



Cranial nerves(9,10,11,12)

By:

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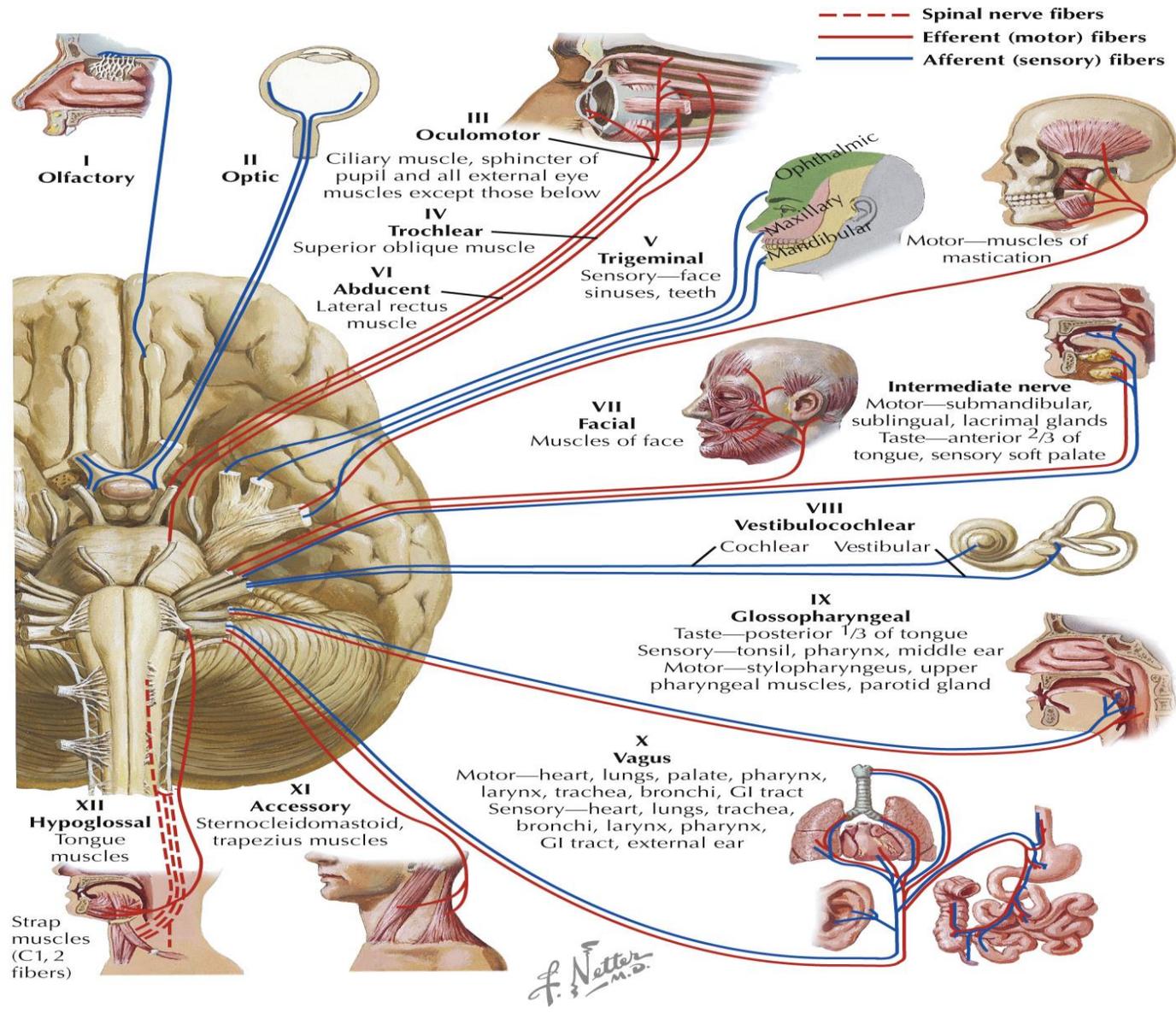
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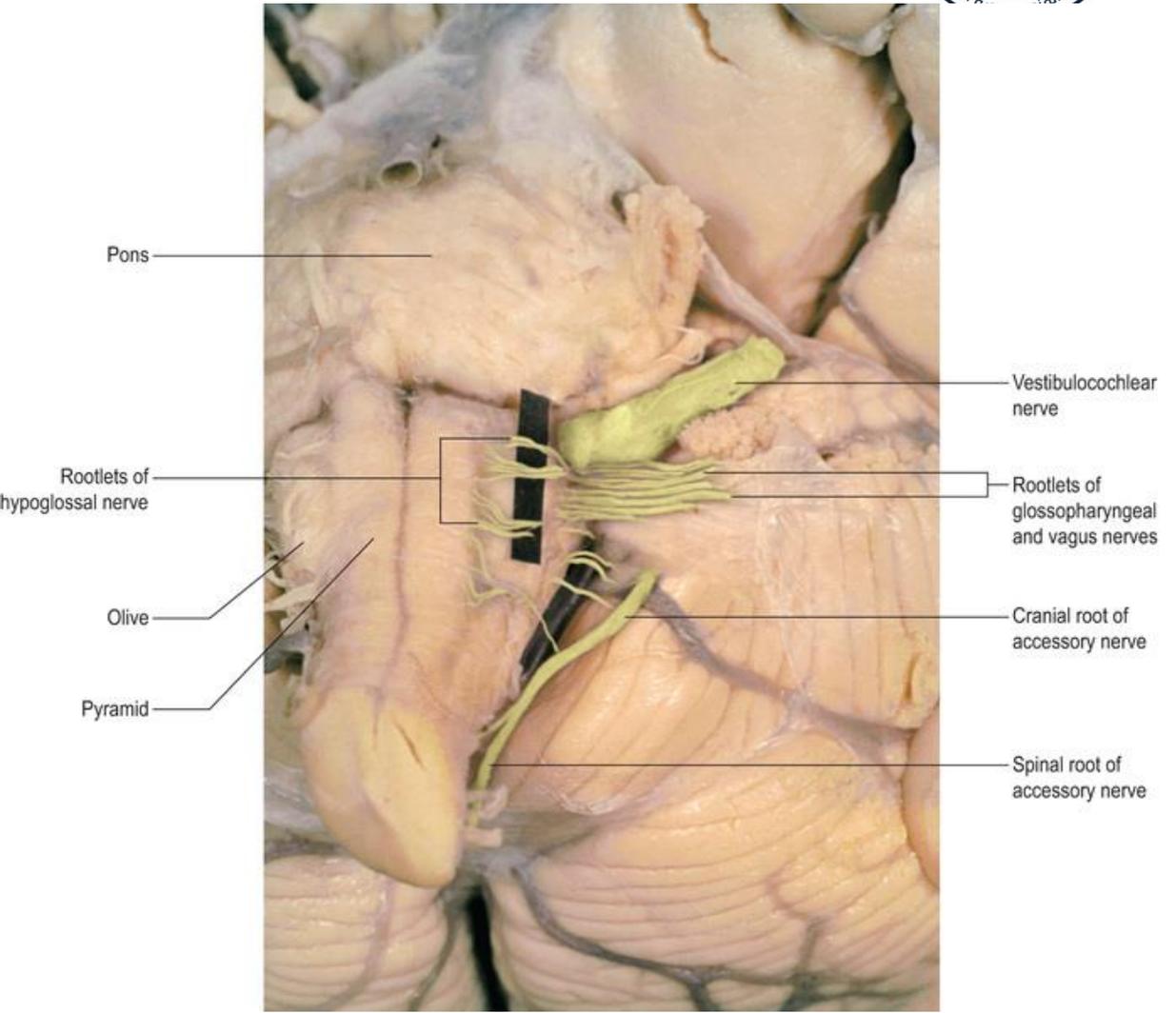
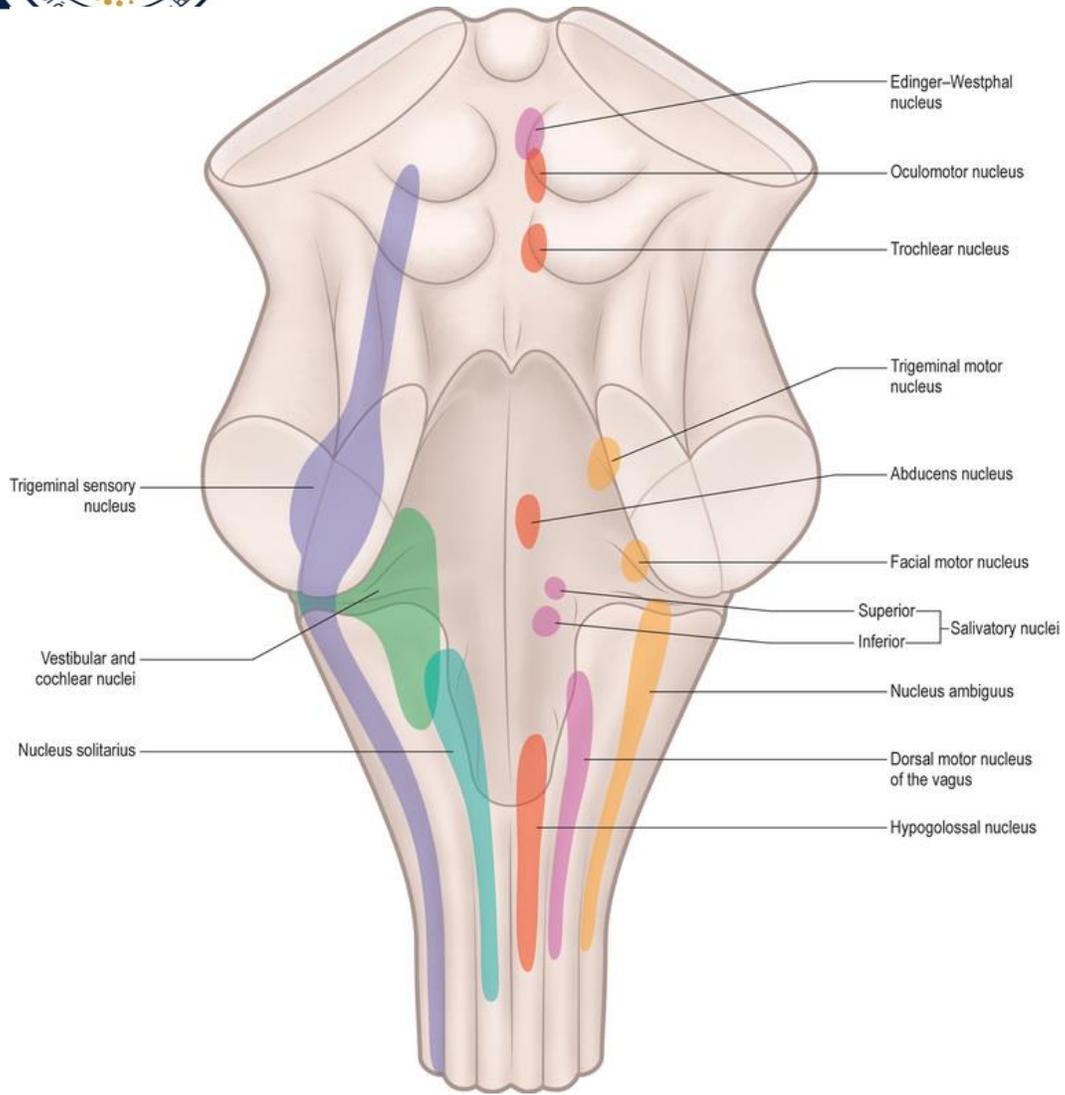


Intended Learning Outcomes (ILOs)

1. Identify the **deep origin, exit ,course and branches** of the last four cranial nerves(9,10,11,12)
2. Recognize the **course of gustatory pathway.**
3. Enumerate **different lesions** result from last four cranial nerve injuries

Cranial Nerves (Motor and Sensory Distribution): Schema





IX. Glossopharyngeal nerve

Type: it is A MIXED nerve.

Deep origin: it has 4 nuclei:

1. Motor nucleus: upper part of nucleus ambiguous.

It supplies the stylopharyngeus muscle.

2. Parasympathetic nucleus: inferior salivatory nucleus.

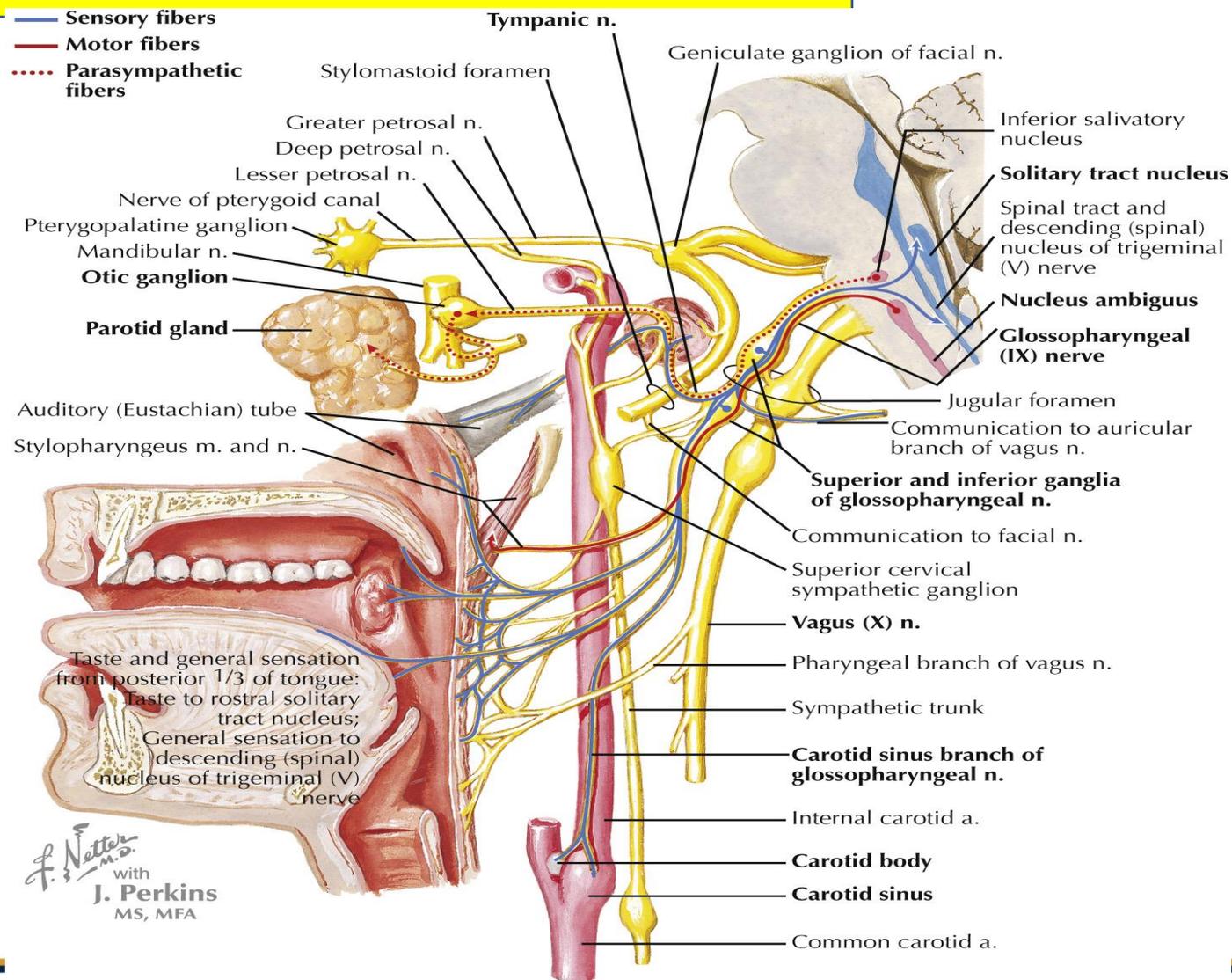
It supplies the parotid gland.

3. Two sensory nuclei:

- **Nucleus solitarius:** it receives taste fibers from the posterior third of the tongue.

- **Spinal trigeminal nucleus:**

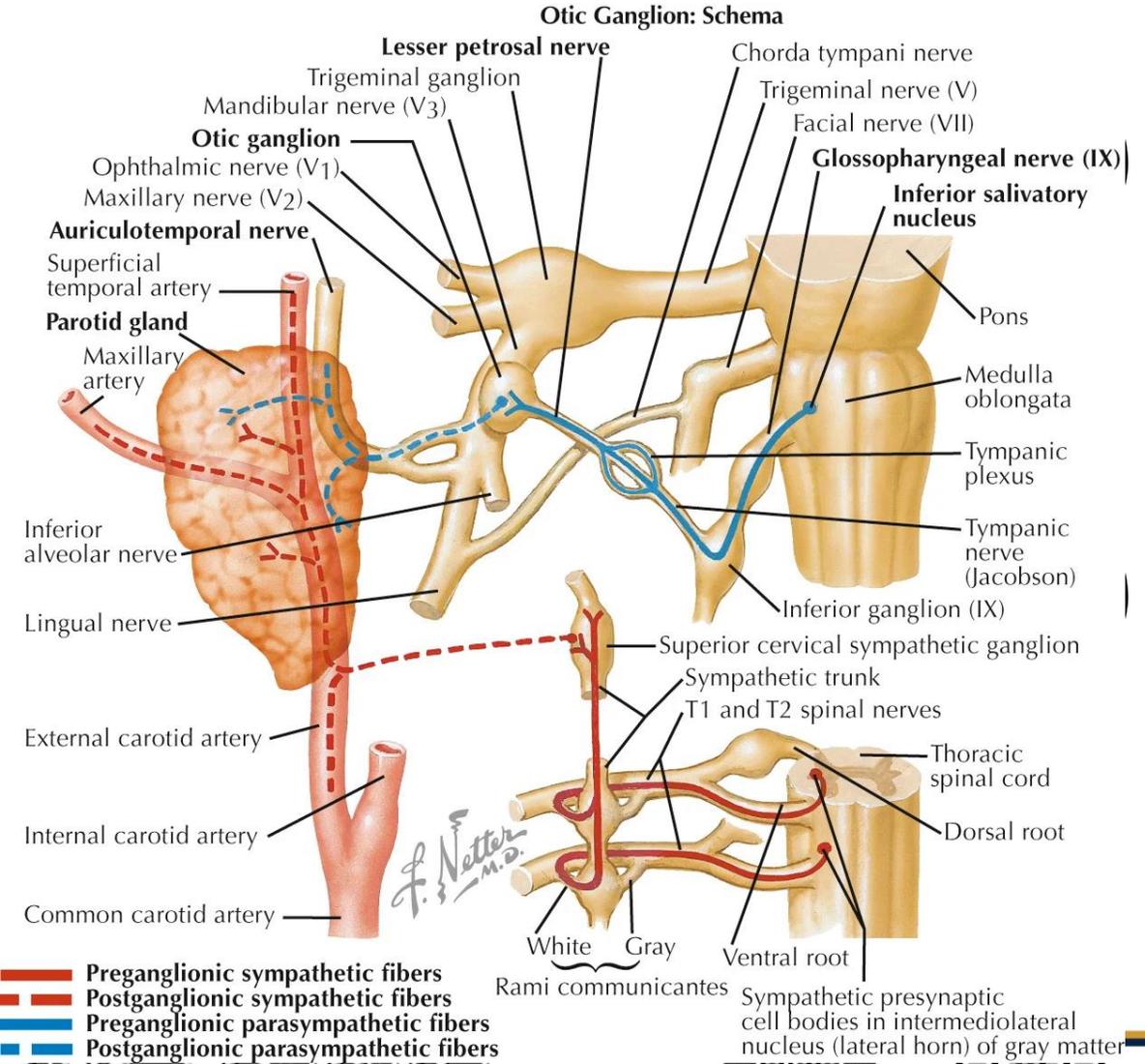
- it receives sensory fibers from a small area behind the ear.

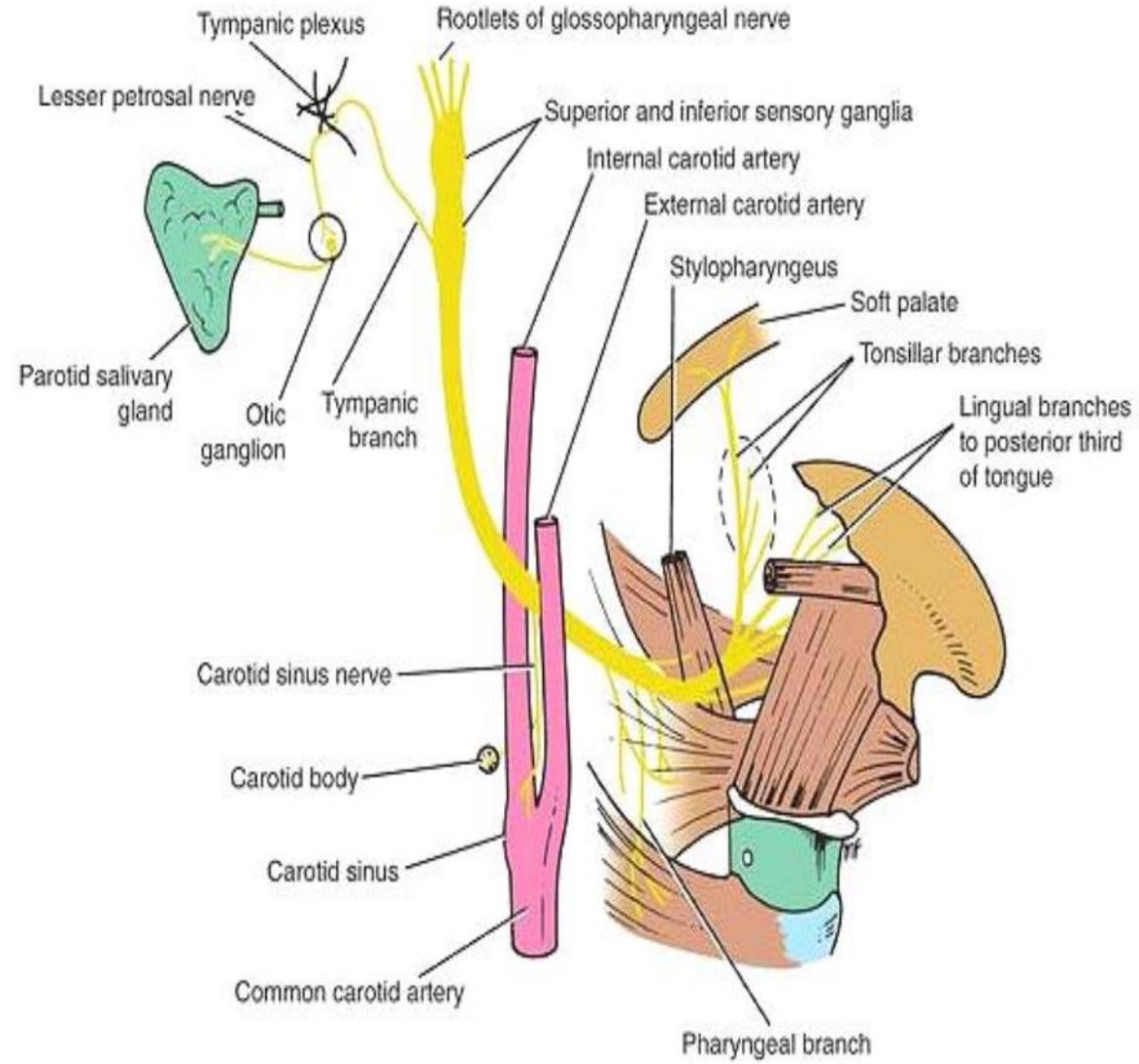


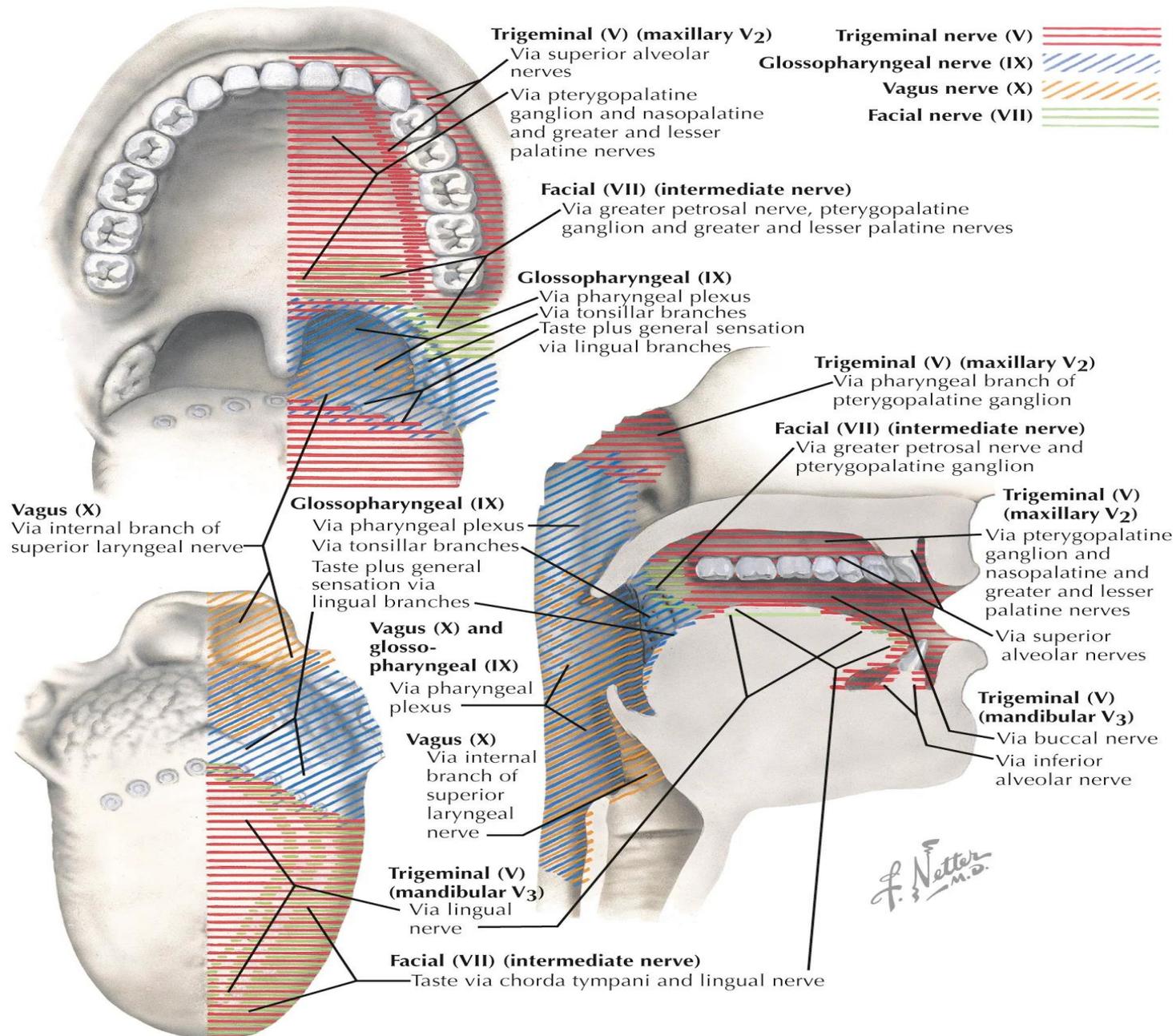
IX. Glossopharyngeal nerve

The afferent fibers of the glossopharyngeal nerve convey information from:

- Receptors for general sensation in the pharynx, the posterior third of the tongue, Eustachian tube and middle ear
- Taste buds of the pharynx and the posterior third of the tongue
- Chemoreceptors in the carotid body and baroreceptors in the carotid sinus



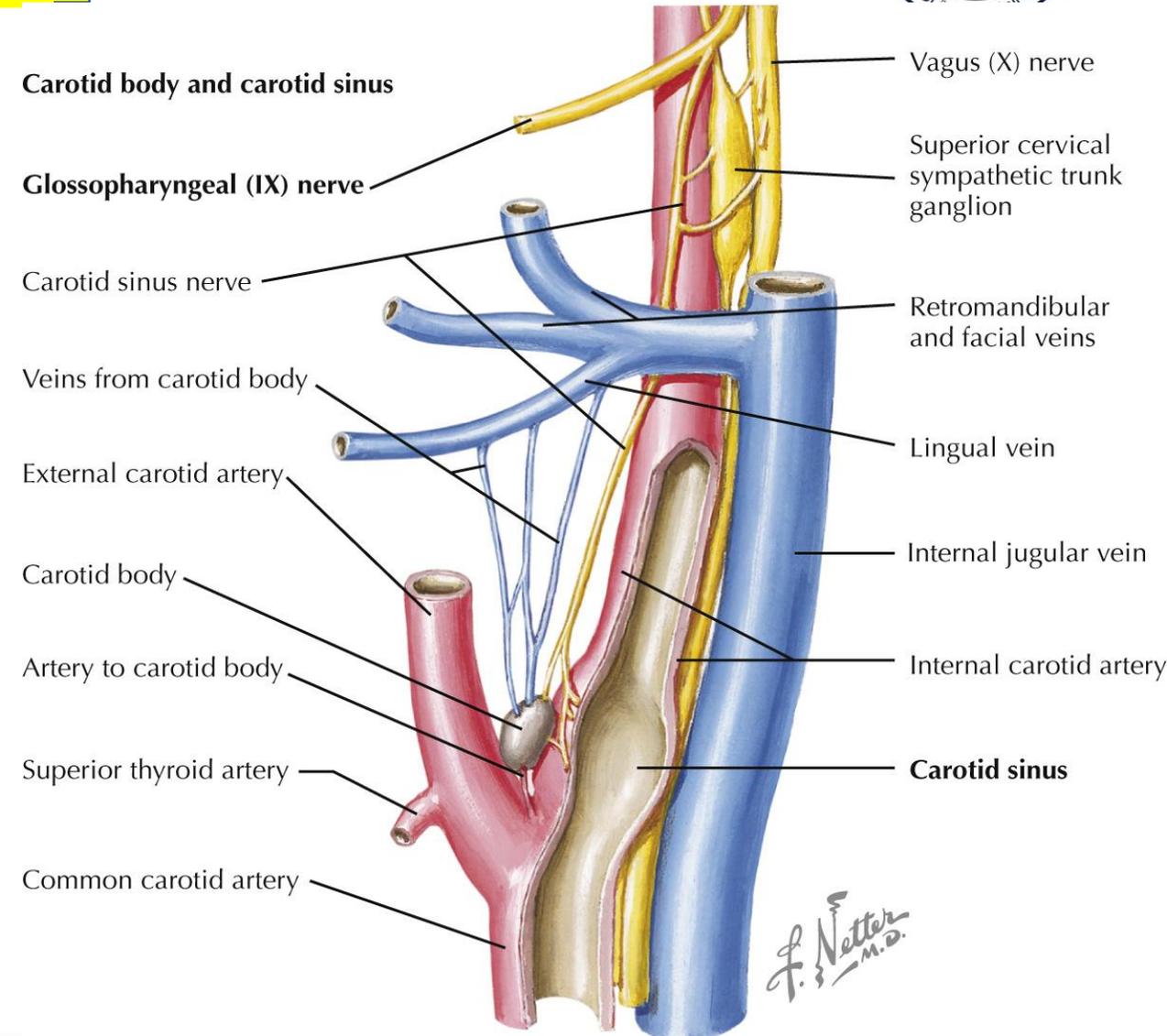




IX. Glossopharyngeal nerve

Lesion:

1. Loss of **taste sensation** from the posterior third of the tongue.
2. Loss of the **pharyngeal gag reflex.**
3. Loss of the **carotid sinus reflex.**



X. Vagus Nerve

Type: it is **A MIXED NERVE.**

Deep origin: it has **4 nuclei:**

1. Motor nucleus: middle part of nucleus ambiguous.

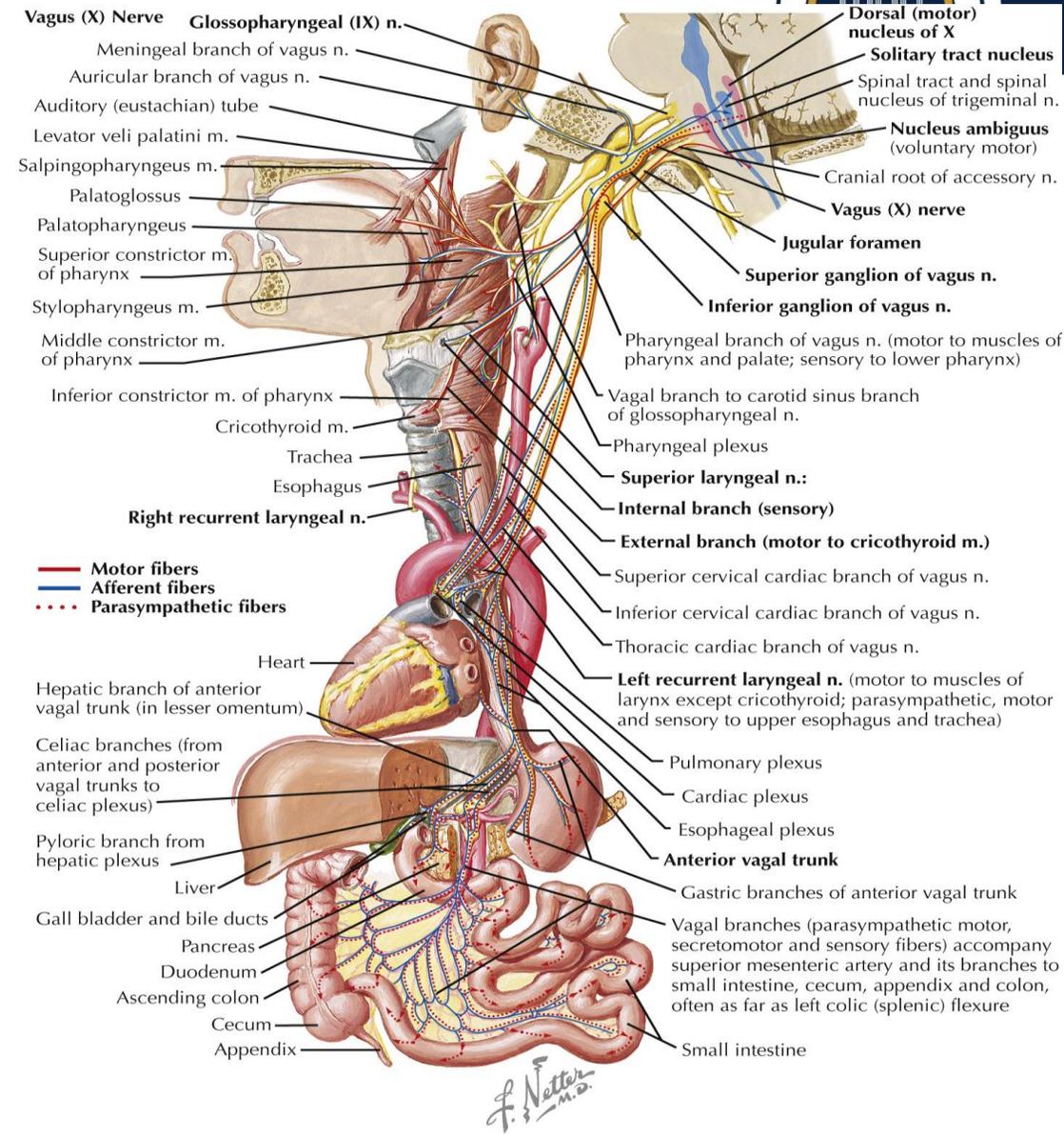
It supplies muscles of the **pharynx** except the **stylopharyngeus**, larynx and palate except the **tensor palati** muscle.

2. Parasympathetic nucleus: dorsal motor nucleus of the vagus. It supplies the thoracic and the abdominal organs as far as the **left colic flexure.**

3. Two sensory nuclei:

- **Nucleus solitarius:** it receives **taste fibers** from the most posterior part of the **tongue** and **epiglottis.** They terminate in the **upper third** of the nucleus.

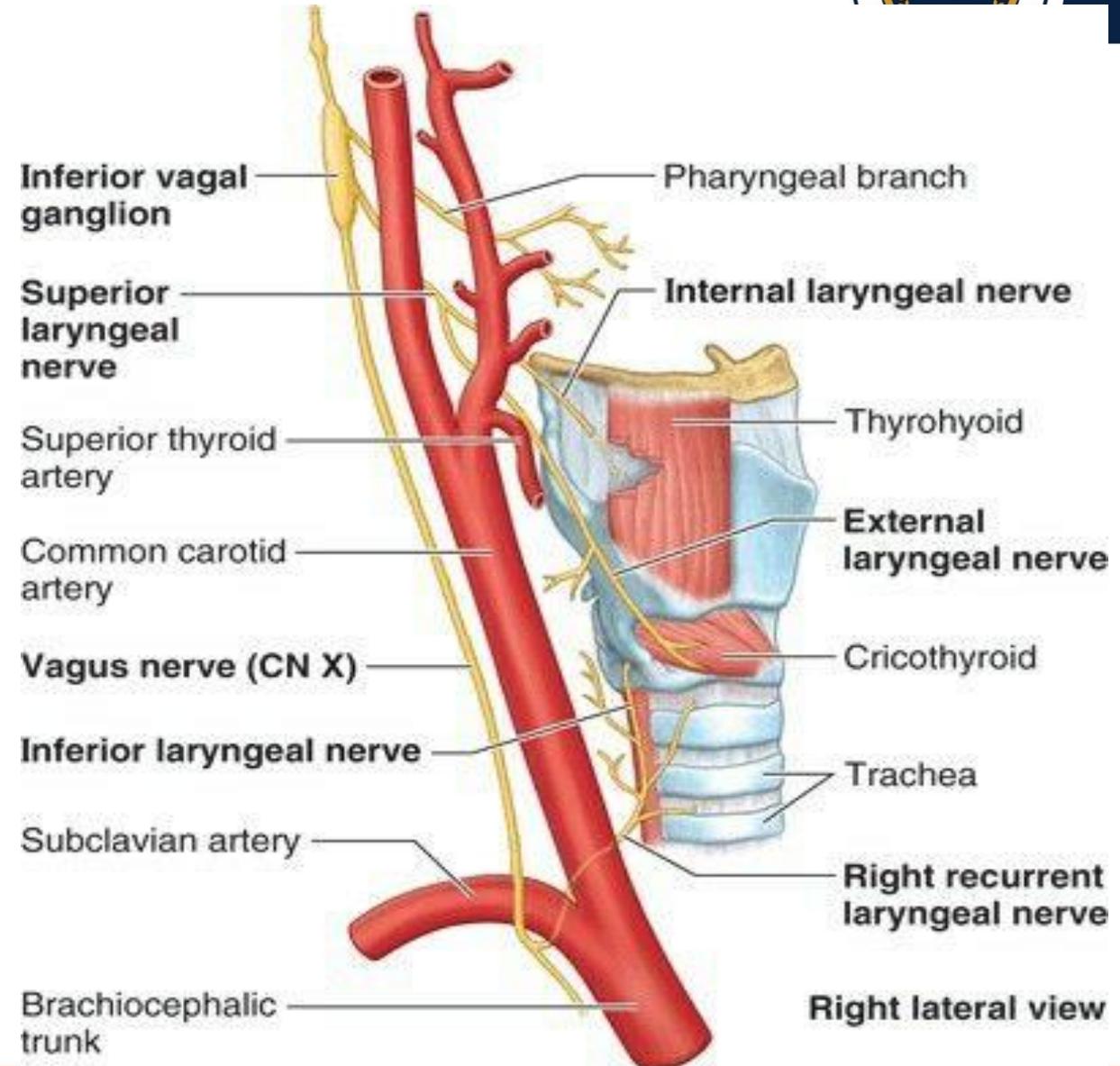
- **Spinal trigeminal nucleus:** it receives sensory fibers from the **external auditory meatus** and **tympanic membrane.**



X. Vagus Nerve

The afferent fibers of the vagus convey information from:

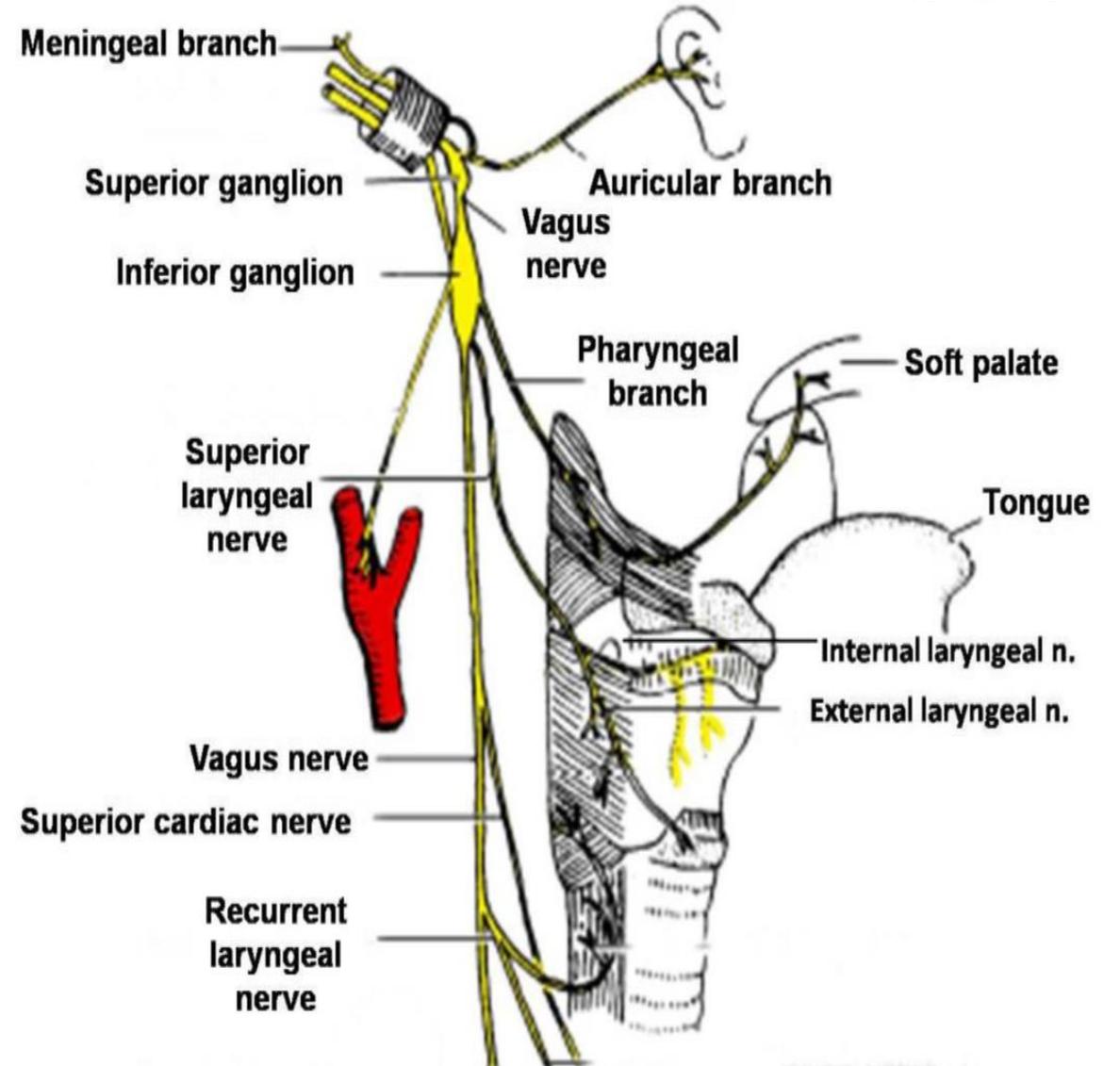
- **Receptors for general sensation** in the pharynx, larynx, oesophagus, tympanic membrane, external auditory meatus and part of the concha of the external ear
- **Chemoreceptors** in the aortic bodies and baroreceptors in the aortic arch
- **Receptors** widely distributed throughout the thoracic and abdominal **viscera**



X. Vagus Nerve

LESION:

1. Paralysis of muscles of the pharynx causes dysphagia & loss of the pharyngeal gag reflex.
2. Paralysis of muscles of the larynx causes hoarseness of voice.
3. Paralysis of muscles of the palate causes regurgitation of food from the nose and deviation of the uvula to the normal side.
4. Anesthesia of the larynx causes loss of the cough reflex.



Taste pathway

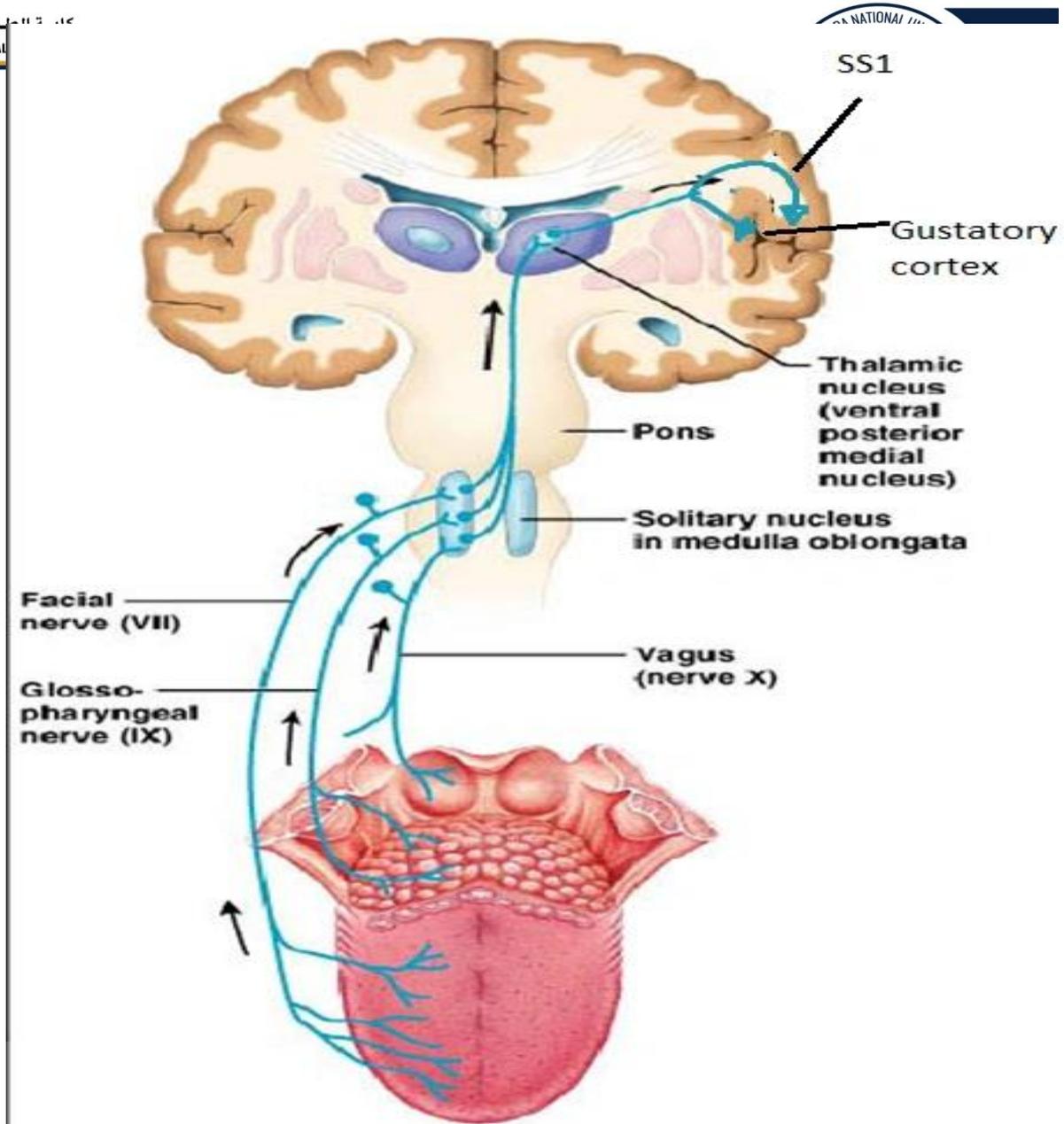
RECEPTORS: Taste buds of the tongue, epiglottis, soft palate and oropharynx.

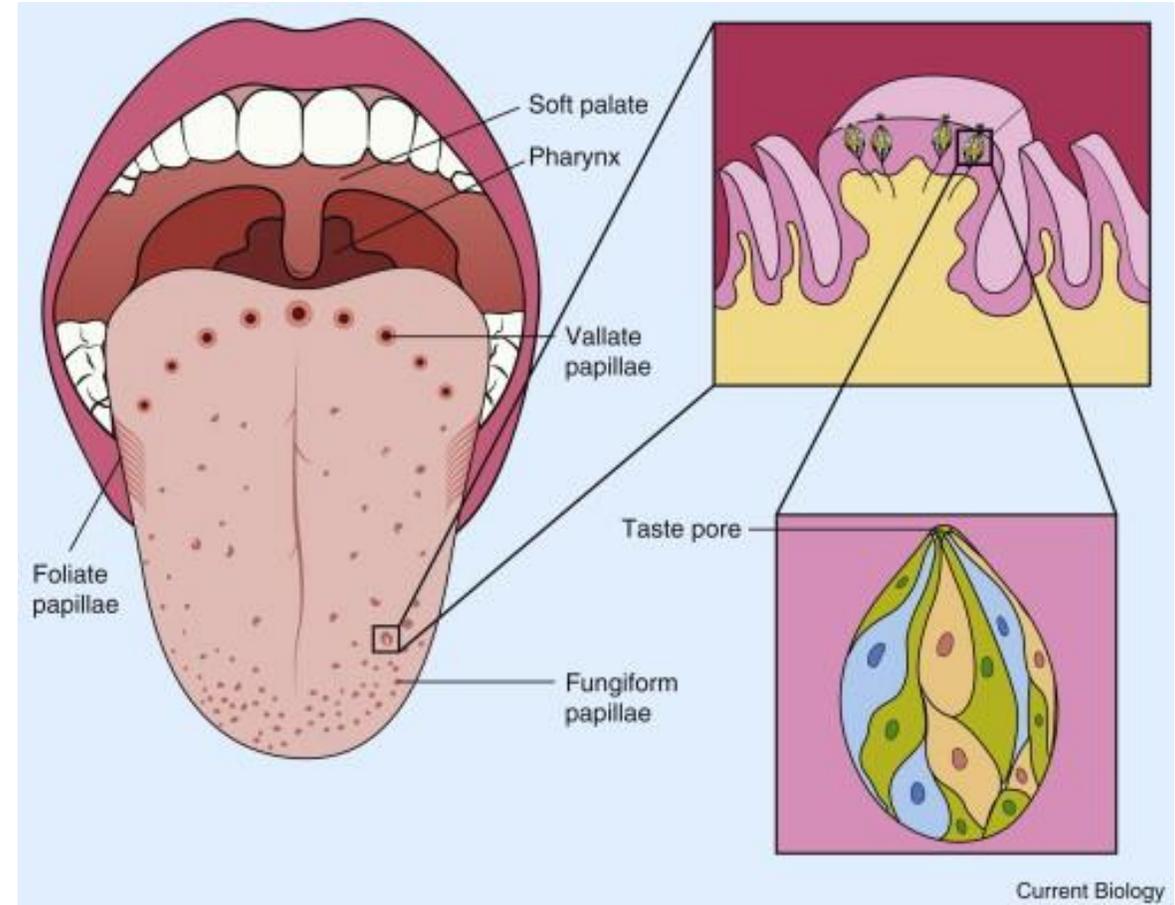
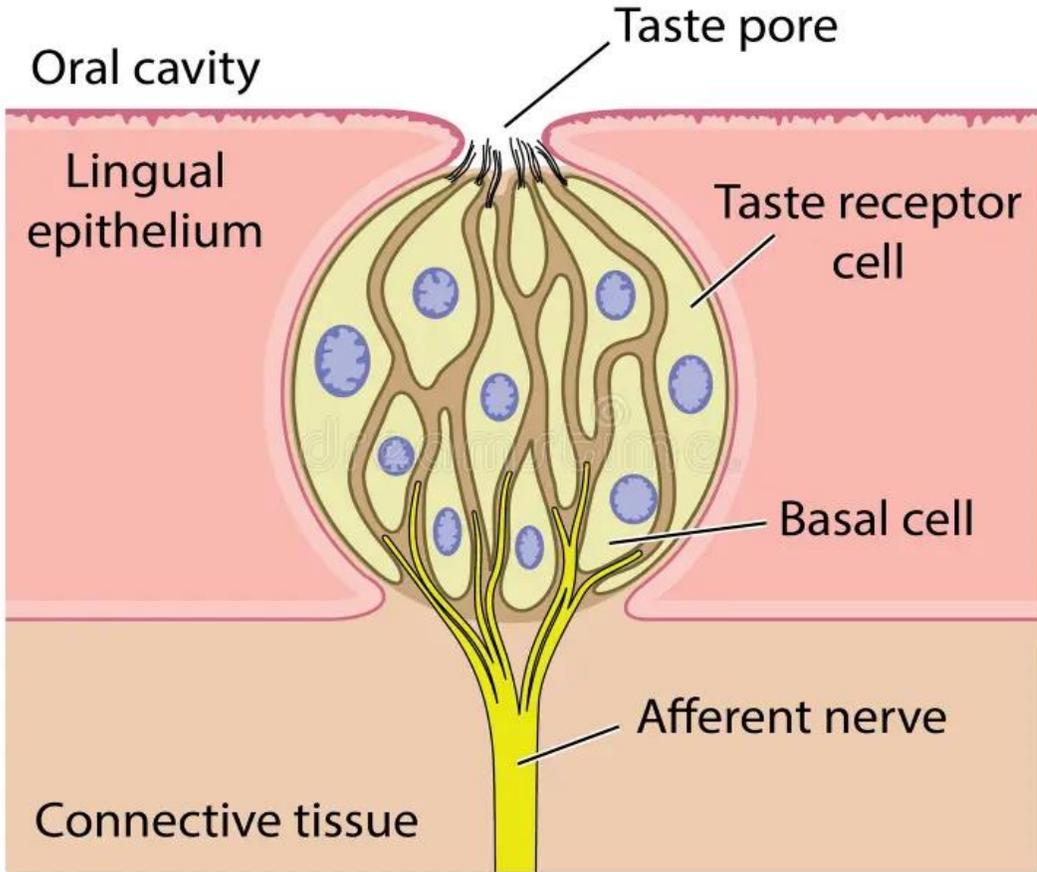
NERVES:

1. Chorda tympani: branch of the facial nerve, anterior 2/3 of the tongue.

2. Glossopharyngeal nerve: posterior 1/3 of the tongue, the vallate papillae, soft palate and oropharynx.

3. Internal laryngeal branch of vagus: epiglottis and most posterior part of the tongue.



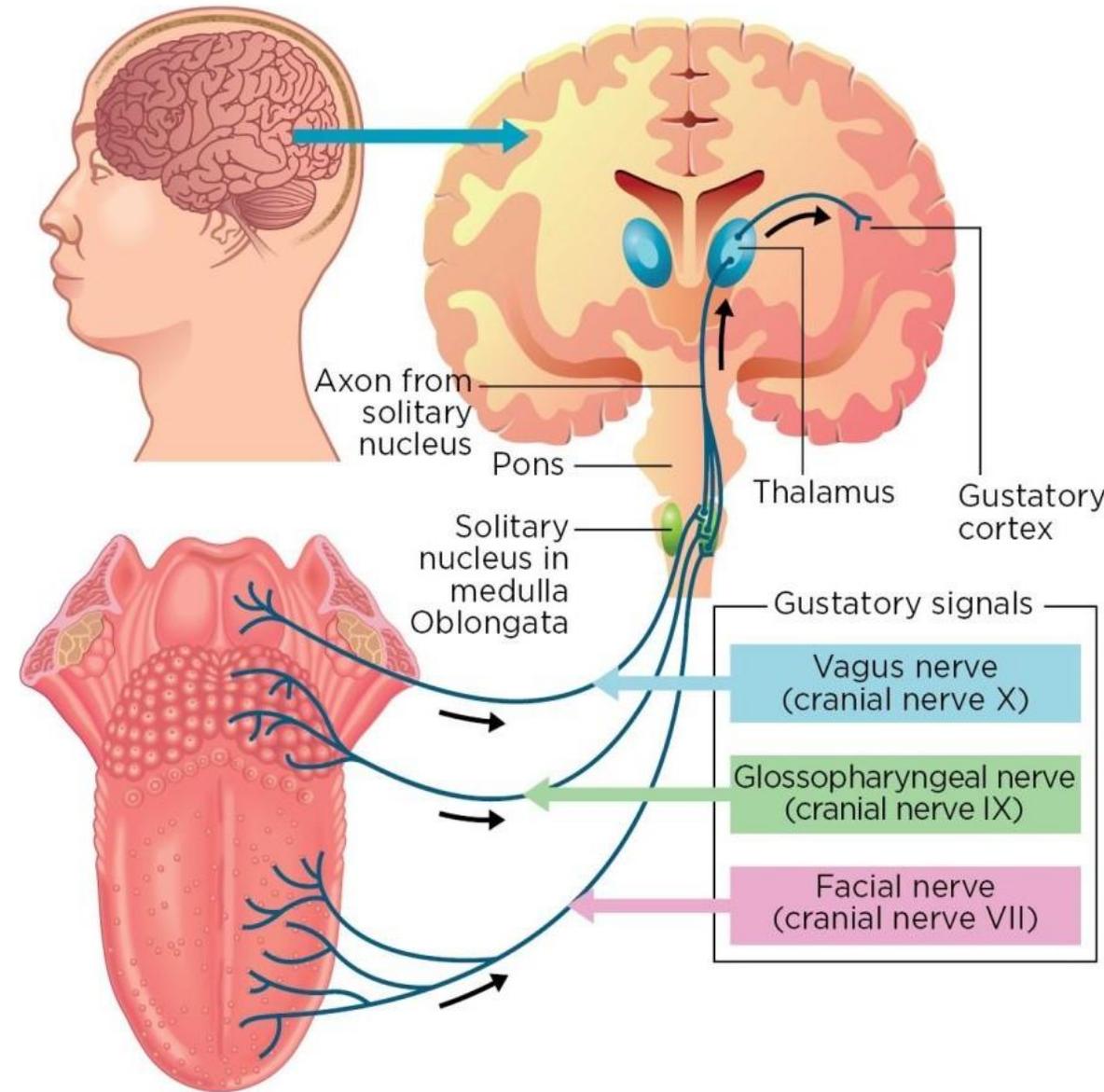


Current Biology

Taste pathway

First-order Neuron: GANGLIA

- 1. Anterior two-thirds of the tongue:** geniculate ganglion of the facial nerve.
- 2. Posterior one-third of the tongue:** inferior ganglion of the glossopharyngeal nerve.
- 3. Epiglottis and most posterior part of the tongue:** inferior ganglion of the vagus nerve.
 - The peripheral branches of the ganglia end in the taste buds.
 - The central branches enter the brainstem and end in the nucleus solitarius.



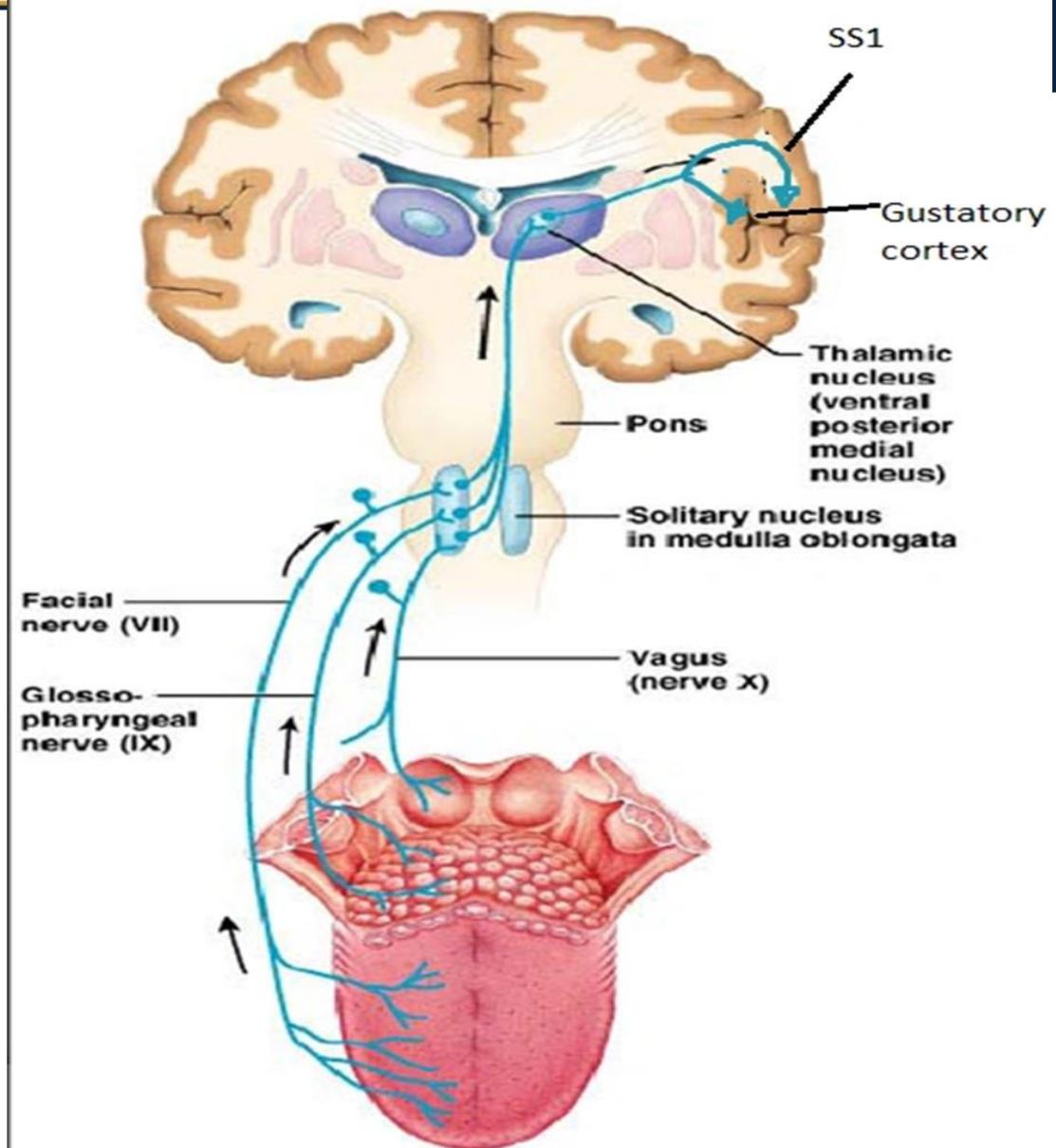
Taste pathway

Second-order neuron: upper 1/3 of nucleus solitarius

- Axons of nucleus solitarius cross to the opposite side and ascend in the central tegmental tract dorsal to the medial lemniscus to end in the ventral posterior medial nucleus of the thalamus (VPMNT).
- Collateral branches reach the salivatory nuclei for reflex activity.

Third-order Neuron: VPMNT

- Axons of the VPMNT pass through the posterior limb of the internal capsule and terminate in the taste area (area 43) (gustatory area) in the lower part of the postcentral gyrus.



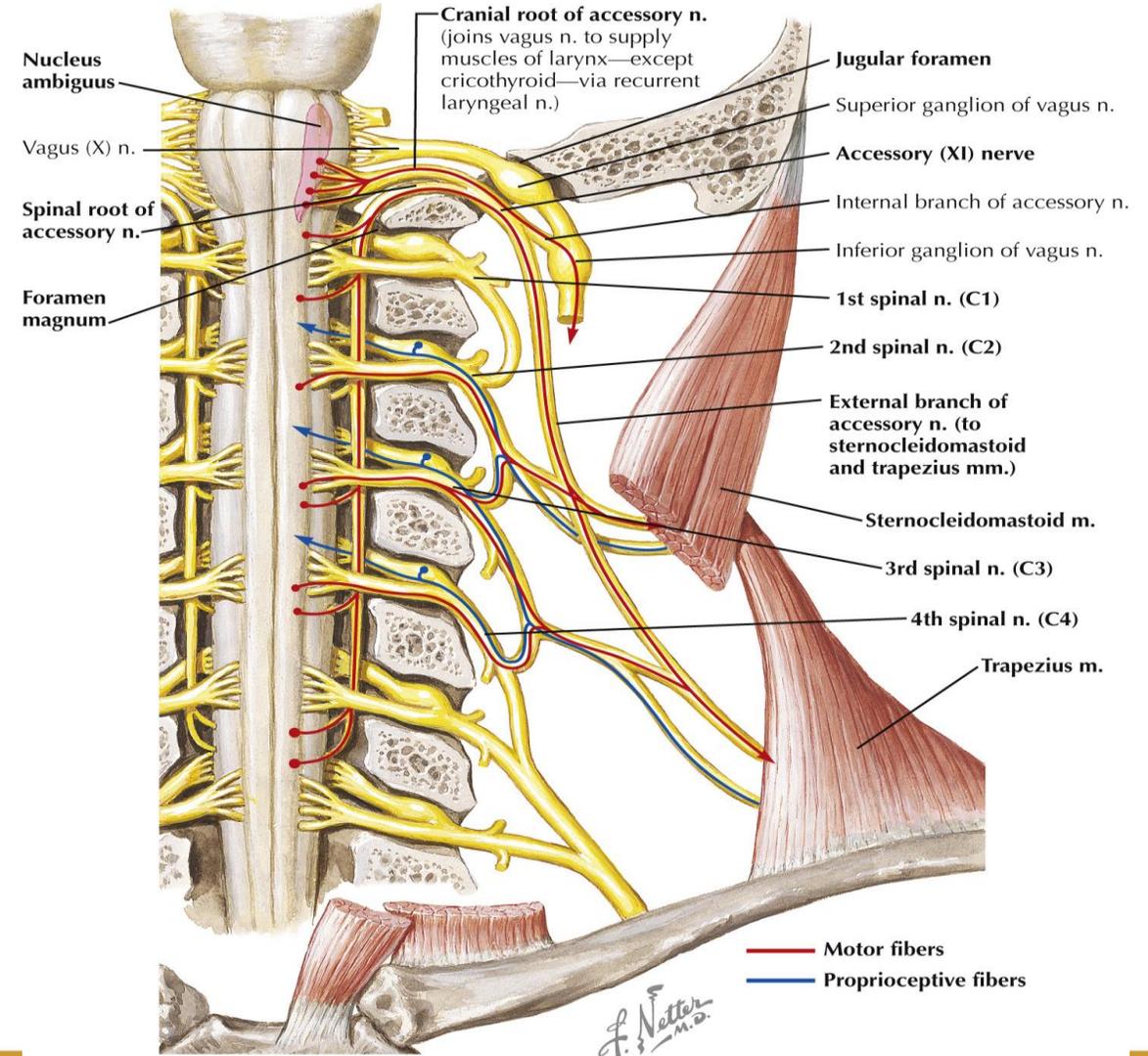
XI. Accessory Nerve (CN XI)

TYPE: pure **MOTOR** nerve.

ROOTS: It has two roots:

A. Cranial Root:

- It arises from the **lower part** of the nucleus ambiguus.
- It leaves cranial cavity through the **jugular foramen** and joins the vagus nerve.
- It is distributed with **the recurrent laryngeal nerve** to all muscles of the larynx except **the cricothyroid muscle**.



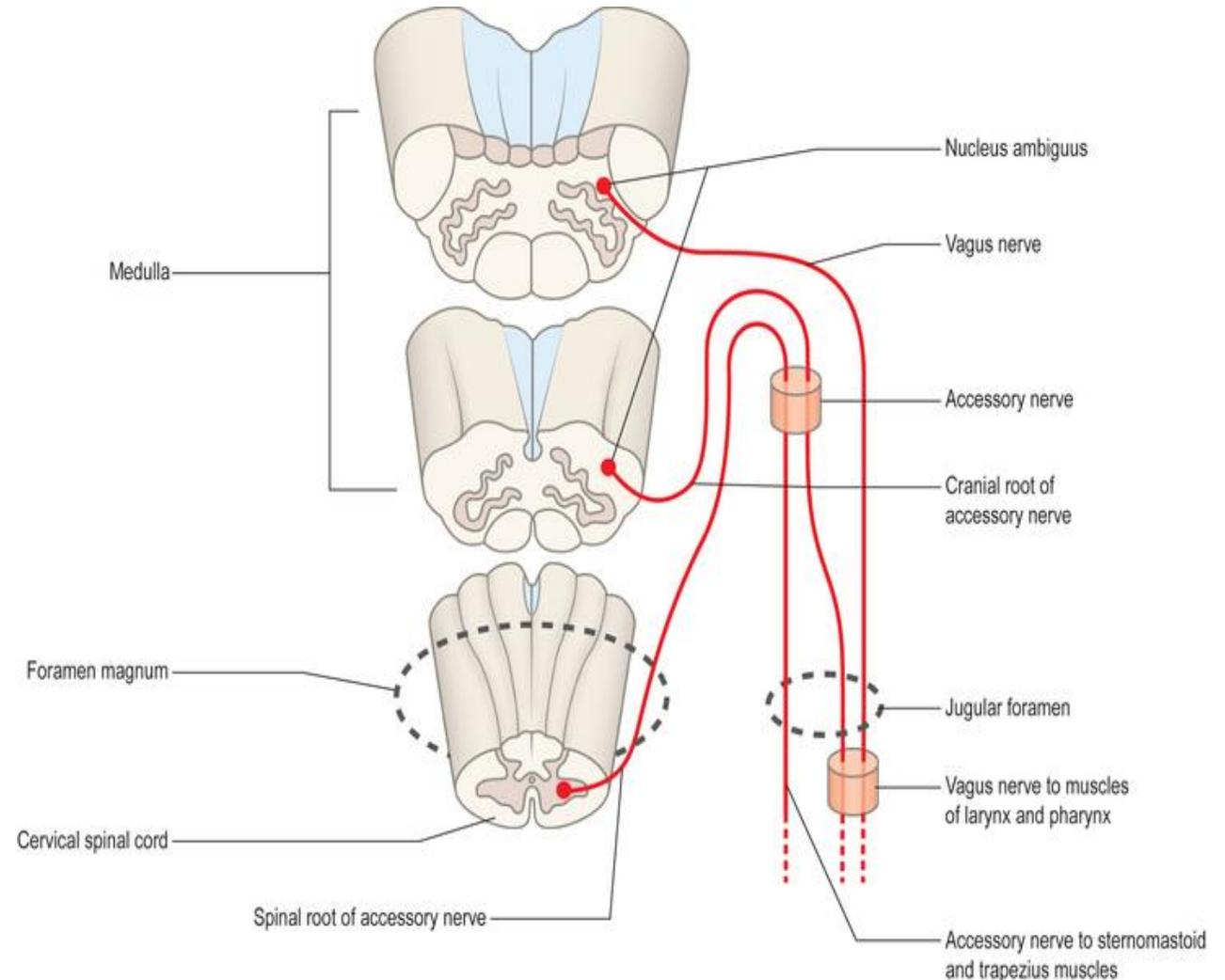
XI. Accessory Nerve (CN XI)

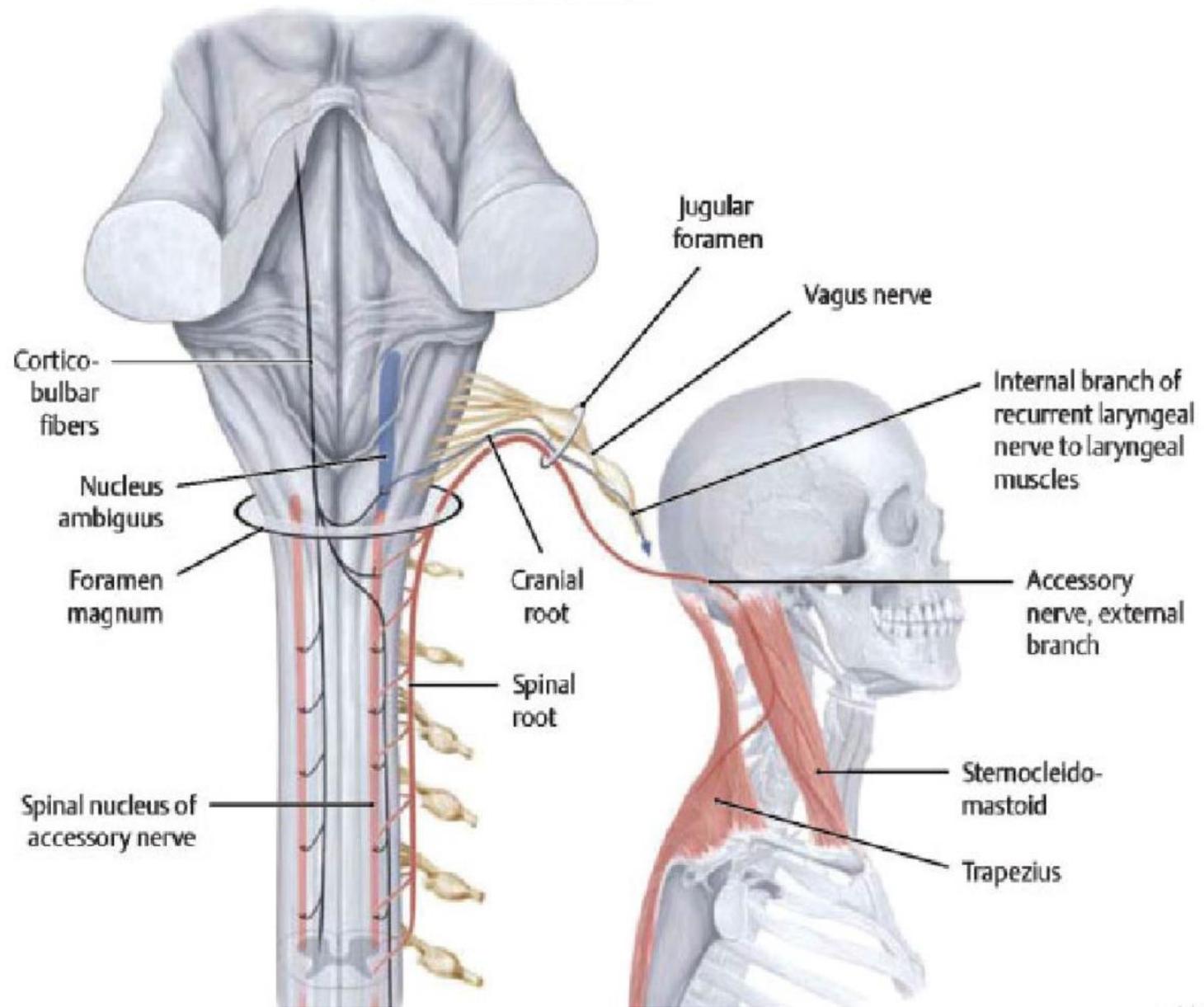
B. Spinal root:

- It arises from the **upper five or six cervical** segments of the spinal cord.
- It supplies the **sternomastoid and trapezius muscles**.
- Lesion of The Spinal Accessory Nerve:**

1. Paralysis of sternomastoid: causes inability to rotate the head to the **opposite side**.

2. Paralysis of trapezius: causes inability to **shrug (up and down) the shoulder**.





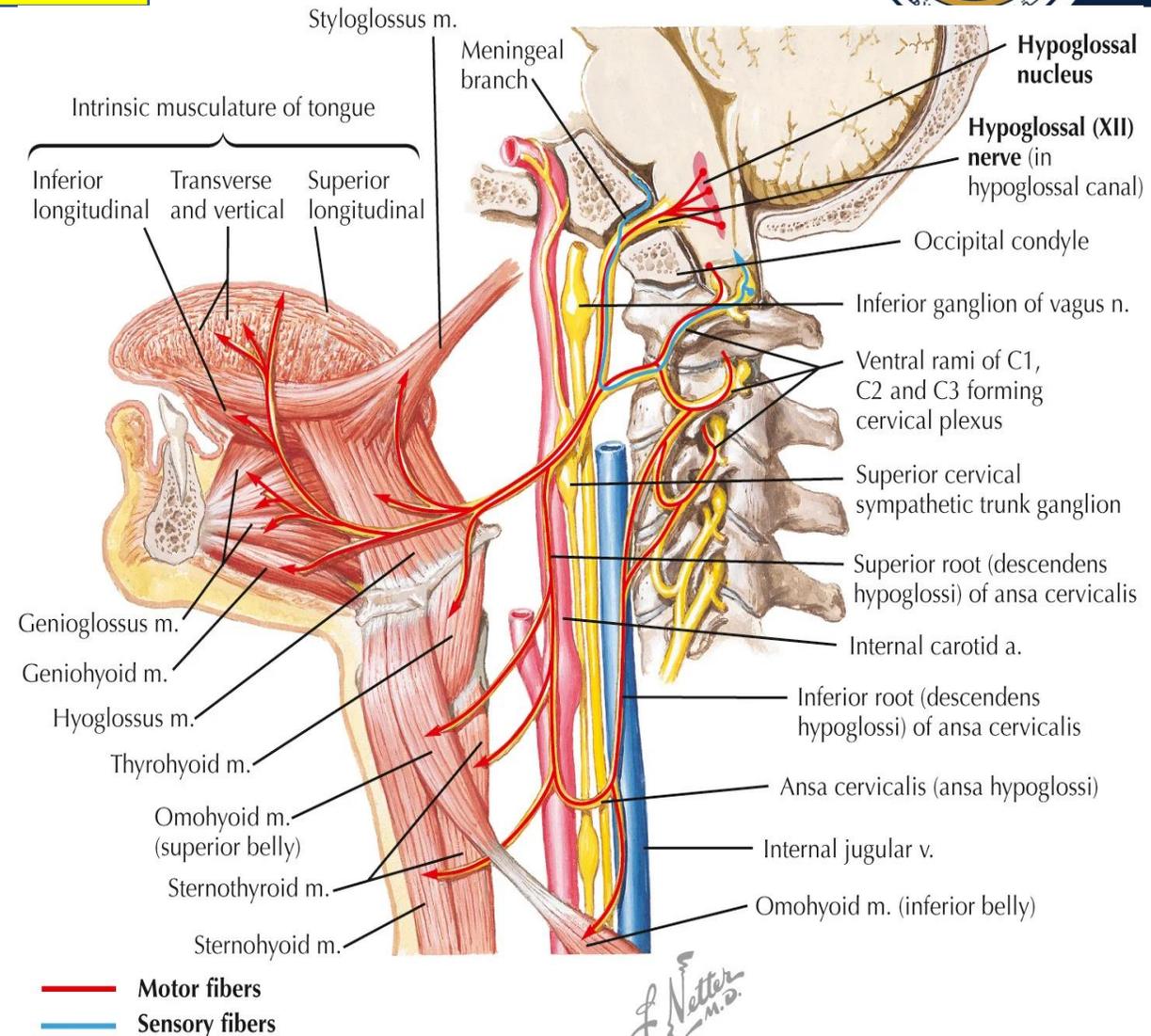
XII. Hypoglossal Nerve (CN XII)

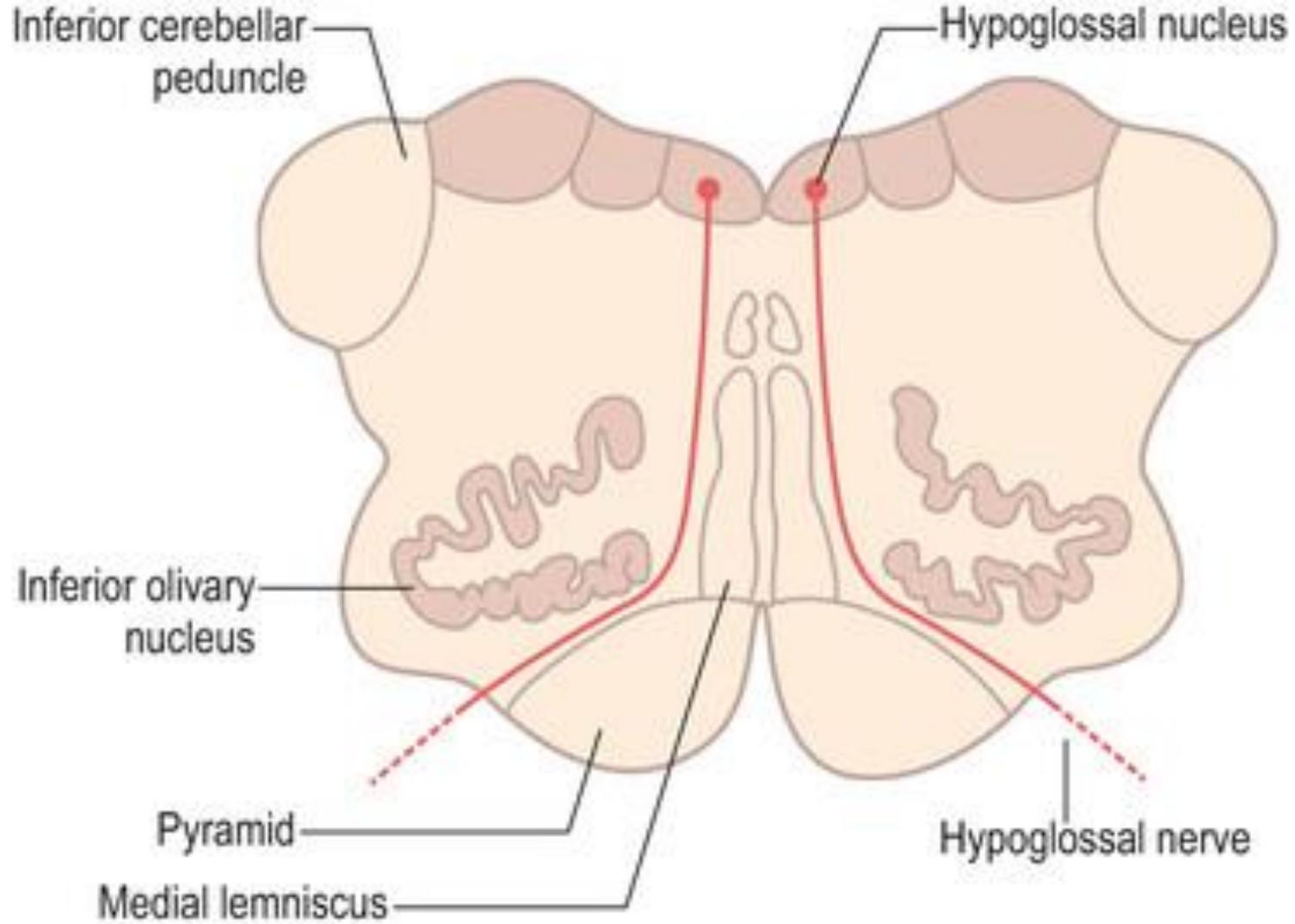
TYPE: It is a pure **MOTOR** nerve.

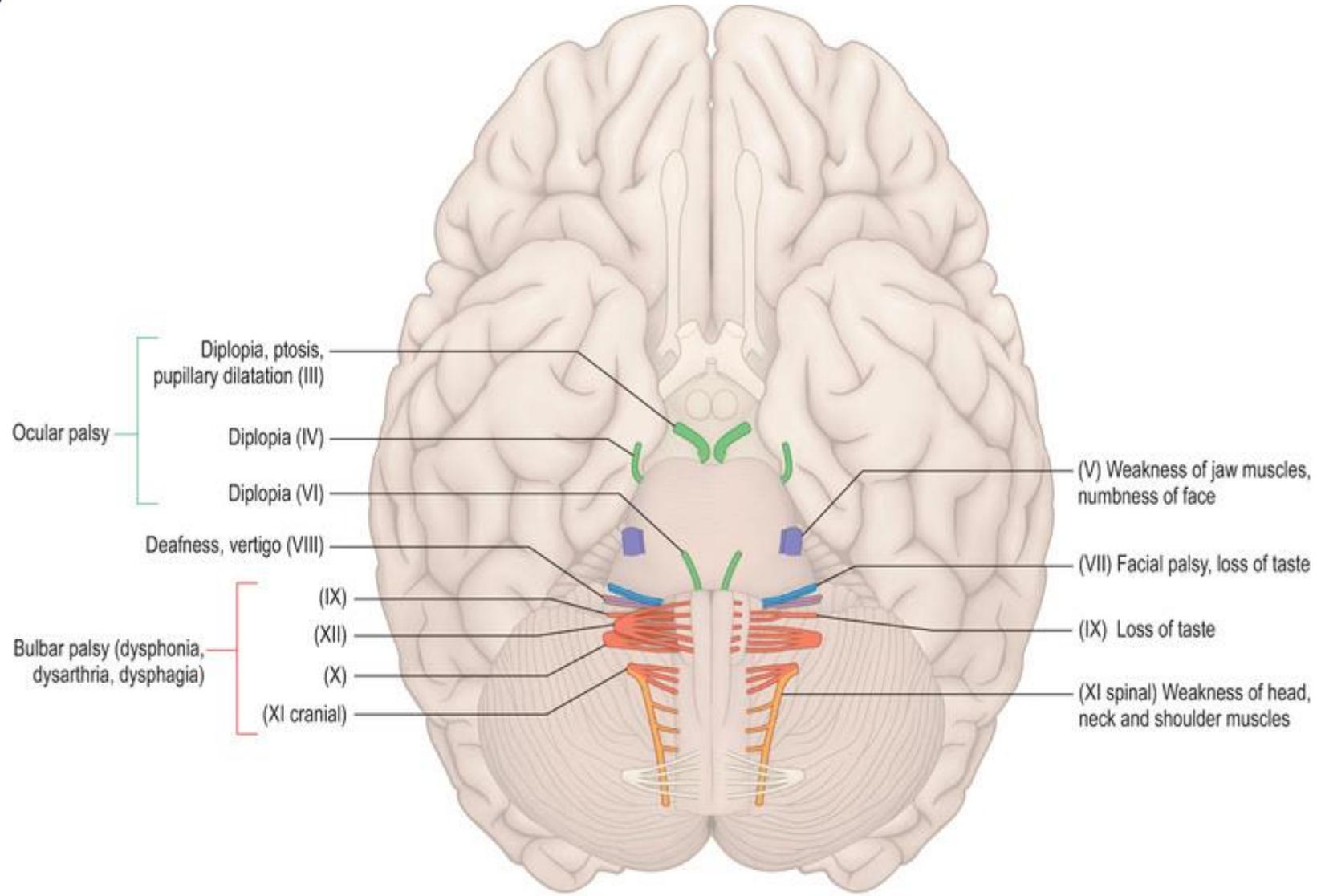
- It arises from the **hypoglossal nucleus** of the **medulla** in the floor of the 4th ventricle.
- It exits from the **pre-olivary fissure**.
- It supplies all muscles of the tongue except **palatoglossus** muscle.

LESION:

- LMN paralysis** of the **same side** of the tongue (hemiparalysis).
- Deviation of the protruded tongue toward **the affected side**.







Quiz

Which of the following related to **hypoglossal nerve**?

- A. It is a mixed nerve.
- B. It exits from the post-olivary fissure.
- C. It supplies all muscles of the tongue except palatoglossus muscle.
- D. It arises from the upper five or six cervical segments of the spinal cord
- E. Its lesion results in paralysis of muscles of the larynx causes hoarseness of voice.

Answer:



Quiz

Which of the following related to **glossopharyngeal nerve**?

- A. It supplies all muscles of the tongue except palatoglossus muscle.
- B. It exits from the pre-olivary fissure.
- C. Its lesion results in paralysis of muscles of the larynx causes hoarseness of voice.
- D. Its motor nucleus arises from middle part of nucleus ambiguous.
- E. Its parasympathetic nucleus(inferior salivatory nucleus supplies the parotid gland.

Answer:

Thank You!