

# Autonomics of the Head and Neck

**NEW YORK INSTITUTE  
OF TECHNOLOGY**

College of Osteopathic  
Medicine

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Do.  
Make.  
Heal.  
Innovate.  
Reinvent the Future.

# Sympathetics

# External Carotid Plexus

## Branches with maxillary a.

- Parotid gland

## Branches with lingual a.

- Sublingual gland
- Submandibular gland

## Branches with facial a.

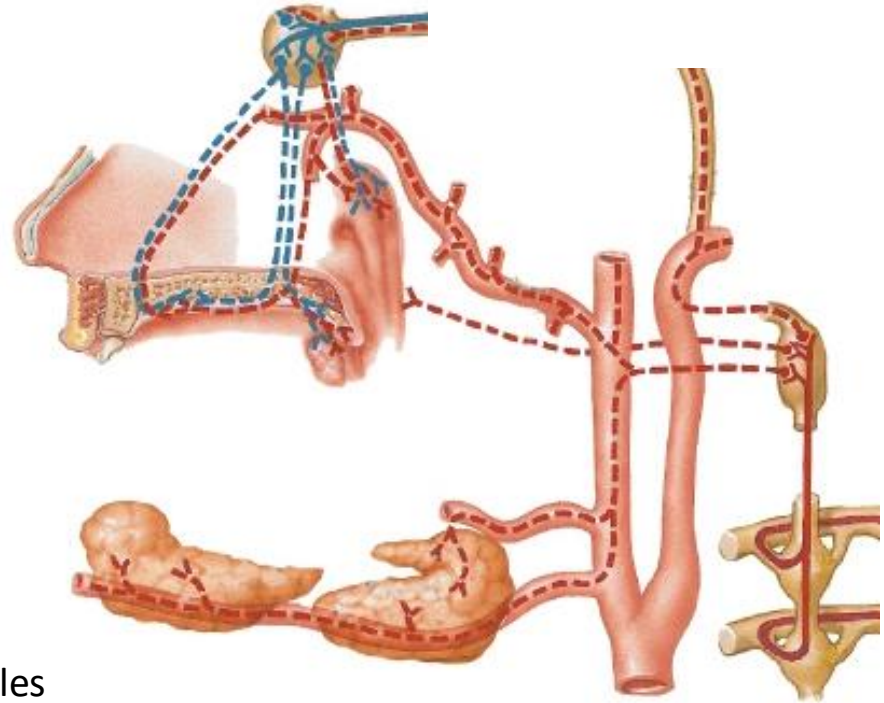
- Submandibular gland

## Branches with superior thyroid a.

- Thyroid gland

## With all branches

- Vasoconstriction of arterioles
- Facial sweat glands



Sympathetic preganglionic ———

Sympathetic postganglionic - - - -

# Clinical Consideration

# Horner's Syndrome



## Cause

- Damage or blockage of sympathetic pathway to head

## Symptoms

- **Constricted pupil (miosis)**
- **Drooping upper eyelid (mild ptosis)**
- **Lack of sweating (anhidrosis)**
- Loss of cutaneous vasodilation in face (cannot blush)
- Loss of ocular vasoconstriction ("bloodshot" eye)

# Parasympathetics

# Ciliary Ganglion

## **Preganglionic cell bodies**

- Brain (visceral efferent oculomotor nucleus)

## **Preganglionic axons**

- Oculomotor Nerve (CN III)

## **Postganglionic cell bodies**

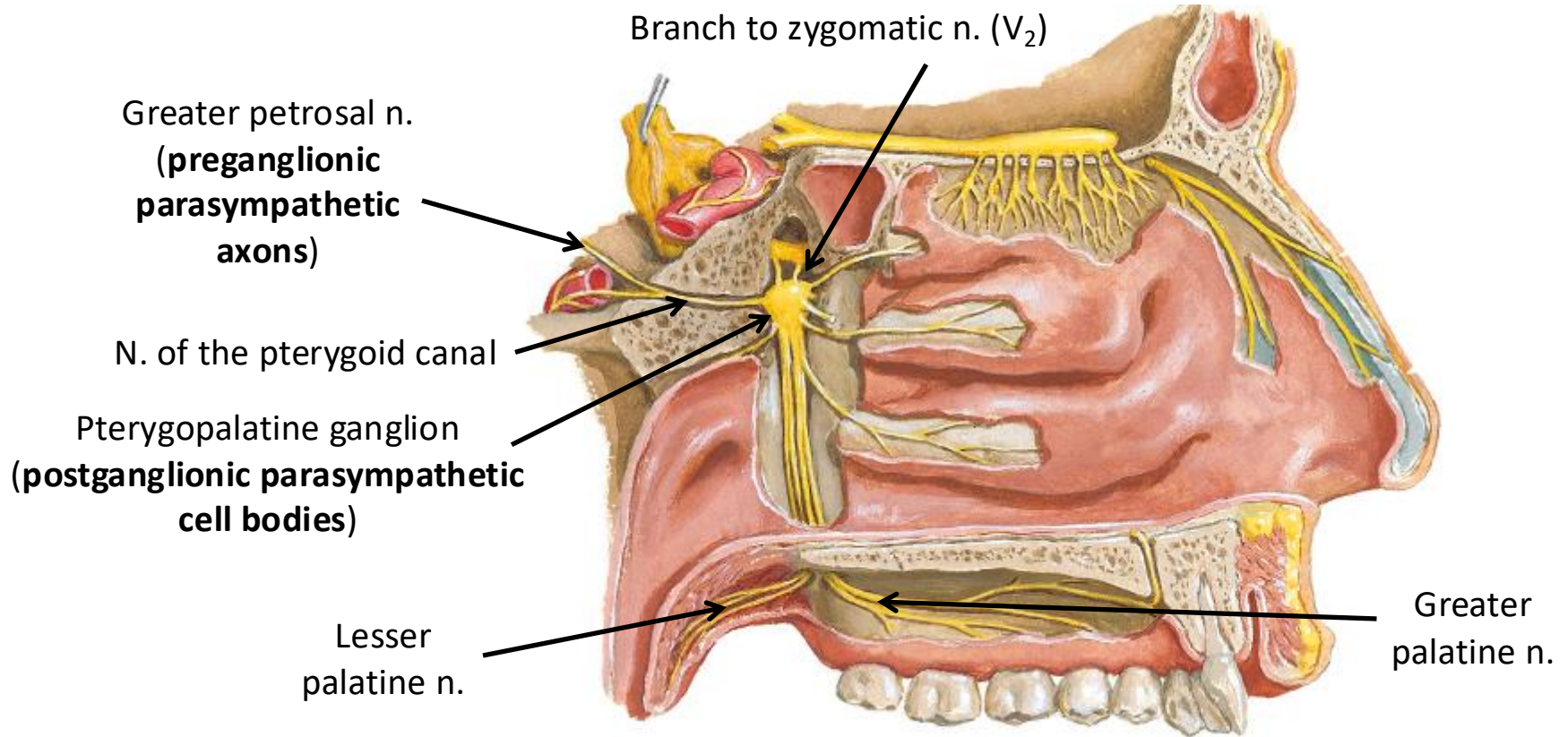
- Ciliary ganglion

## **Postganglionic axons**

- Short ciliary to: ciliary muscle (muscle of accommodation) and constrictor (= sphincter) pupillae

# Pterygopalatine Ganglion

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# Submandibular Ganglion

## **Preganglionic cell bodies**

- Brain (superior salivary nucleus)

## **Preganglionic axons**

- Facial Nerve (CN VII) > chorda tympani > lingual n (V<sub>3</sub>)

## **Postganglionic cell bodies**

- Submandibular ganglion

## **Postganglionic axons**

- Submandibular gland: direct branches
- Sublingual gland: Lingual n.

# Otic Ganglion

## **Preganglionic cell bodies**

- Brain (inferior salivary nucleus)

## **Preganglionic axons**

- Glossopharyngeal n (IX) > tympanic nerve > tympanic plexus > lesser petrosal

## **Postganglionic cell bodies**

- Otic ganglion

## **Postganglionic axons**

- Parotid gland: Auriculotemporal n. (V<sub>3</sub>)

# Vagus n.

## **Preganglionic cell bodies**

- Brain (dorsal motor vagus nucleus)

## **Preganglionic axons**

- Vagus n.

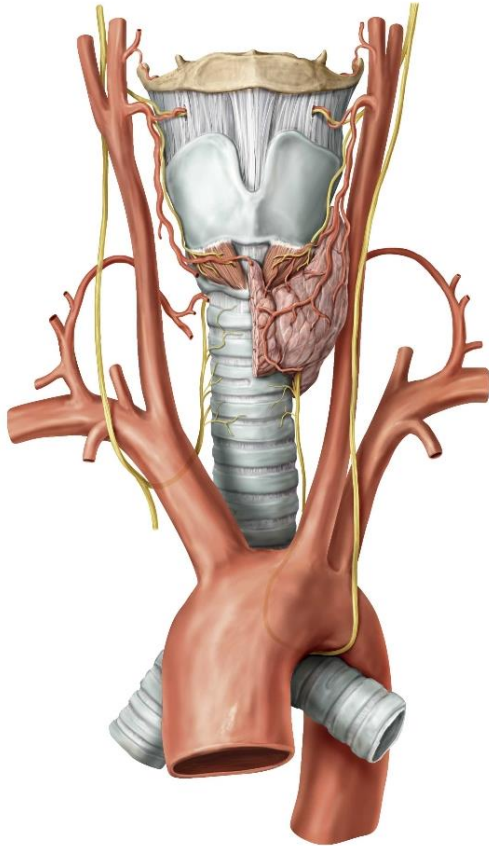
## **Postganglionic cell bodies**

- Close to target organ

## **Postganglionic axons**

- Glands and blood vessels in pharynx
- Mucous glands and blood vessels in larynx

# Vagus n.



## **Pharyngeal branches**

- Pharyngeal glands

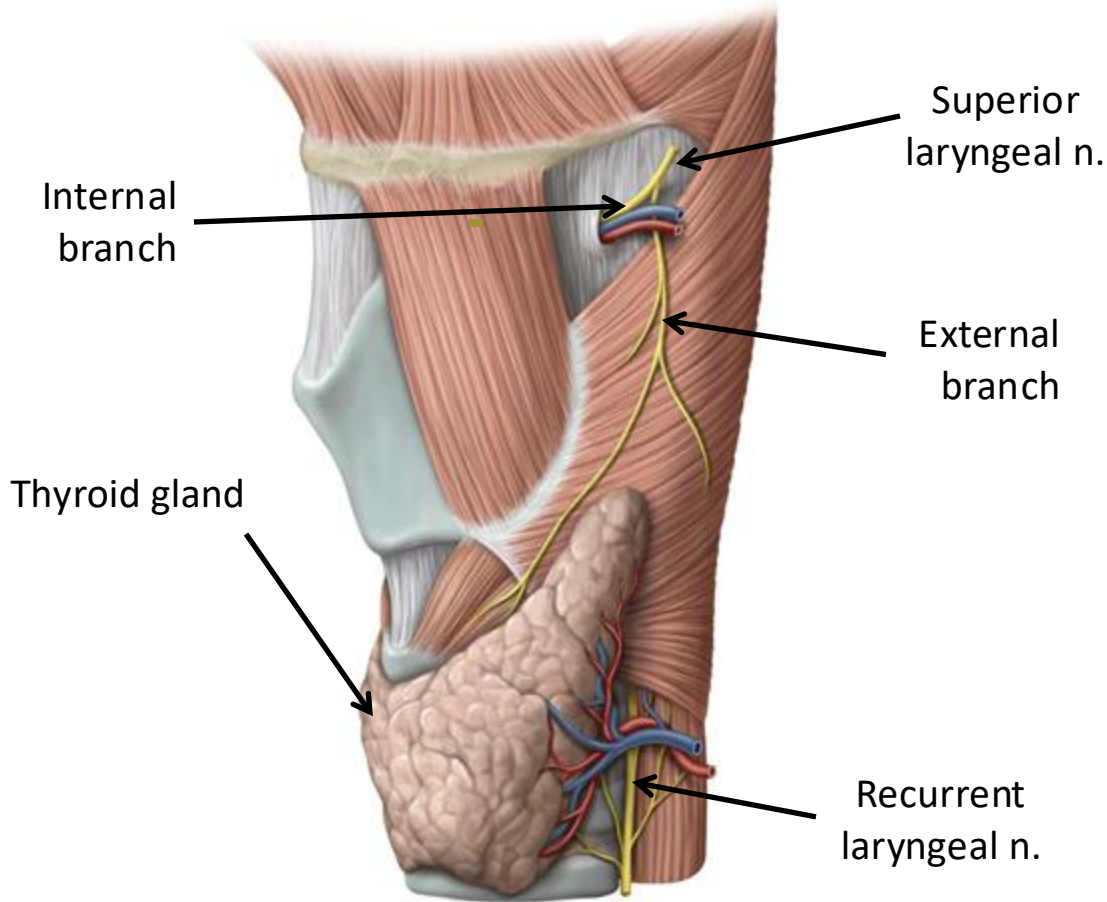
## **Superior laryngeal n.**

- Larynx above vocal fold

## **Recurrent laryngeal n.**

- To thyroid and parathyroid glands
- Larynx below vocal folds

# Vagus n.



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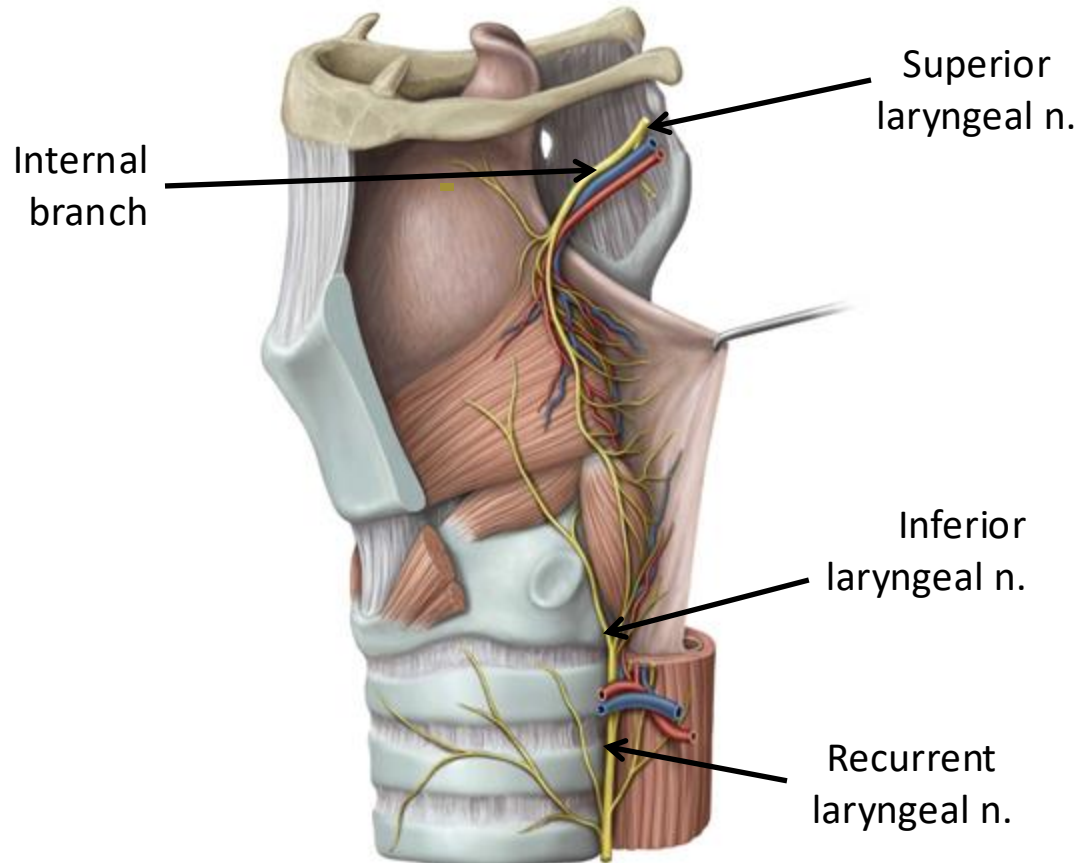
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