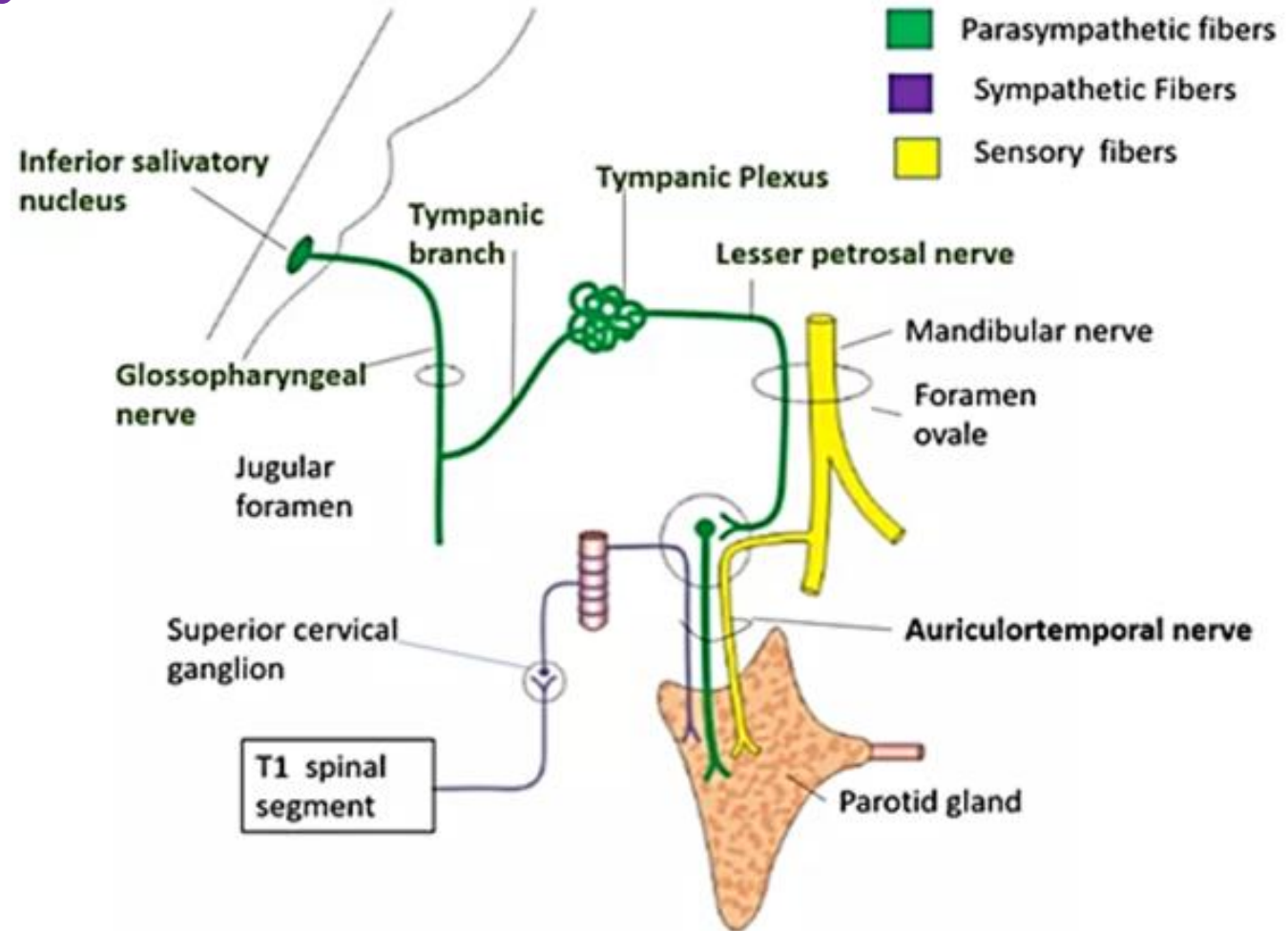
- It is formed from preganglionic parasympathetic fibers which originate from the Edinger-Westphal nucleus and pass through the oculomotor nerve.
- Runs with the nerve to inferior oblique.
- They relay in the ciliary ganglion
- The postganglionic fibers reach the eyeball through the short ciliary nerve to supply the sphincter pupillae and ciliary muscle.



# Otic Ganglion

## Parasympathetic root: (Relay in the ganglia)

- Preganglionic fibres arise from the inferior salivatory nucleus in the upper medulla.
- They join glossopharyngeal nerve (9<sup>th</sup> cranial)
- They leave the 9<sup>th</sup> nerve as its tympanic branch
- Tympanic branch enters the middle ear where it joins the tympanic plexus.
- Lesser petrosal nerve arises from the tympanic plexus and leaves the middle ear to the middle cranial fossa.
- It then passes through foramen ovale to the infratemporal fossa .
- It relays in the **otic** ganglion
- Postganglionic fibres reach the parotid gland by joining the auriculotemporal nerve.



# Otic Ganglion

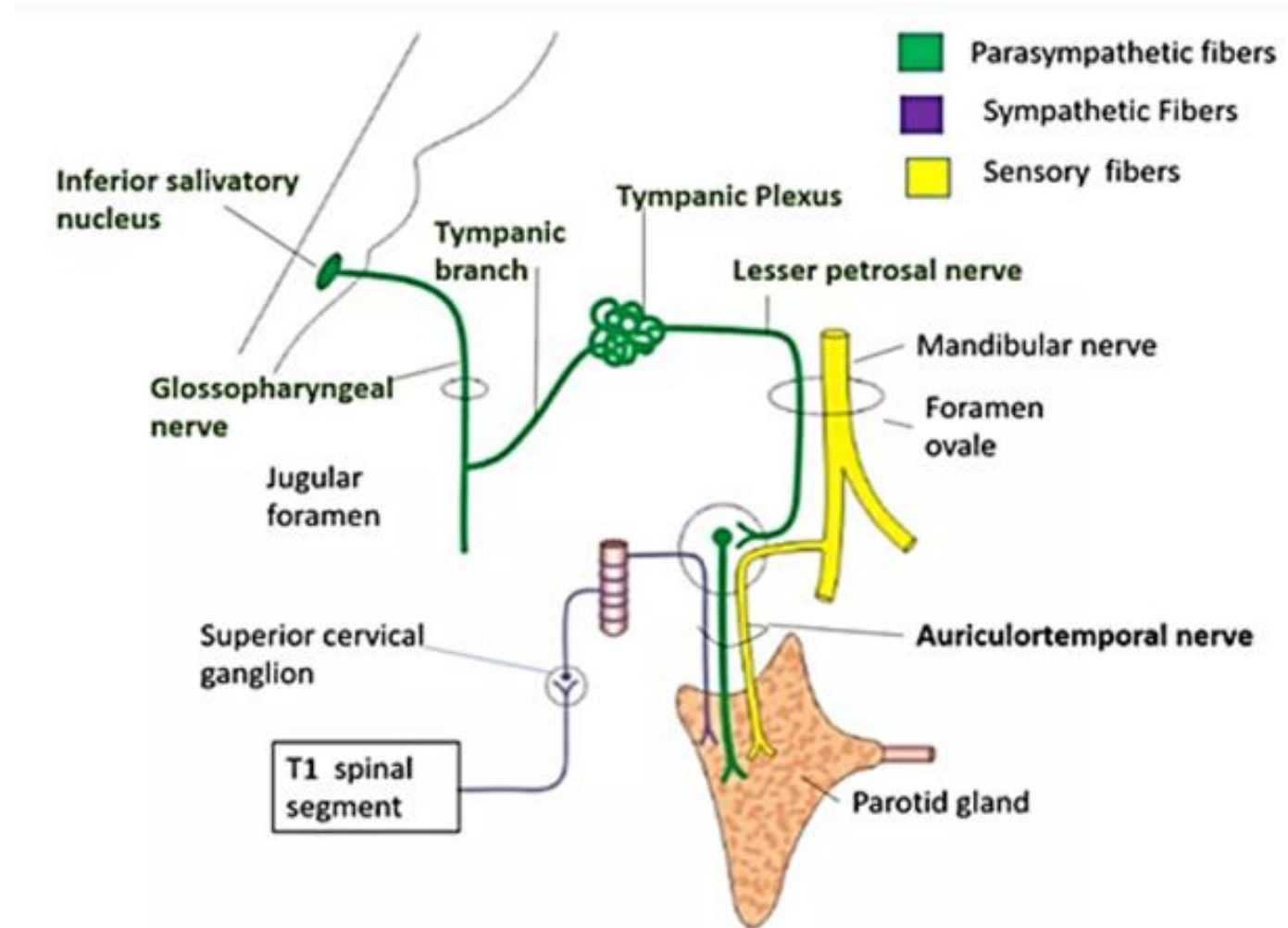
- **Sympathetic root (passes without relay)**
  - ✓ Vasoconstrictor to the blood vessels of the parotid gland.
  - ✓ Postganglionic from the plexus around the external carotid artery.

- **Sensory root (passes without relay)**

Passes through auriculotemporal nerve to parenchyma of parotid gland

- **Motor root: (passes without relay)**

Conveys fibres from the nerve to the medial pterygoid to the tensor palati and tensor tympani.

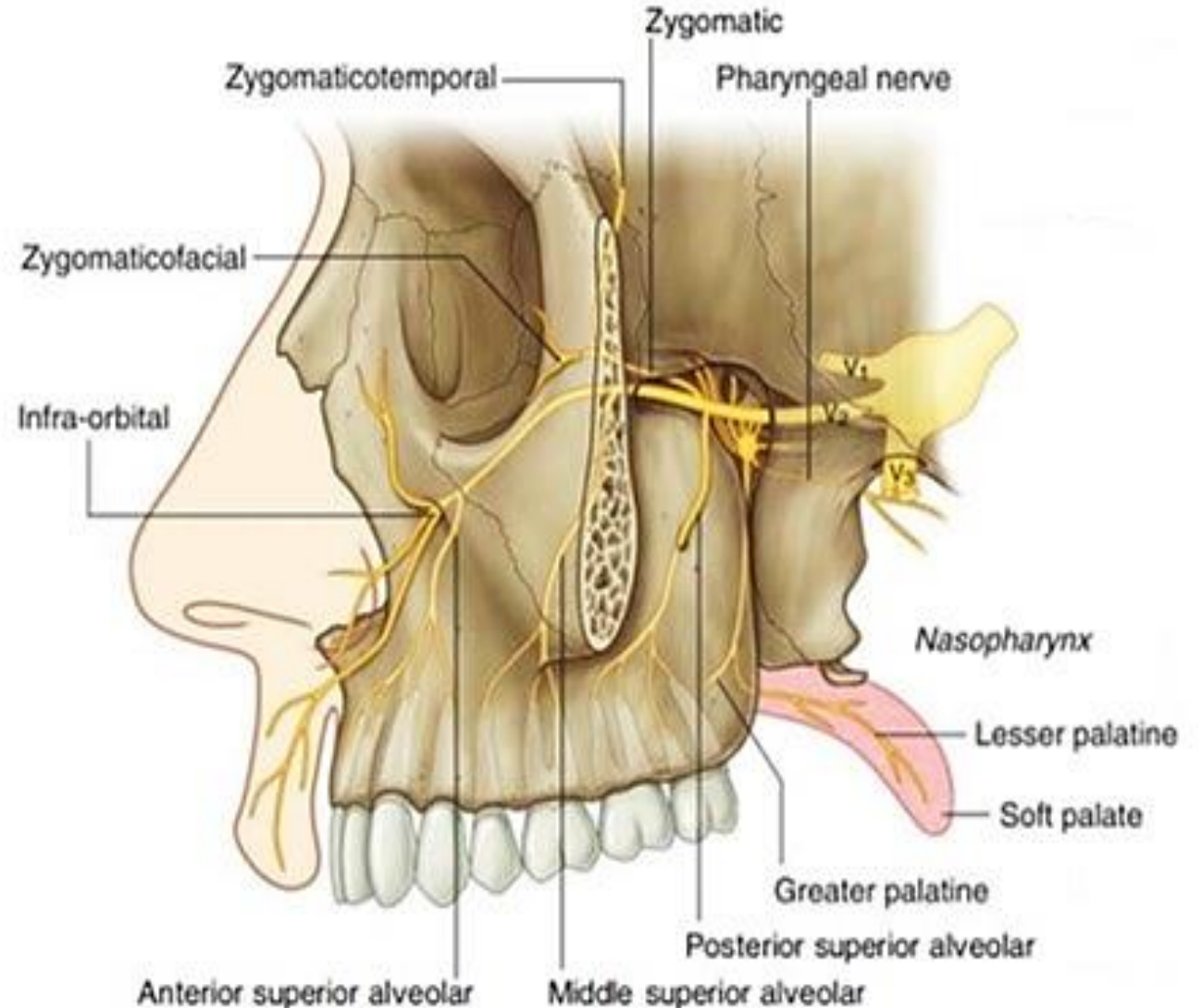


# Pterygopalatine Ganglion

- It is the largest parasympathetic ganglion in the head

## Position:

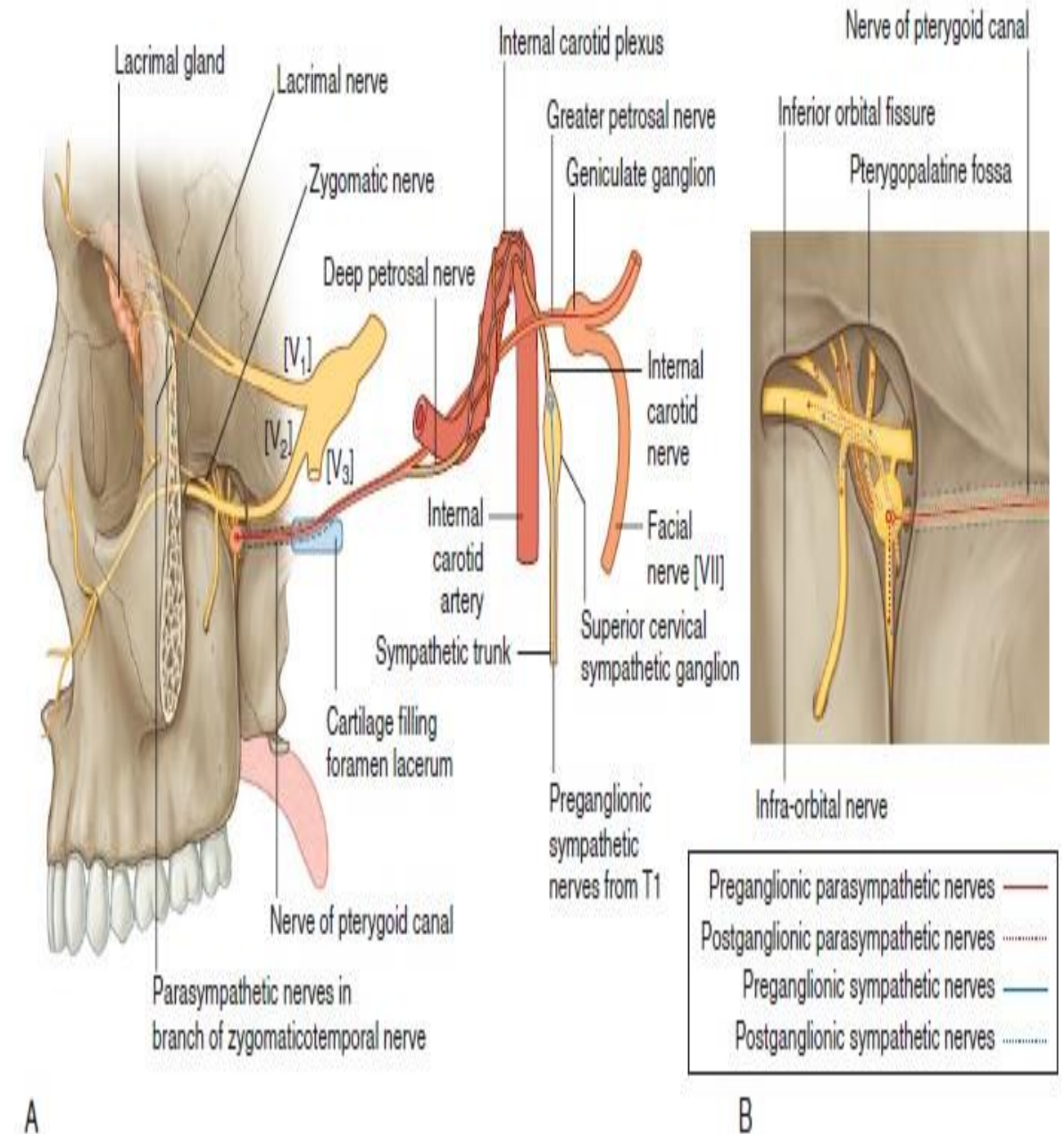
- It lies in the pterygopalatine fossa hanging from the maxillary nerve by its ganglionic branches, but **functionally related to the facial nerve.**



# • Roots:

## 1. Parasympathetic :

- Its fibers arise from the Superior salivary N. or lacrimatory nucleus in pons
- These fibres runs with the facial nerve and leave as greater superficial petrosal nerve, which joins the deep petrosal nerve forming the nerve of pterygoid canal (Vidian nerve) which relay in sphenopalatine ganglion.
- The postganglionic fibers reach lacrimal gland through zygomatic branch of maxillary nerve that communicate with lacrimal branch of ophthalmic nerve

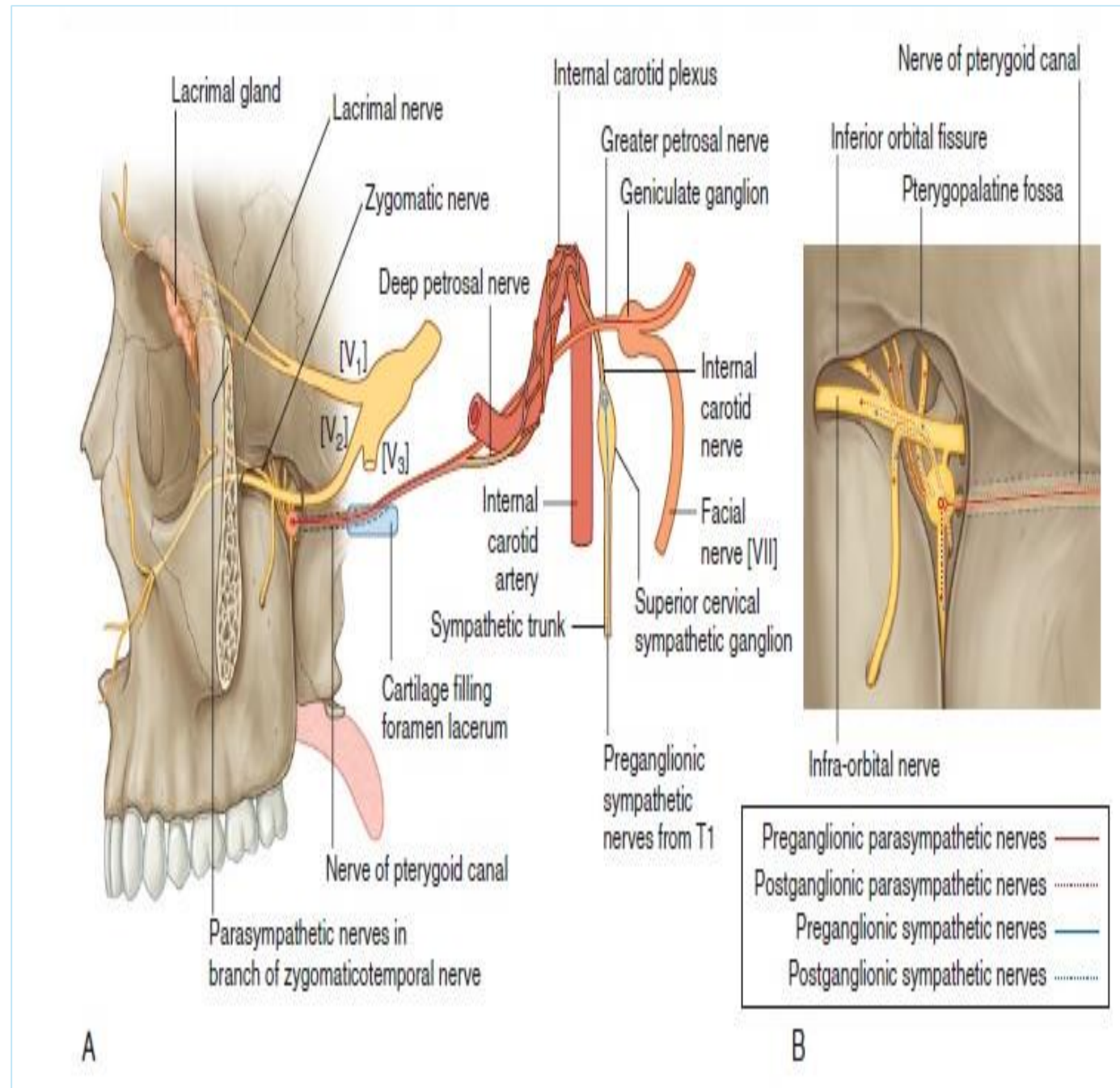


## • 2. Sympathetic:

- The deep petrosal nerve arises from a plexus around the internal carotid artery.
- joins the greater petrosal forming the Vidian nerve.
- pass through ganglion **without relay** and are distributed with its branches .

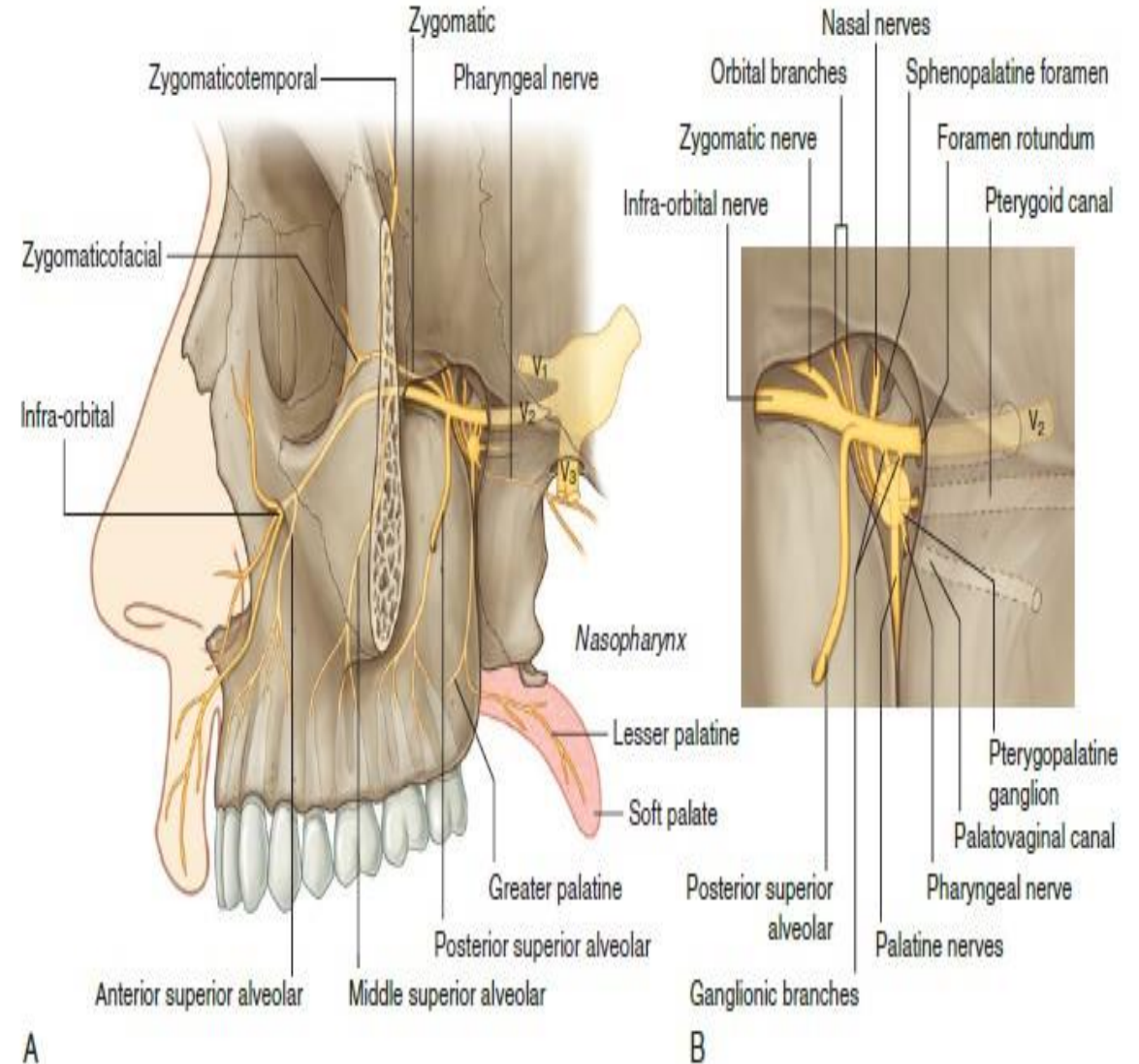
## 3. Sensory: (Pass without relay)

- arises from the maxillary nerve



# Branches:

- 1. Postganglionic fibres:** Join the maxillary nerve in their way to lacrimal gland.
- 2. Orbital branches:**
  - 2 or 3 slender supply the orbit periosteum.
- 3. Pharyngeal branch:**
  - Passes backwards through the palatovaginal canal to the nasopharynx and the pharyngeal end of the eustachian tube.
- 4. Greater palatine nerve**
  - Descends through the greater palatine canal to supply the lateral wall of the nose
  - Then supplies the upper gum and the hard palate.
- 5. Lesser palatine nerve:**
  - emerge through the lesser palatine foramina to supply the soft palate and the tonsils.
- 6. Sphenopalatine nerves :**
  - They pass through the sphenopalatine foramen to the nasal cavity to reach the nasal septum

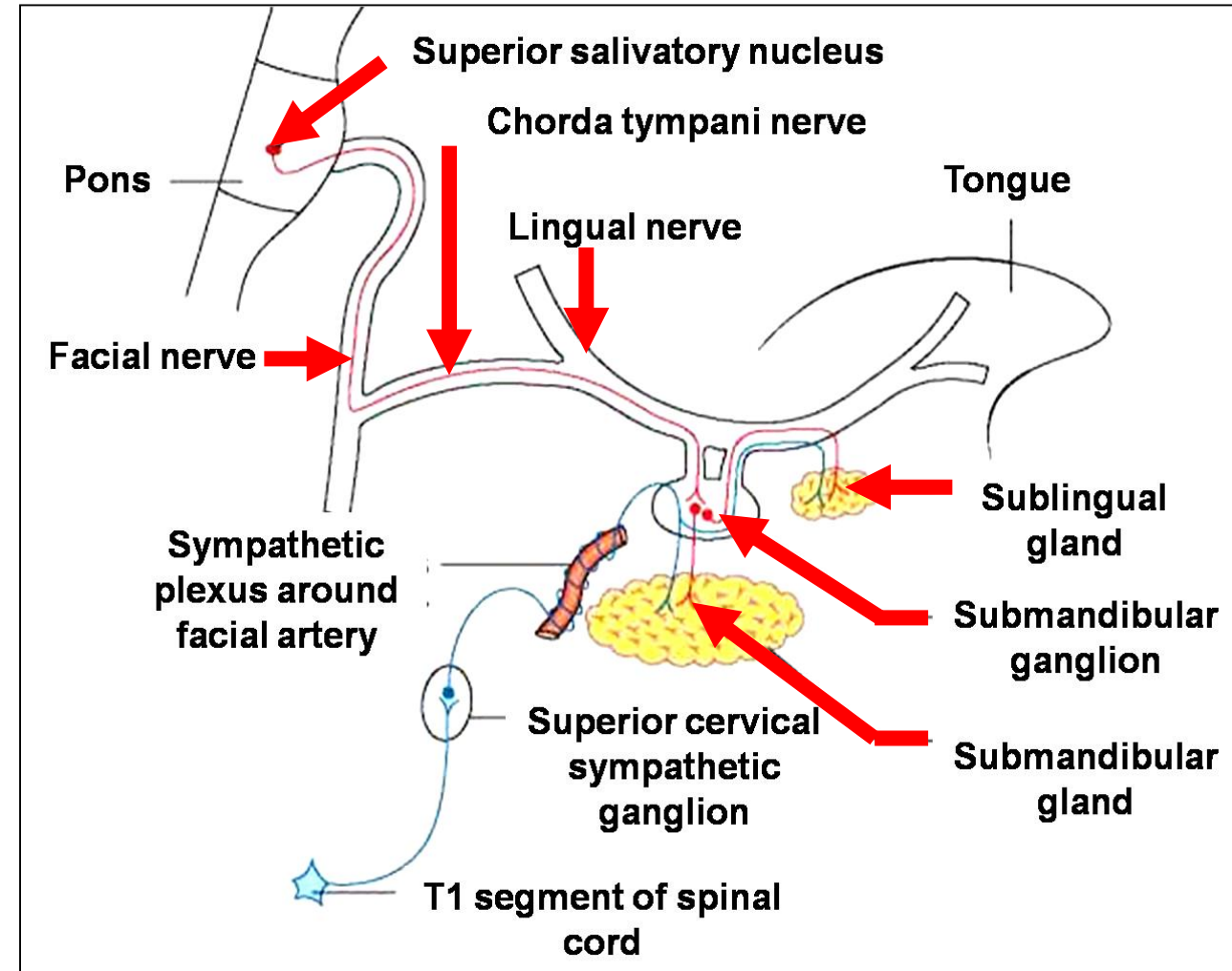


# Submandibular ganglion

## Roots

### 1. Parasympathetic:

- Preganglionic fibres arise from superior salivary nucleus.
- Fibres pass through facial nerve and its chorda tympani branch.
- Chorda tympani joins lingual nerve in infratemporal fossa.
- Fibres relay in submandibular ganglion.
- Postganglionic fibres reach submandibular and sublingual salivary glands directly.



# Roots

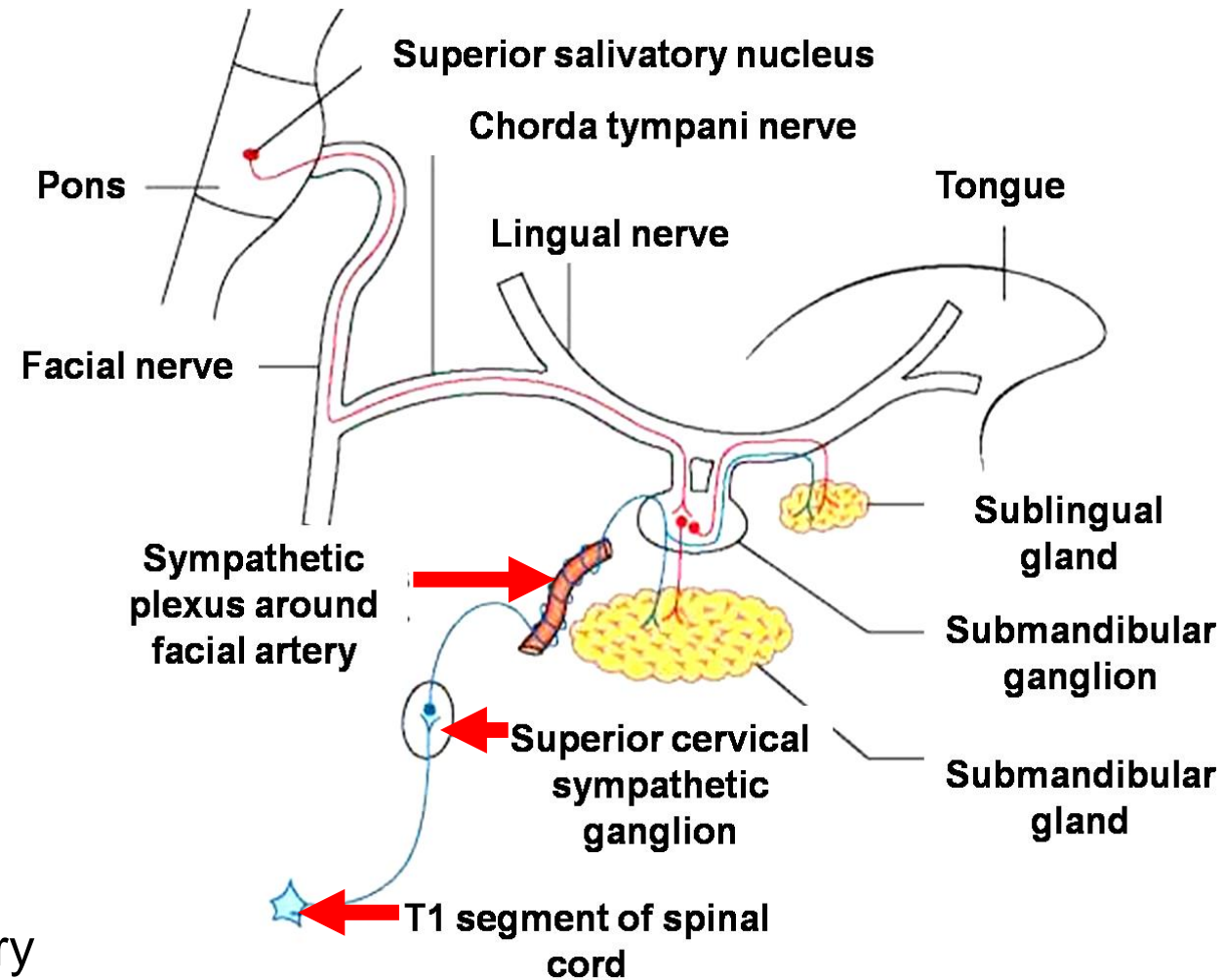
# Submandibular ganglion

## 2. Sympathetic:

- Preganglionic fibers arise from 1<sup>st</sup> T segment of spinal cord.
- They relay in superior cervical sympathetic ganglion.
- Postganglionic fibres reach gland as plexus around facial& lingual arteries.
- They pass through ganglion without relay to reach both salivary glands.

## Branches:

Secretory to submandibular and sublingual salivary glands.



Thank  
you

