The University of Jordan
Faculty Of Medicine

Nerves of the Neck

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Phrenic nerve (C3, 4, 5)

Course & relations:

- It crosses the scalenus anterior muscle from lateral to medial, then it enters the thorax by passing in front of 1st part of subclavian artery

Branches:

- ❖ Motor to diaphragm.
- ❖ The right nerve is sensory to gall bladder .
- ❖ Both are sensory to central pleura and peritoneum related to diaphragm.

Ansa Cervicalis

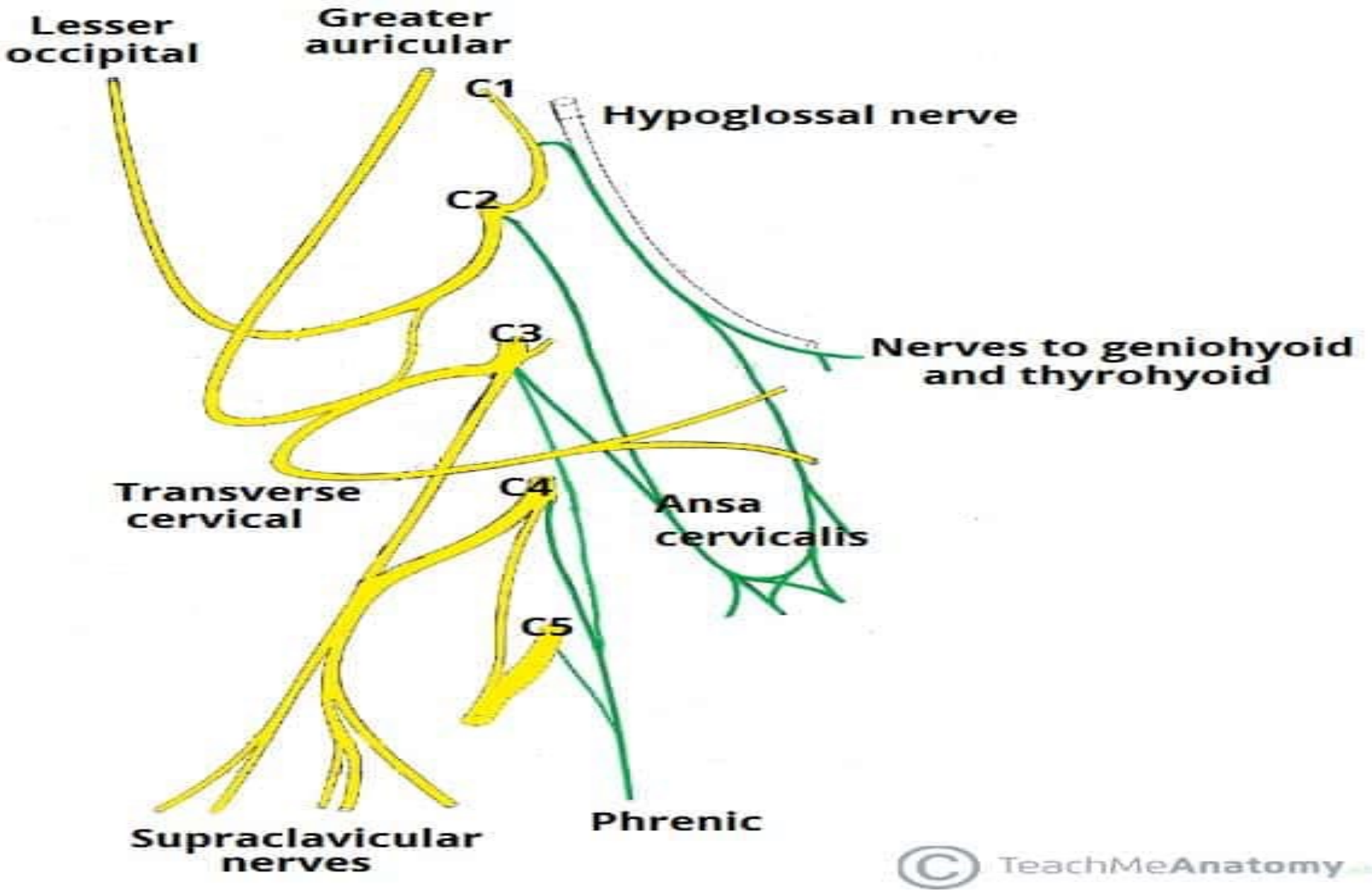
A nervous loop embedded in the anterior wall of carotid sheath & consists of 2 roots:

Superior root (descendens hypoglossi): It is a branch from C1 which joins the hypoglossal nerve then descends in front of ICA and CCA in the anterior wall of carotid sheath.

Inferior root (descendens cervicalis): It arises from C2 and C3 and descends to join the superior root.

Branches: It supplies 3 infrahyoid muscles:

- Sternohyoid.
- Sternothyroid.
- Omohyoid.


Lesser occipital
Greater auricular
C1
Hypoglossal nerve
C2
C3
Nerves to geniohyoid and thyrohyoid
Transverse cervical
C4
Ansa cervicalis
C5
Phrenic
Supraclavicular nerves
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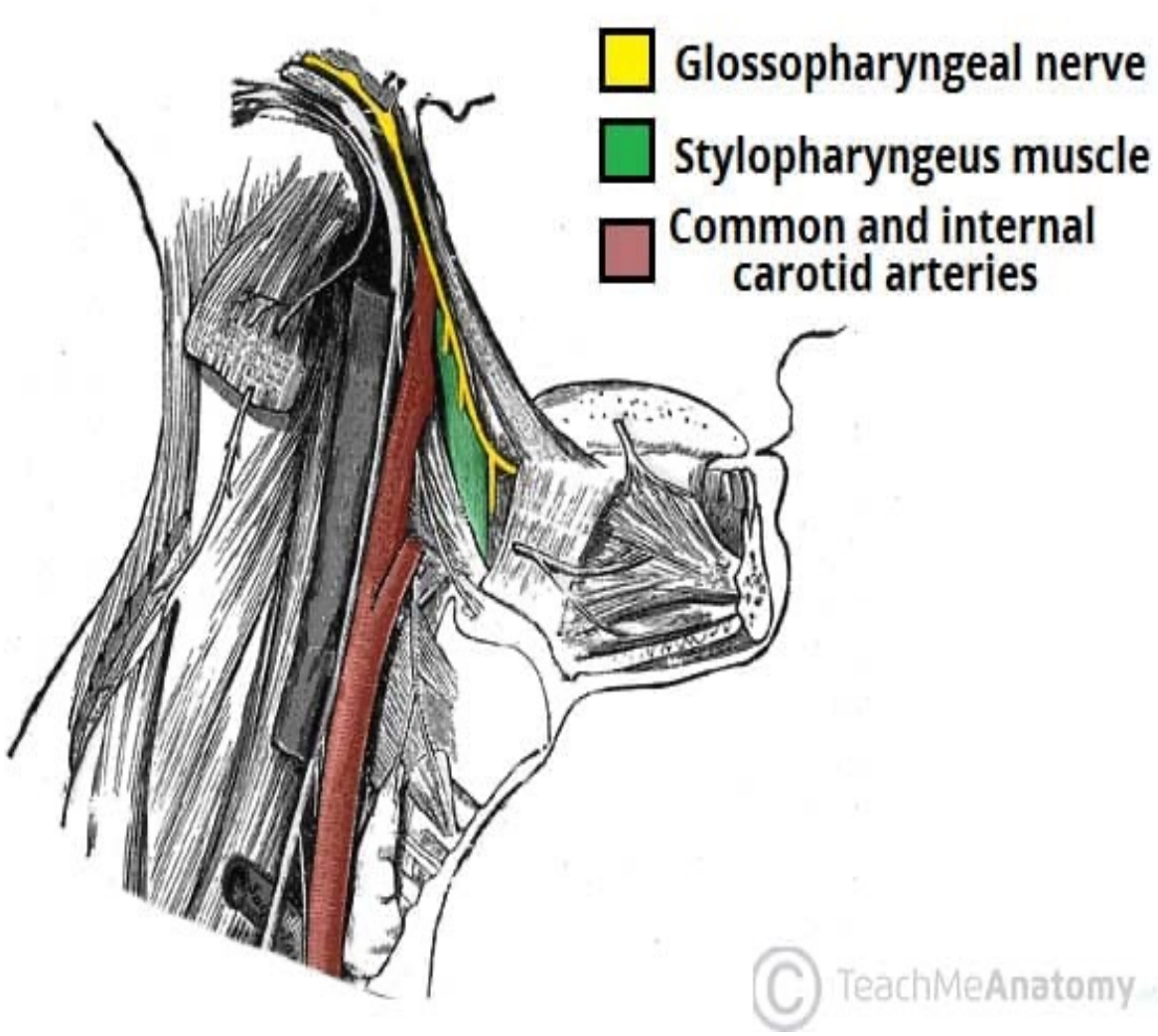
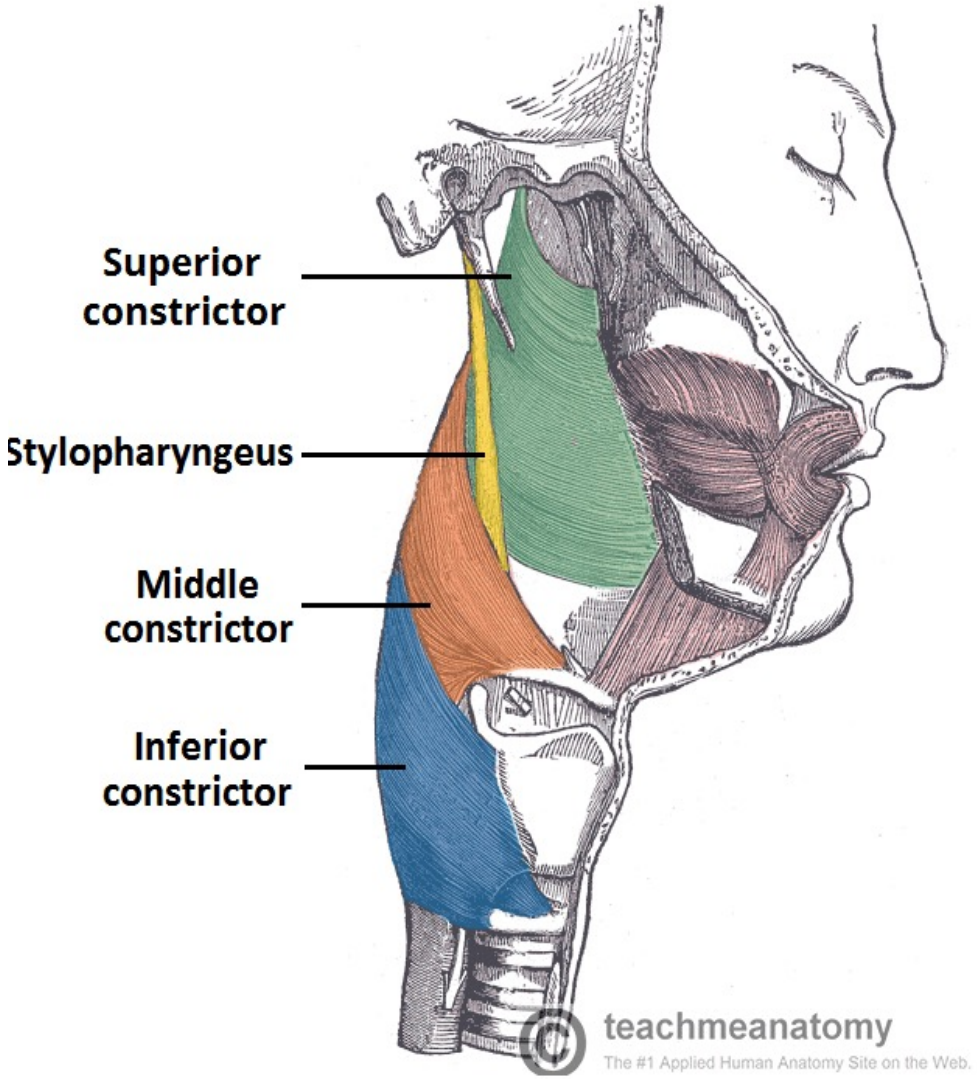
Lower four cranial nerves

I-Glossopharyngeal Nerve (9th cranial nerve)

Extracranial Course:

- It leaves the skull through **jugular foramen**.
- The upper part of the nerve carries superior and inferior **ganglia**.
- It descends between ICA and IJV, **deep to the styloid** process.
- It curves **forwards** with the **stylopharyngeus** muscle **between ICA and ECA**.
- The nerve **enters the pharynx** in the **2nd gap** between superior and middle constrictor muscles of pharynx.
- Finally, it passes **deep to hyoglossus** muscle and divides into tonsillar and lingual branches .


Glossopharyngeal nerve
Stylopharyngeus muscle
Common and internal carotid arteries
TeachMeAnatomy


Superior constrictor
Stylopharyngeus
Middle constrictor
Inferior constrictor
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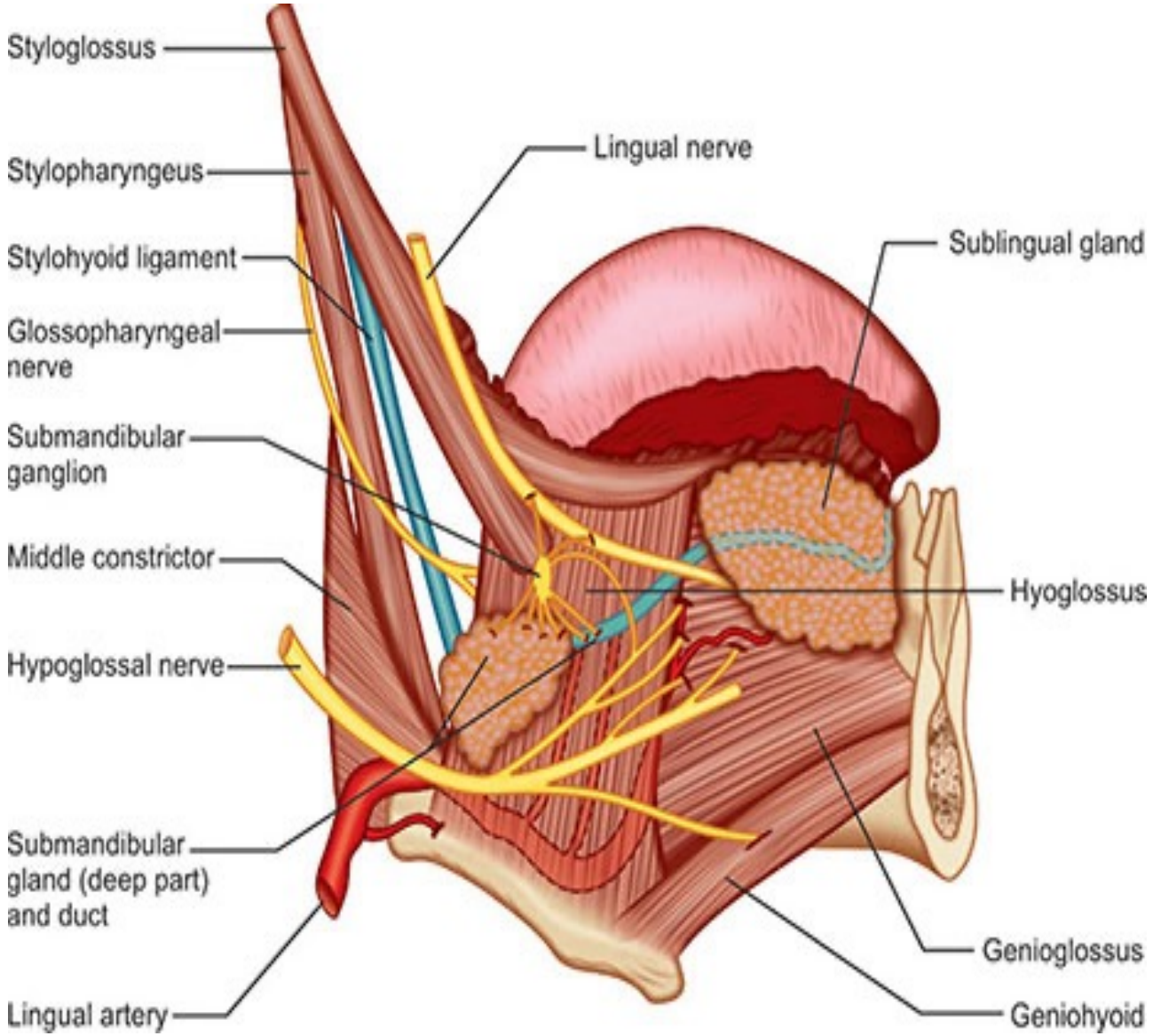
The #1 Applied Human Anatomy Site on the Web.


Styloglossus
Stylopharyngeus
Stylohyoid ligament
Glossopharyngeal nerve
Submandibular ganglion
Middle constrictor
Hypoglossal nerve
Submandibular gland (deep part) and duct
Lingual artery
Lingual nerve
Sublingual gland
Hyoglossus
Genioglossus
Geniohyoid

Branches:

1. Tympanic branch:

- It is a **parasympathetic** and **sensory** nerve
- It is **sensory** to the mucosa of middle ear, auditory tube, mastoid antrum.
- The **preganglionic parasympathetic** fibers leave the tympanic cavity as the **lesser petrosal** nerve which leaves the petrous bone to passes through the **foramen ovale** to relay in the **otic ganglion**.
- **Postganglionic** fibers join the **auriculotemporal** nerve which carries them to the **parotid gland**.

2- Carotid branches: Supply the **carotid sinus and carotid body**

3- Pharyngeal branches: shares in pharyngeal plexus .

Through the plexus, glossopharyngeal N. provides sensory fibers to the pharyngeal mucosa

4-Motor branch: For one muscle only (**stylopharyngeus** muscle).

5-Tonsillar branches: For palatine tonsil and soft palate.

6- Lingual branches: For the **general sensation** and **taste** of **posterior 1/3 of tongue**

This **C**ould **P**ull **M**e **T**o **L**ove

Gag reflex

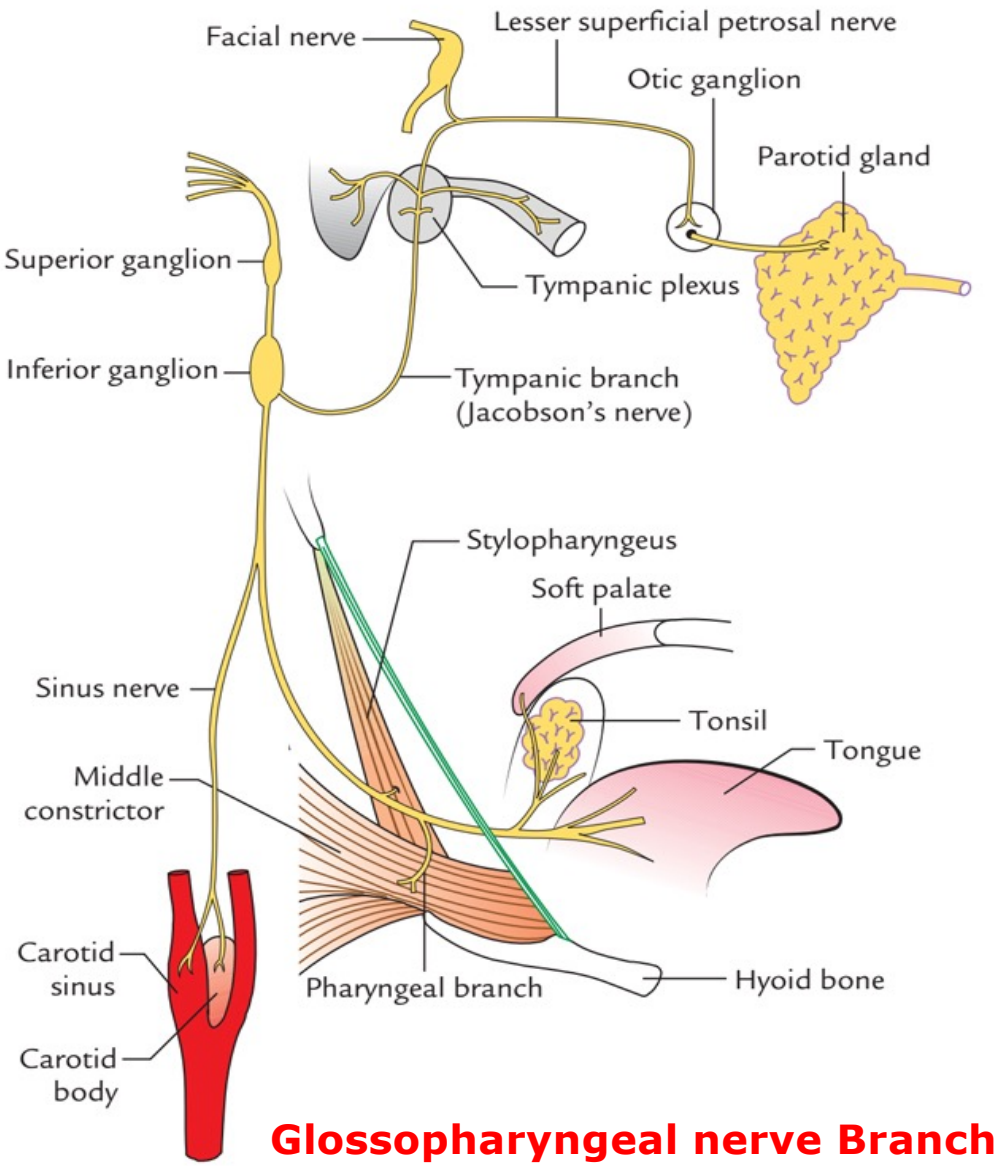
When a foreign object touches the back of the mouth, this stimulates **glossopharyngeal nerve** , beginning the reflex.

The efferent nerve in this process is the **vagus nerve, CNX**.

Read Only

Type of Fibers and function:

- **GSA :** General sensation from tympanic cavity, auditory tube, tonsils, posterior 1/3 of the tongue.
- **SVA :**Taste sensation from From posterior 1/3 of the tongue.
- **GVE :** Parasympathetic secretomotor to parotid gland.
- **SVE :** To stylopharyngeus muscle



Glossopharyngeal nerve Branches

Gag reflex

Glossopharyngeal nerve Lesion

Unilateral Lesion :

✓Deviation the uvula to normal side

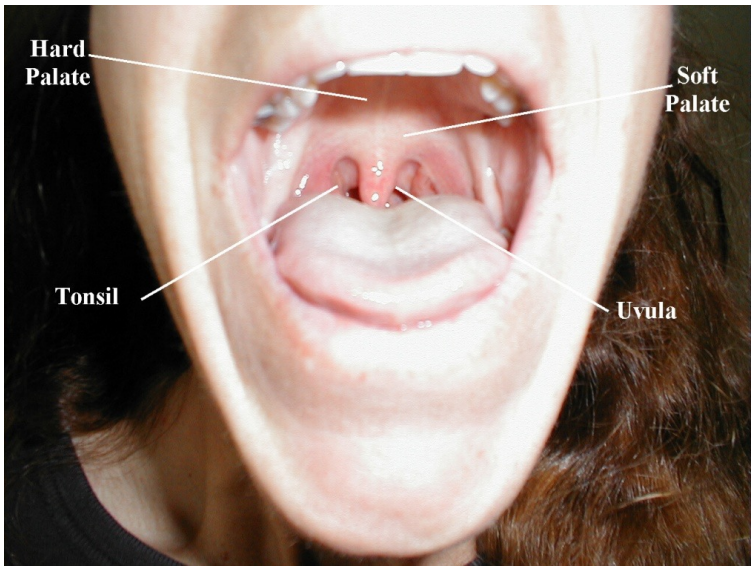
✓Unilateral Lose of taste and general sensation of posterior 1/3 of the tongue

Bilateral lesion :

✓Difficulty of swallowing (Dysphagia)

✓Lose of taste and general sensation of posterior 1/3 of the tongue

✓Loss of Gag reflex



Normal Glossopharngeal nerve

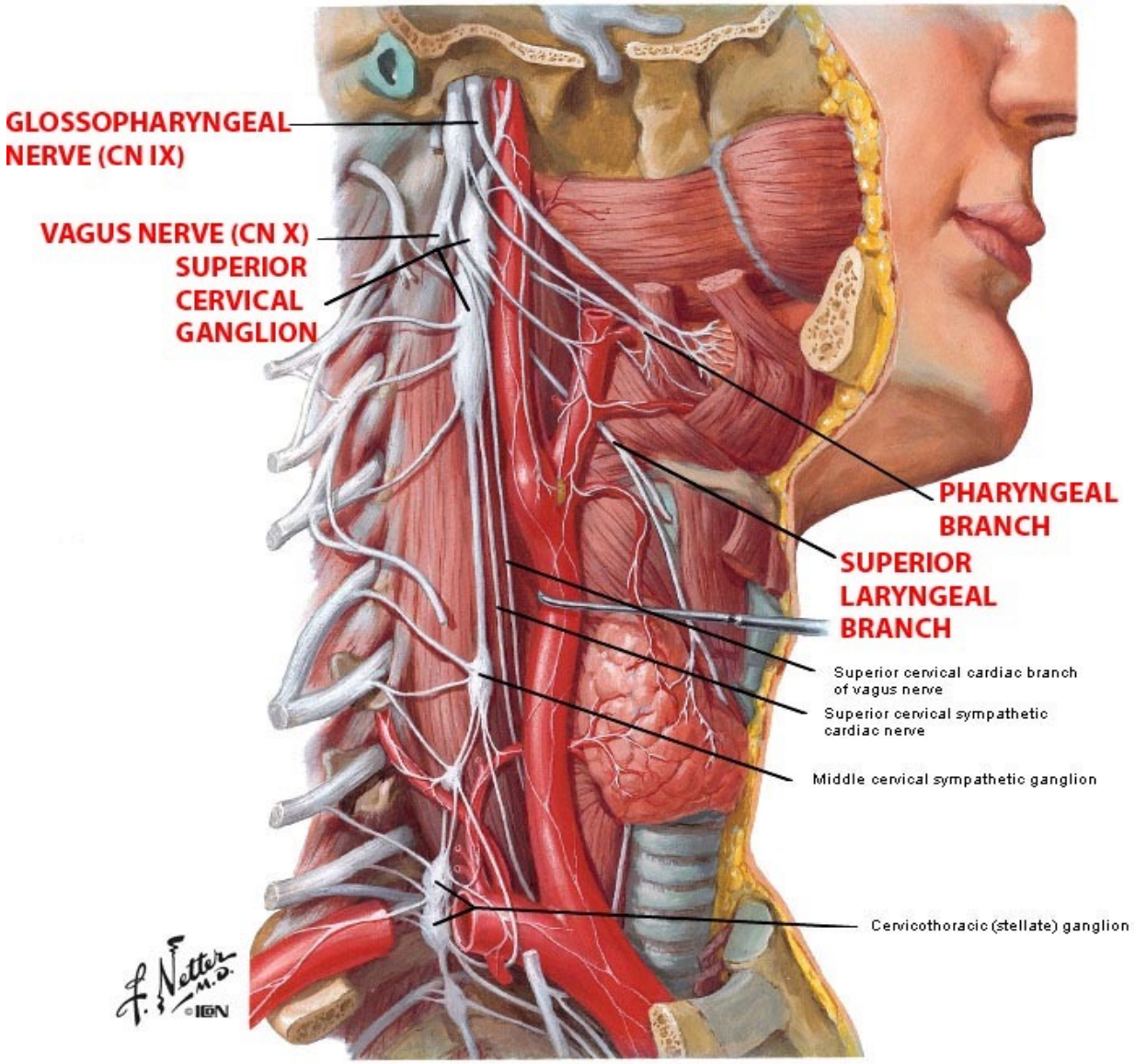
Right Glossopharngeal palsy

The uvula deviated to Lt (normal side)

2- Vagus Nerve (10th cranial nerve)

Course:

- It leaves the skull through jugular foramen
- It descends in the neck inside the carotid sheath between IJV and ICA, then between IJV and CCA
- It crosses in front of the 1st part of subclavian artery to enter the thorax.
- It has 2 ganglia; **superior ganglion** inside jugular foramen and **inferior ganglion** inside carotid sheath.


GLOSSOPHARYNGEAL NERVE (CN IX)
VAGUS NERVE (CN X)
SUPERIOR CERVICAL GANGLION
PHARYNGEAL BRANCH
SUPERIOR LARYNGEAL BRANCH
Superior cervical cardiac branch of vagus nerve
Superior cervical sympathetic cardiac nerve
Middle cervical sympathetic ganglion
Cervicothoracic (stellate) ganglion
F. Netter M.D.
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Branches:

1. Two branches from inside jugular foramen:

- ***Meningeal branch*** .
- ***Auricular branch*** for external auditory meatus and ear drum.

2. Two cardiac branches (superior and inferior): They end in the cardiac plexuses to supply the heart.

3. Pharyngeal branch:

It shares in the pharyngeal plexus,It supplies all muscles of pharynx except **stylopharyngeus** and all muscles of the soft palate except **tensor palati**.

4.Laryngeal branches:

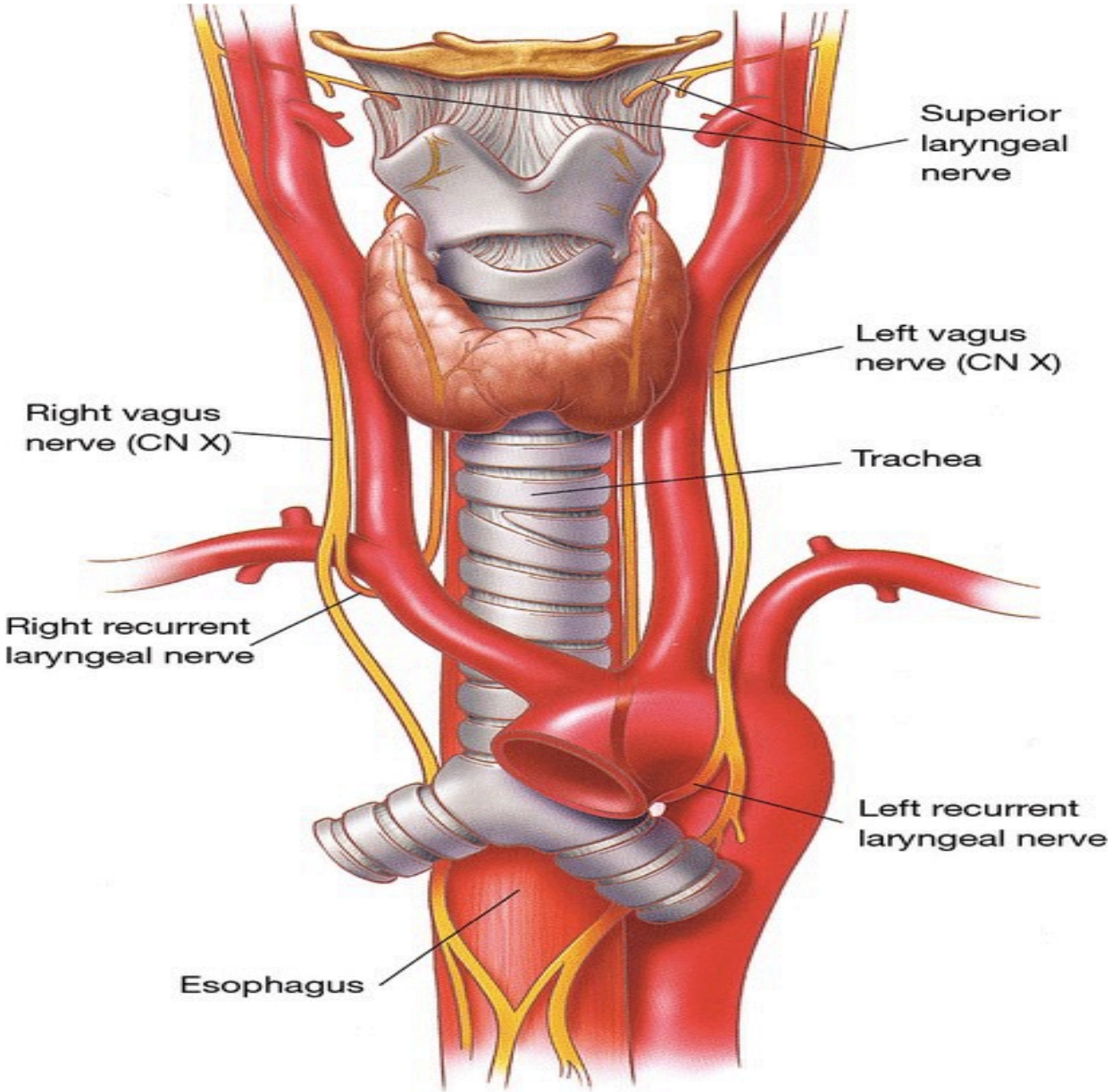
a. Superior laryngeal nerve: it divides into two branches:

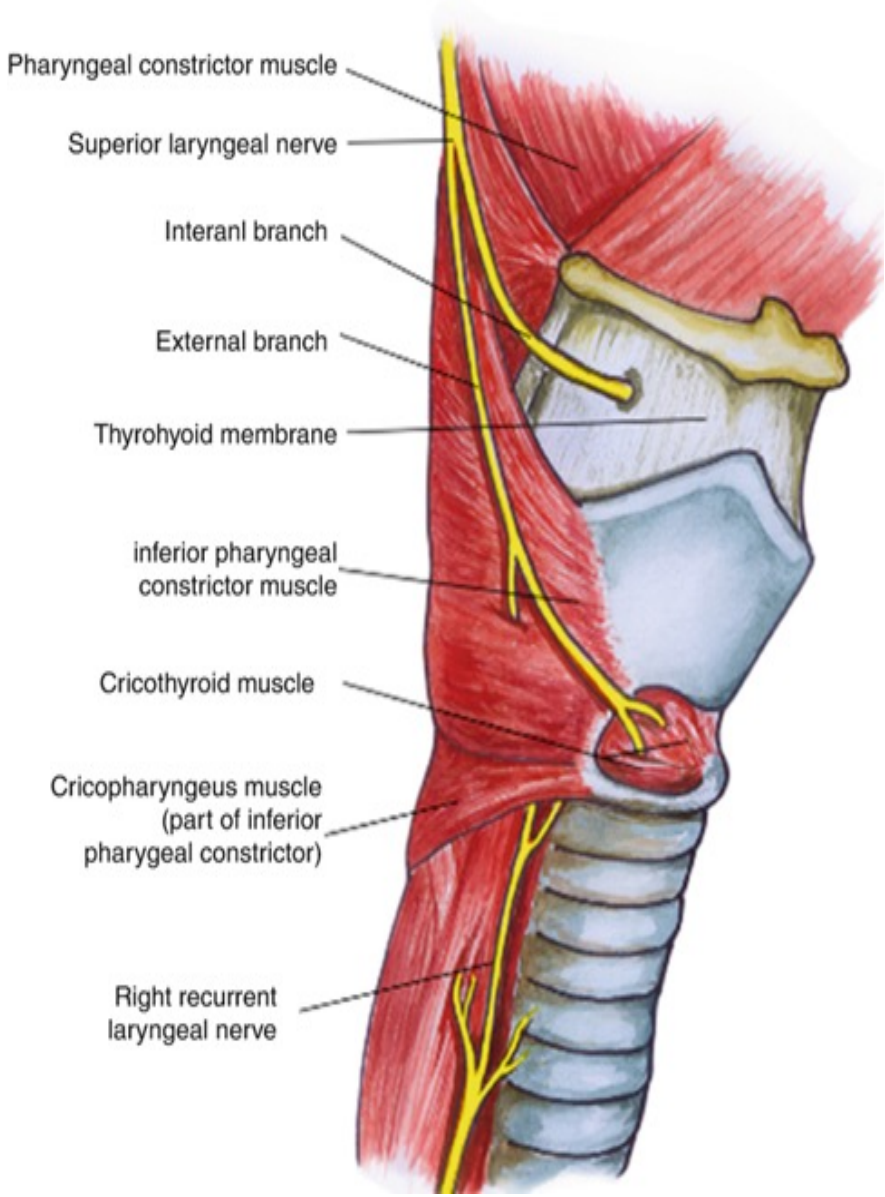
- *Internal laryngeal nerve (sensory)*
- *External laryngeal nerve (motor)*

b. Recurrent laryngeal nerve (RLN)

Lesion:

- Hoarse of the voice
- Difficulty in swallowing


Superior laryngeal nerve
Left vagus nerve (CN X)
Right vagus nerve (CN X)
Trachea
Right recurrent laryngeal nerve
Left recurrent laryngeal nerve
Esophagus


Pharyngeal constrictor muscle
Superior laryngeal nerve
Interanl branch
External branch
Thyrohyoid membrane
inferior pharyngeal constrictor muscle
Cricothyroid muscle
Cricopharyngeus muscle (part of inferior pharygeal constrictor)
Right recurrent laryngeal nerve

Read Only

Type of Fibers and function:

- **GSA :** External ear, meatus, and tympanic membrane
- **SVA :**Taste sensation from From posterior 1/3 of the tongue.
- **GVA :** Cervical, thoracic, abdominal fibres, and carotid and aortic bodies
- **GVE :** Parasympathetic to Thoracic organ (Cardiac, pulmonary) and GIT organ (esophageal, gastric, ,,,,)
- **SVE :** To pharyngeal and Laryngeal muscles

3-Accessory Nerve (11th cranial nerve):

Accessory nerve has 2 roots join each other in the **jugular foramen** and separate below it.

I)Spinal root:

- It arises from **upper 5-6 segments of spinal cord**. (C1-C6)
- It ascends to enter the cranial cavity through **foramen magnum**

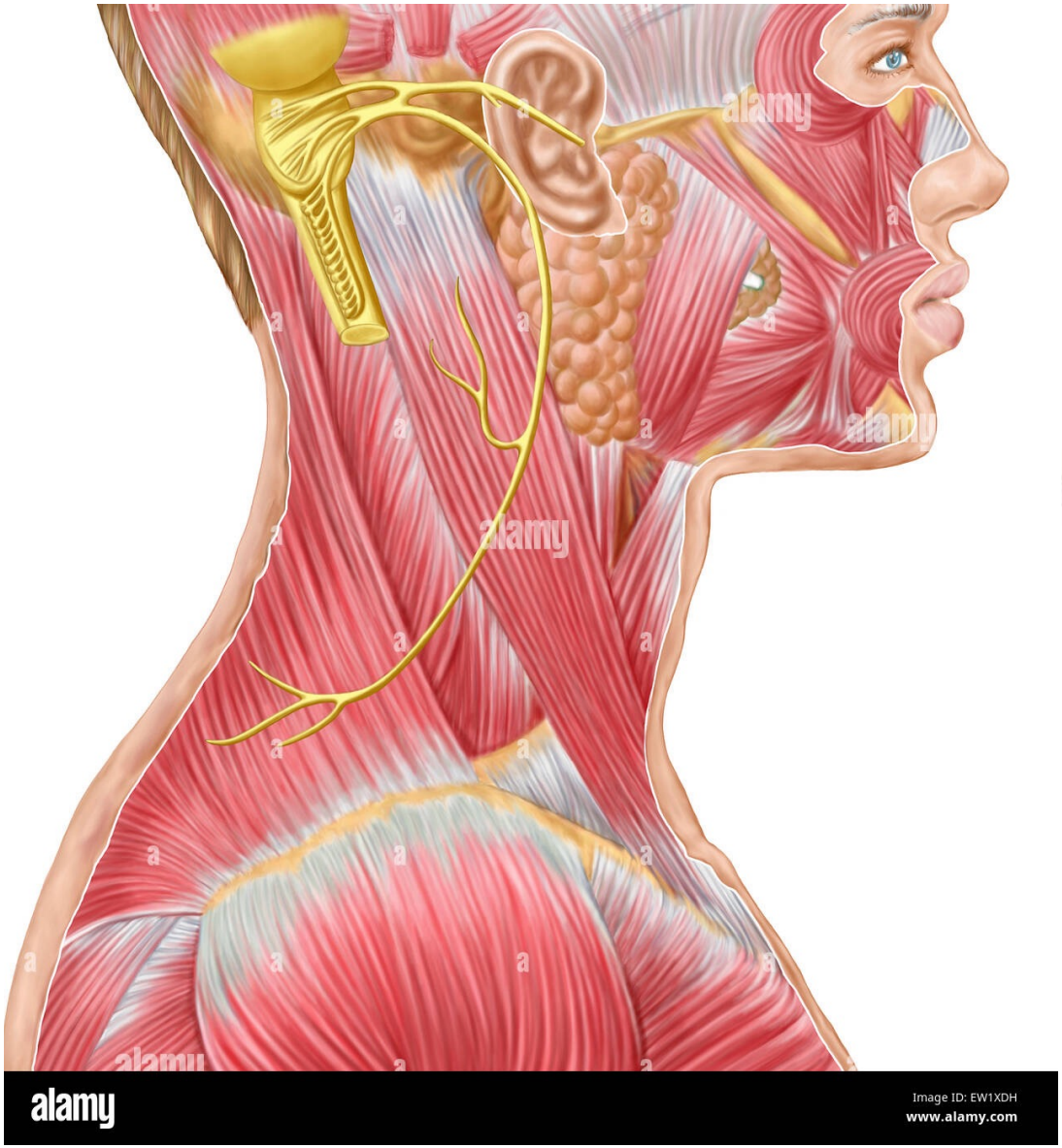
II) Cranial root:

- It arises from medulla oblongata.

Spinal part and cranial part join and leave the skull via **jugular foramen** then the nerve divides into two again

The cranial part **joins the vagus** nerve and distributes with **its pharyngeal and laryngeal branches**

The spinal part **supplies** 2 muscles (sternomastoid and trapezius).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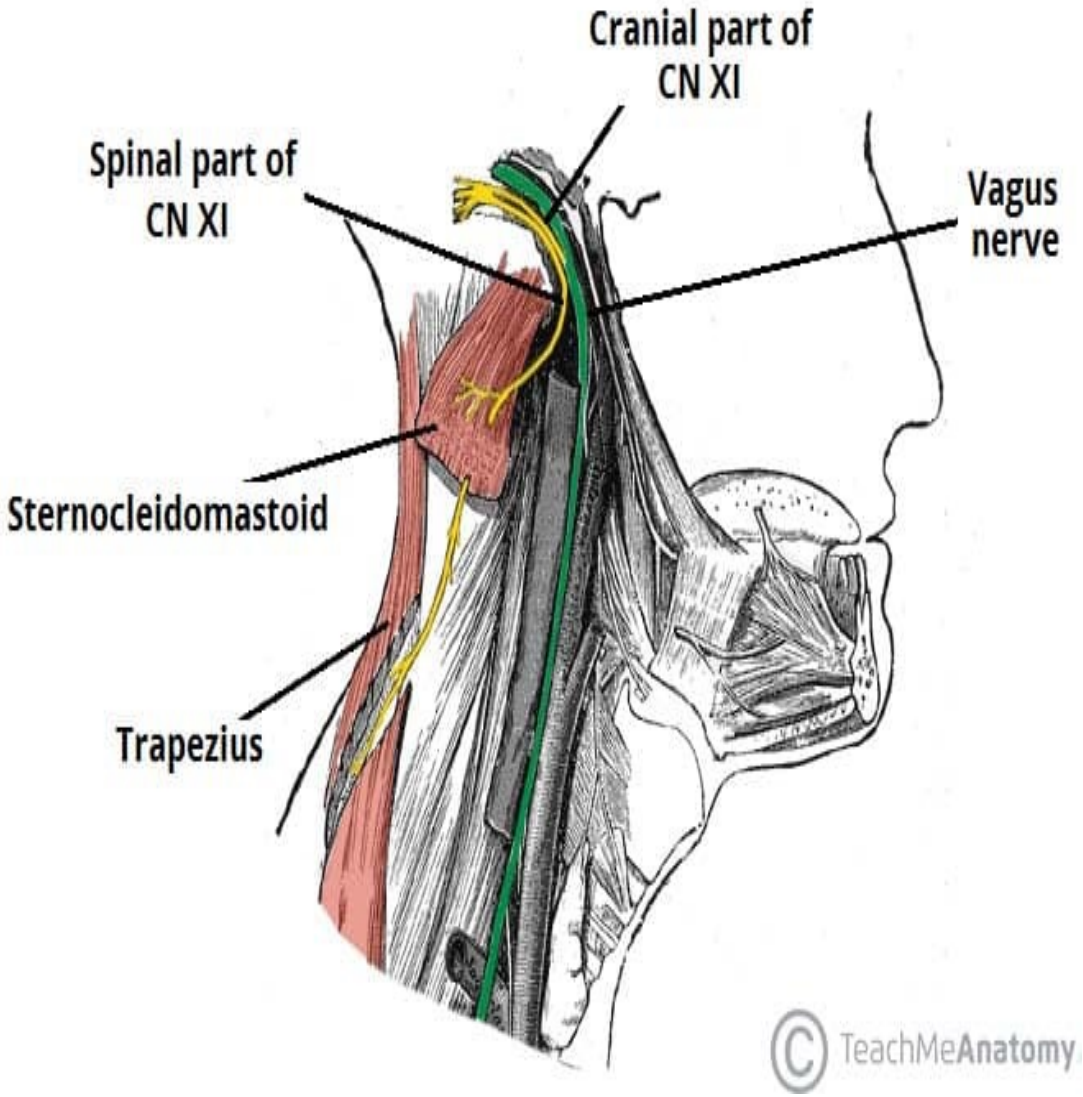
Cranial part of
CN XI
Spinal part of
CN XI
Vagus
nerve
Sternocleidomastoid
Trapezius
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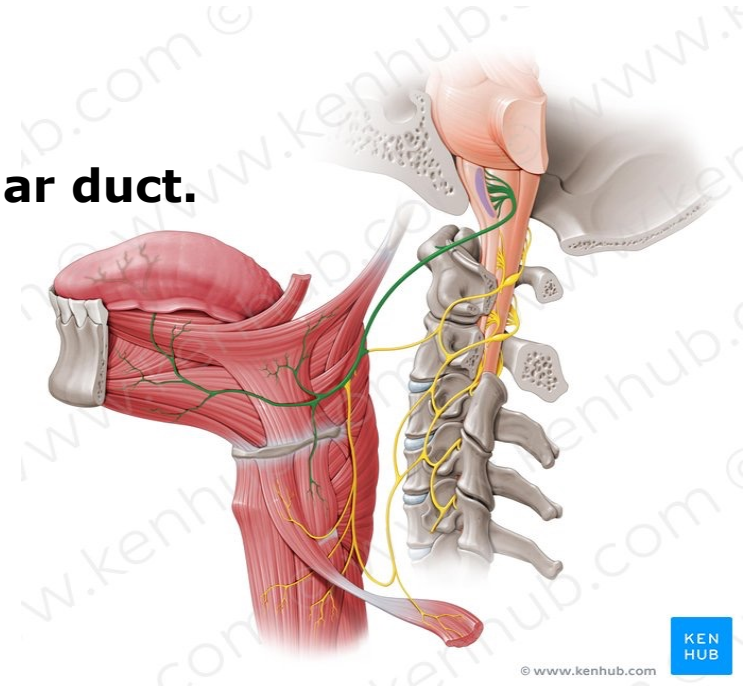
4-Hypoglossal Nerve (12th cranial nerve)

Course and relations:

- It leaves the skull through **hypoglossal canal**.
- **Just below the skull** it is joined by a branch from **C1** .
- It descends in the between between IJV and ICA, then it **curves crossing 3 arteries**; ICA, ECA and the loop of lingual artery.
- Then, it enters the **digastric triangle** where it lies on the lateral surface of **hyoglossus muscle** , below **submandibular duct.**



⋆ Branches:

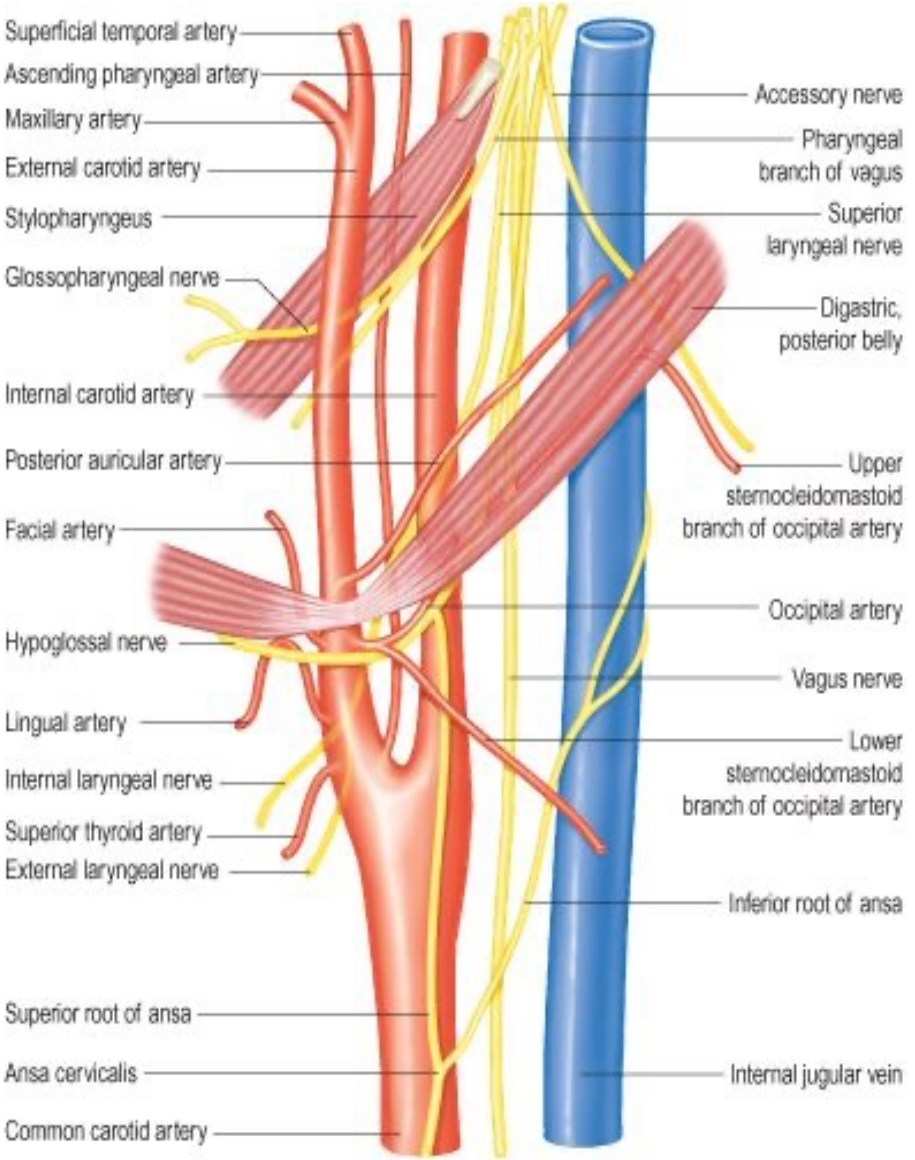
1) **Branches from hypoglossal nerve**: it is a purely motor nerve suppling all intrinsic and extrinsic muscles of tongue except palatoglossus (supplied by cranial accessory through vagus).

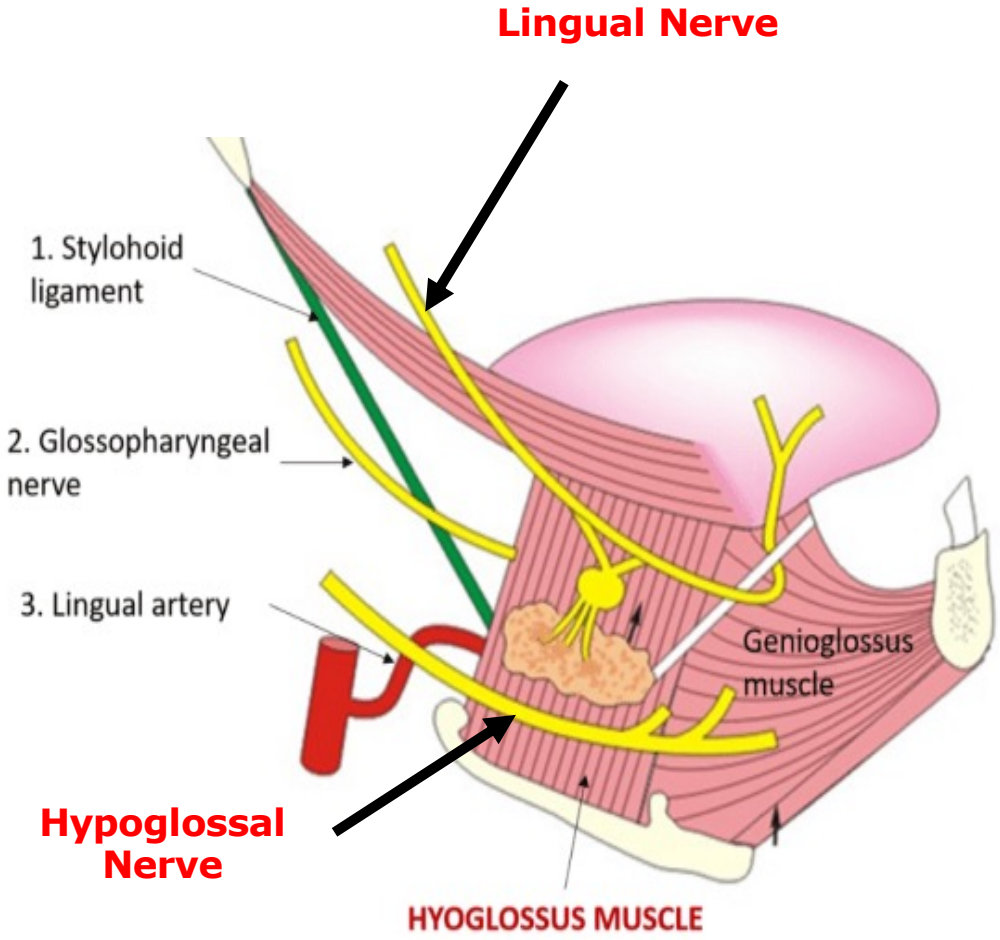
2) Branches from C1:

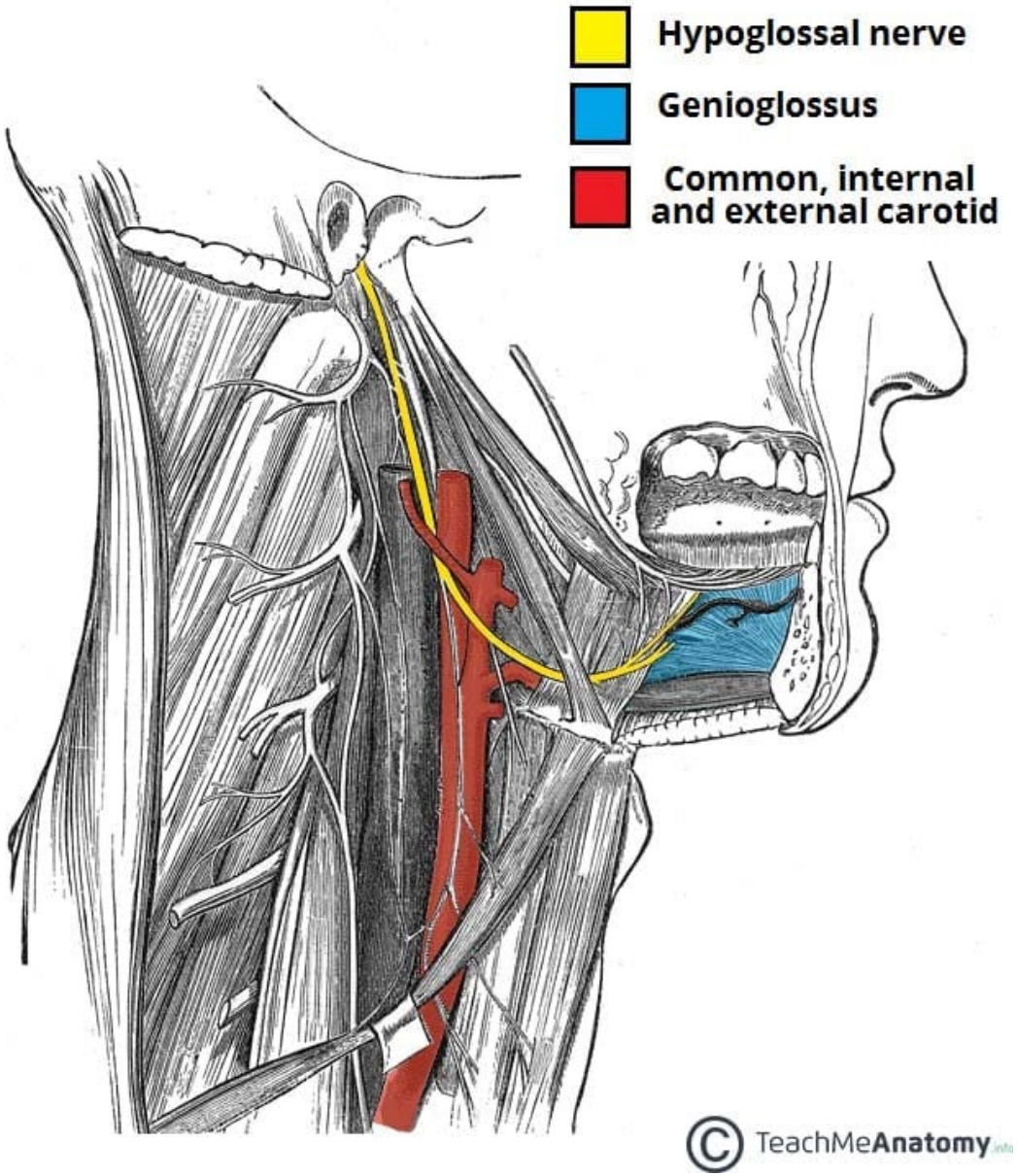
a) Meningeal branch

b) Descendens hypoglossi (shares in formation of ansa cervicalis).

c) Branches to thyrohyoid and geniohyoid.






Hypoglossal nerve
Genioglossus
Common, internal and external carotid
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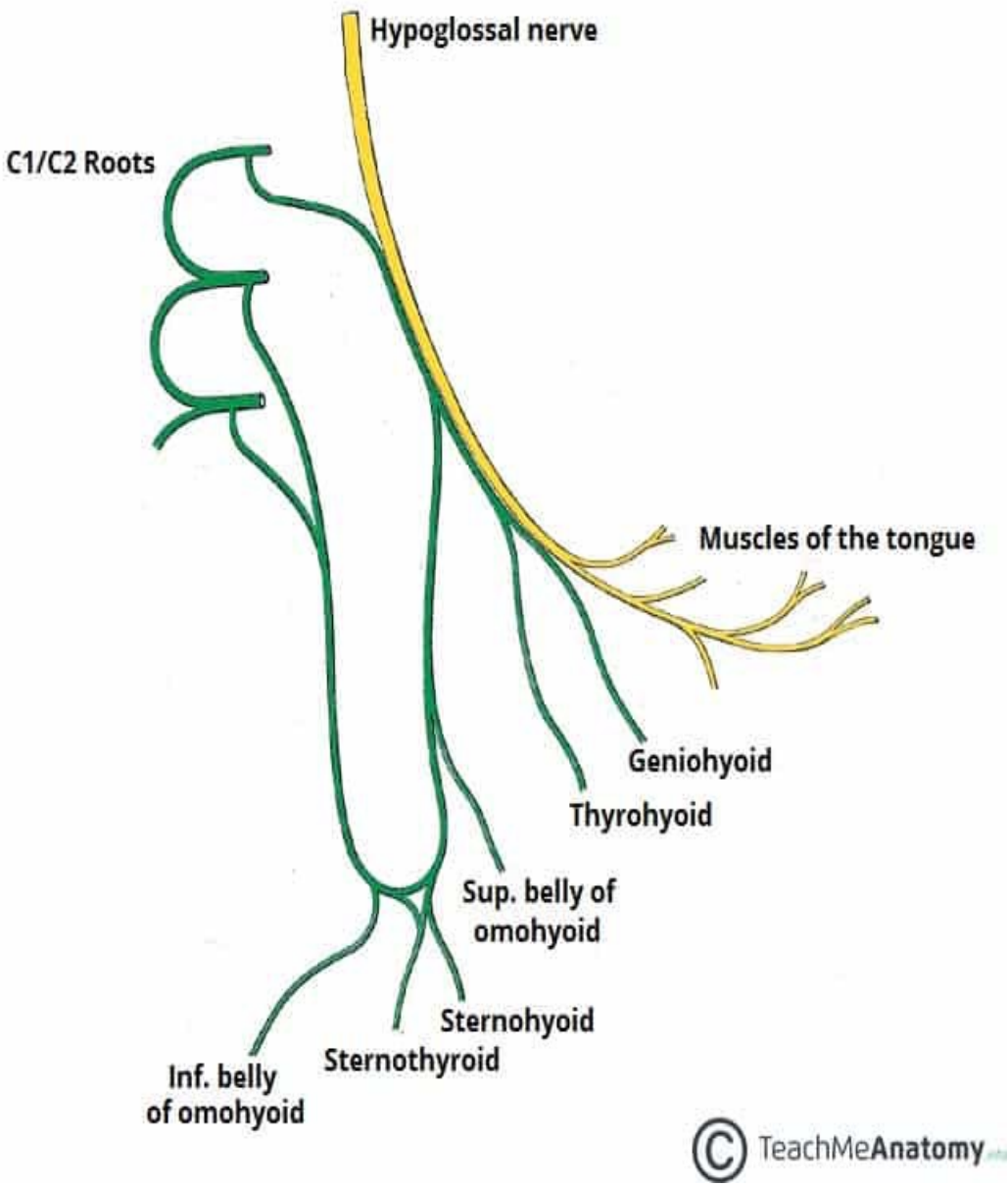
Hypoglossal nerve
C1/C2 Roots
Muscles of the tongue
Geniohyoid
Thyrohyoid
Sup. belly of omohyoid
Sternohyoid
Sternothyroid
Inf. belly of omohyoid
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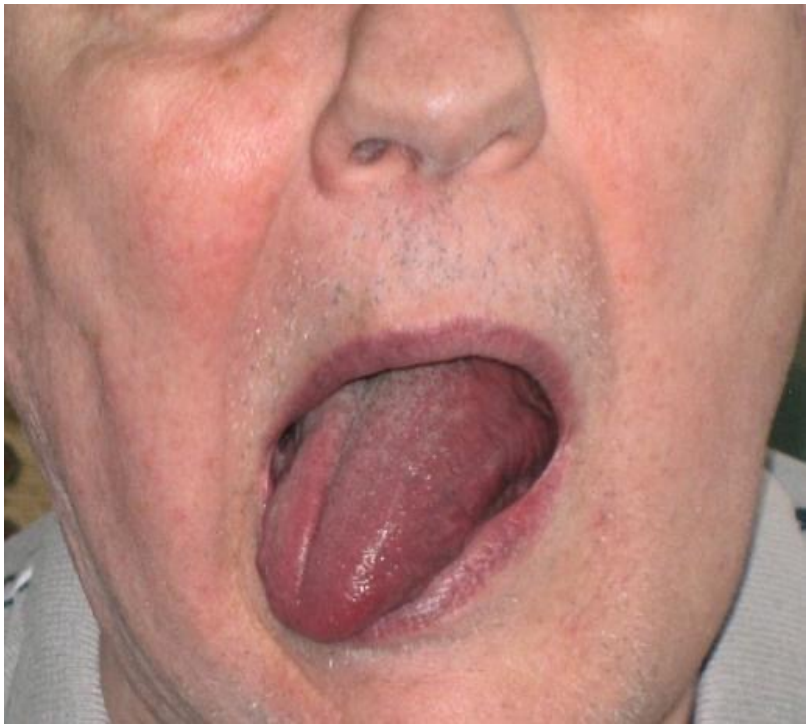
Lesion

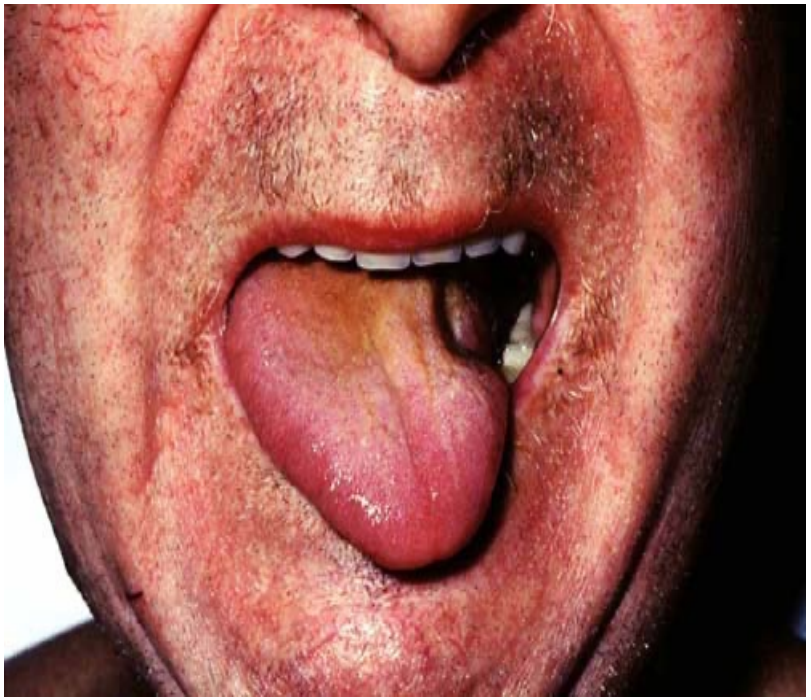
- ❖Atrophy of ipsilateral tongue muscles
- ❖Deviation of the tongue to the paralyzed side,

Why ????

The tongue being pushed by the genioglossus muscle of the normal side



Right Hypoglossal Nerve palsy



Left Hypoglossal Nerve palsy

The Cervical Plexus :

The plexus lies on scalenus medius, ***behind*** **the** prevertebral fascia.

Formation of the Cervical Plexus :

It is formed by the upper 4 cervical ventral rami.

Branches of the Cervical Plexus :

A. Four cutaneous branches (Sensory):

1. Lesser occipital N. (C2)
2. Great auricular (C2,3)
3. Transverse cervical (C2,3)
4. Supraclavicular nerves (C3,4)

B. Motor Branches

1-Spinal nerve C1 (via hypoglossal nerve): Thyrohyoid and geniohyoid muscles

2-Ansa cervicalis (C1-C3): Other infrahyoid muscles (omohyoid, sternohyoid and sternothyroid muscles)

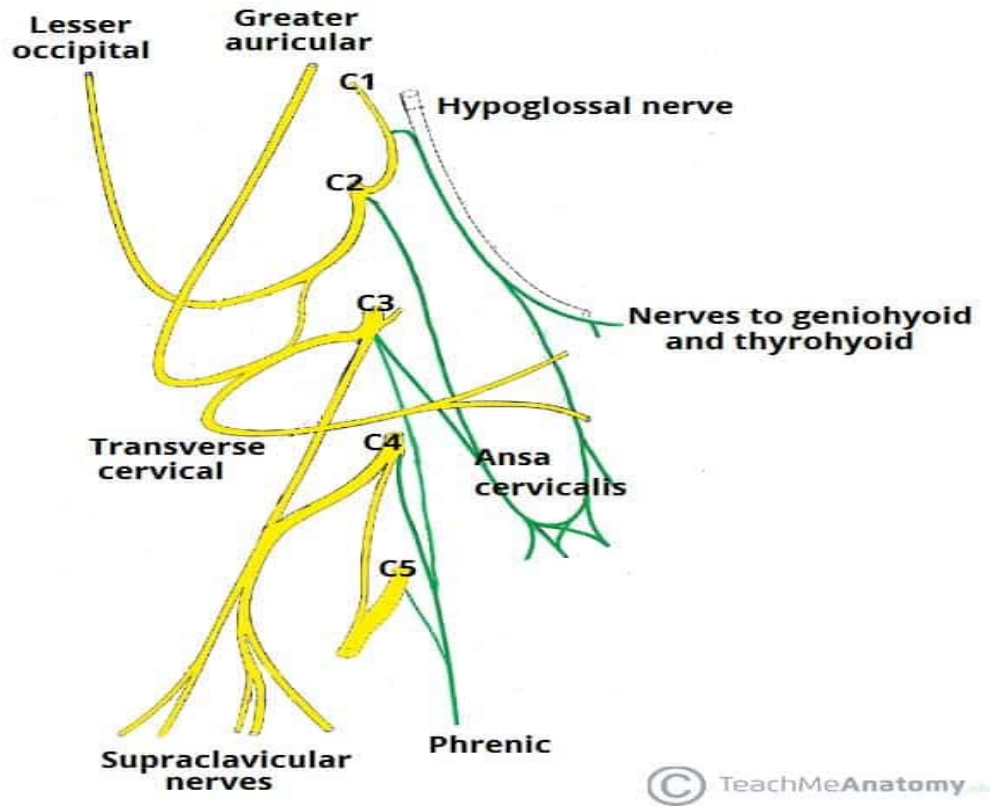
3-Phrenic nerve (C3-C5): It is motor and sensory . It supplies diaphragm

4-Four groups of *motor* muscular branches to

-Longus capitis, longus colli.

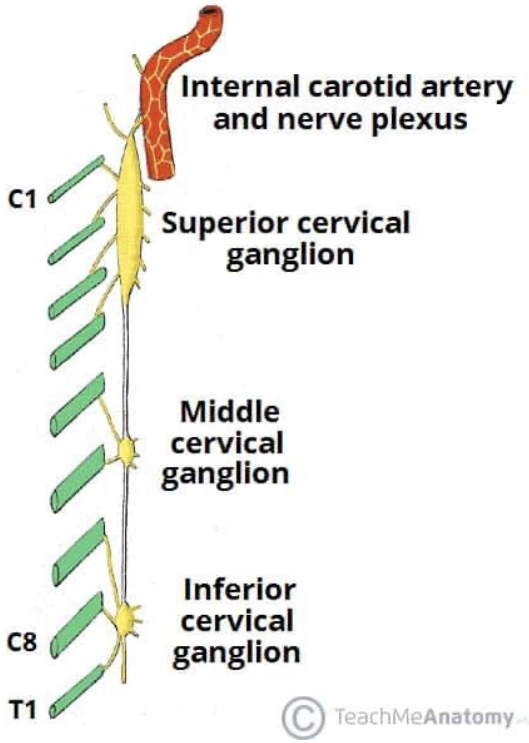
-Rectus capitis anterior, rectus capitis lateralis.

-Scalenus medius, levator scapulae.



The Sympathetic Trunk

- The cervical sympathetic chain carries 3 ganglia : superior, middle and inferior.
- The preganglionic sympathetic nerve fibers to the cervical ganglia arise from the T1 to T6 segments of the spinal cord, ascend in the sympathetic chain to relay in the 3 cervical ganglia.
- Postganglionic fibers are distributed along cervical nerves and blood vessels to the structures in the head and neck and upper limb.



Ganglia and its branches :

- See the table

Ganglion	Site	Somatic branches grey rami communicants	Vascular	Visceral
The superior G.	•It Lies anterior to 2nd, 3rd cervical vertebrae	To upper 4 cervical nerves	•Plexus around I.C.A. and E.C.A.	• Pharyngeal branches→ pharyngeal plexus • Superior cervical cardiac branch → cardiac plexuses
The middle G.	• It lies in front of C_6 vertebra	To 5th, 6th cervical nerves	•Plexus around the inferior thyroid A. •Ansa subclavia loops around subclavian A. to the cervicothoracic ganglion	• Tracheal, oesophagcal branches. • Middle cervical cardiac branch cardiac plexus
Inferior G. or Cervicothoacic G. or stellate G.	• It fuses with the first thoracic G. to form the Cervicothoracic ganglion, in front of neck of first rib.	To the 7^{th} and 8^{th} cervical nerves.	•Plexus around vertebral and subclavian arteries	• Inferior Cervical cardiac branch → cardiac plexus.


Thank you