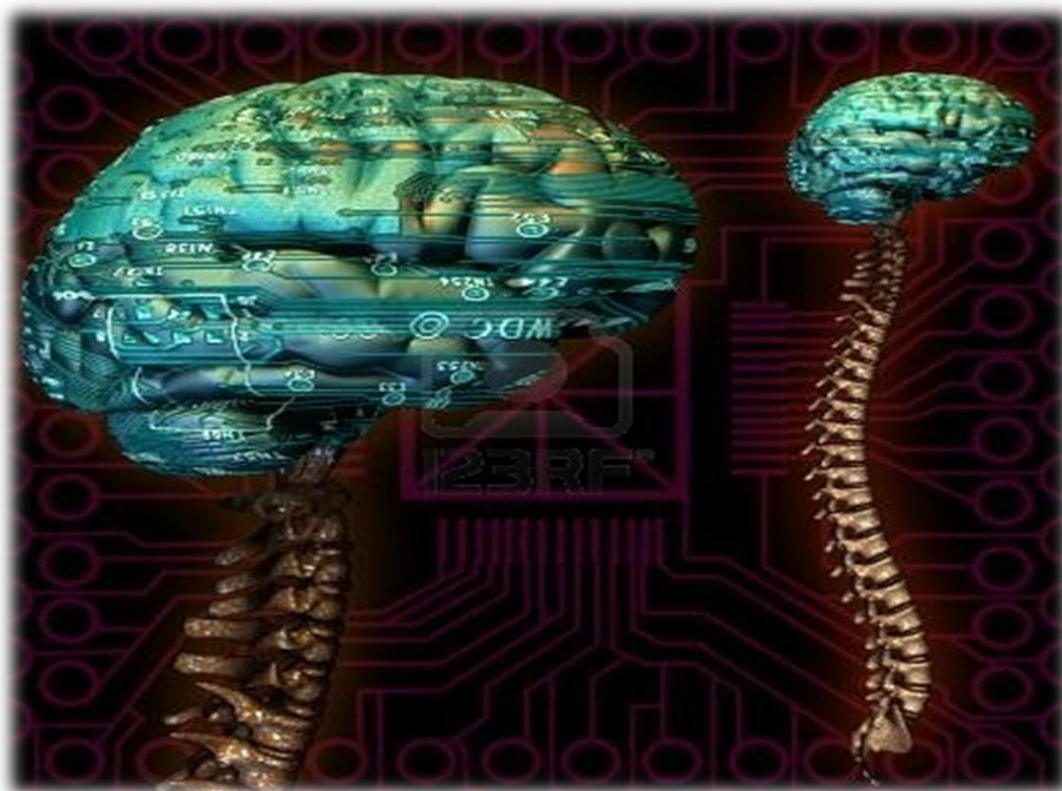




CNS Block



LECTURE (8)

CRANIAL NERVES IX-X
(GLOSSOPHARYNGEAL & VAGUS NERVES)
Done by: Shroog Al-Harbi

Reviewed by: ayedh alamri

[If there is any mistake please feel free to contact us:](#)

Anatomyteam32@gmail.com

Both - Black

Male Notes - BLUE

Female Notes - GREEN

Explanation and additional notes - ORANGE

Very Important note - Red





Objectives:

By the end of the lecture, the student will be able to:-

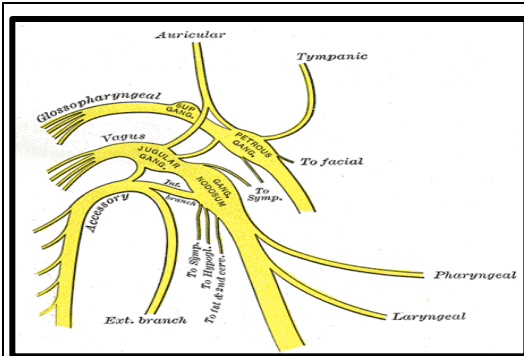
- Define the deep origin of both Glossopharyngeal and Vagus Nerves.
- Locate the exit of each nerve from the brain stem.
- Describe the course and distribution of each nerve.
- List the branches of both nerves.



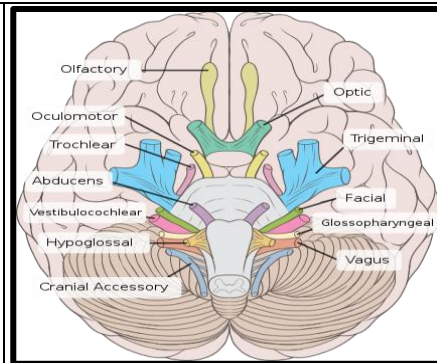
GLOSSOPHARYNGEAL(IX) CRANIAL NERVE

Type of fiber: A	It is principally a Sensory nerve with preganglionic parasympathetic and few motor fibers (mixed)		
Neucleus: A	It has no real nucleus to itself. Instead it shares nuclei with VII and X		
Superficial attachment: B, C	It arises from the ventral aspect of the medulla by a linear series of small rootlets, in groove between olive and inferior cerebellar peduncle.		
Course: D	<p>It <u>leaves the cranial cavity</u> by passing through the jugular foramen in company with the <u>Vagus</u> , <u>Accessory nerves</u>(cranial fiber) and the <u>Internal jugular vein</u></p> <p>It <u>Passes forwards</u> between Internal jugular vein and External carotid artery.</p> <p>Lies Deep to Styloid process.</p> <p><u>Passes between</u> external and internal carotid arteries at the posterior border of Stylopharyngeus then lateral to it.</p> <p>It reaches the pharynx by passing between middle and inferior constrictors, deep to Hyoglossus, where it breaks into terminal branches.</p>		
Component of fiber: E,F	SVE fibers	originate from nucleus ambiguus (NA) => in medulla	supply stylopharyngeus muscle .
SVE fibers = special visceral efferent	GVE fibers:	arise from inferior salivatory nucleus (ISN) => preganglionic parasympathetic fiber	relay in otic ganglion , the postganglionic fibers supply parotid gland Motor
GVE fibers = general visceral efferent	SVA fibers:	The peripheral processes supply the taste buds on posterior third of tongue .	arise from the cells of inferior ganglion (relay of fiber coming from posterior third of tongue), their central processes terminate in nucleus of solitary tract (NST) =>(7th N with 9 th N)
SVA fibers = special visceral afferent	GVA fibers:	<u>visceral sensation</u> from mucosa of posterior third of tongue, pharynx, auditory tube and tympanic cavity, carotid sinus	End in nucleus of solitary tract (NST) . Sens
GVA fibers = General visceral Afferent fiber			
Ganglia: G	Superior ganglion:		Inferior ganglion:
	Small, with no branches.		Large and carries general sensations from pharynx, soft palate and tonsil.
Communications: G	Superior ganglion:	Inferior ganglion:	Trunk of the nerve
	Superior Cervical sympathetic ganglion	It is connected to Auricular Branch of Vagus .	Facial nerve at the <u>stylomastoid foramen</u>
Branches: H	Tympanic: (preganglionic parasympathetic fiber)= GVE		relays in the otic ganglion and gives secretomotor to the parotid gland
	Nerve to Stylopharyngeus muscle (motor fiber)		to Stylopharyngeus muscle
	Pharyngeal: (General visceral Afferent fiber)= GVA		to the mucosa of pharynx .
	Tonsillar.		to the mucosa of tensile .
	Lingual : (general and special visceral afferent fiber)= G&SVA		carries sensory branches, general and special (taste) from the posterior third of the tongue .
	Sensory branches: (General visceral Afferent fiber)= GVA		from the carotid sinus and body (pressoreceptors and chemoreceptors).

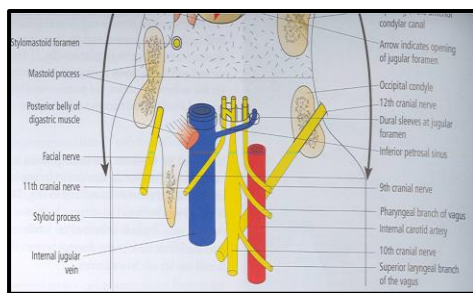
A, B, C, D, E, F, G, H => in the next slide



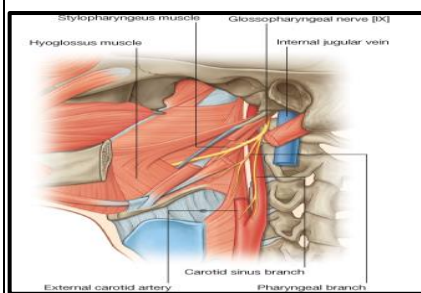
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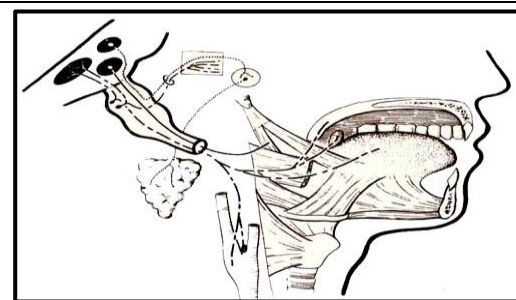
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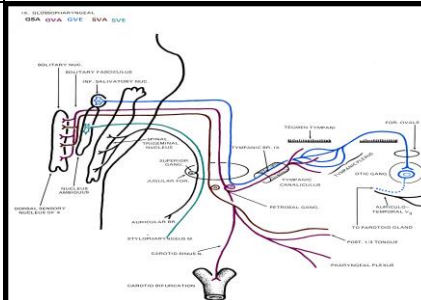
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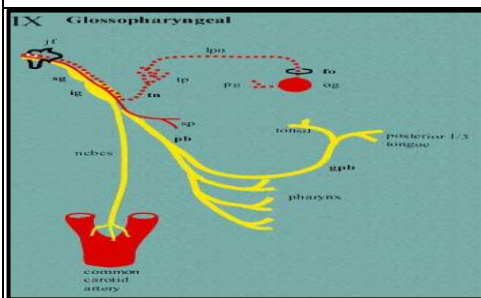
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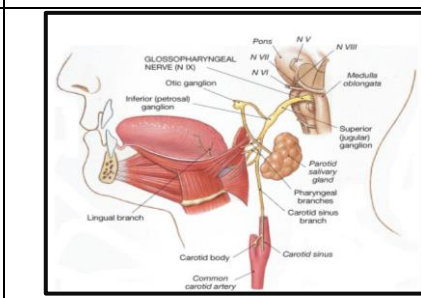
E



F



G



H



VAGUS (X) CRANIAL NERVE

Type of fiber:A	It is a Mixed nerve & The principal role of the vagus is to provide: * parasympathetic supply to organs throughout the <u>thorax and upper abdomen</u> . main component * sensory and motor supply to the <u>pharynx and larynx</u> .		
General note:A	حائر Its name means <u>wandering</u> (it goes all the way to the abdomen) So it is the longest and most widely distributed cranial nerve.		
Superficial attachment:B,C	Its rootlets exit from medulla between olive and inferior cerebellar peduncle.		
COURSE:E,F	<p>Leaves the <u>skull</u> through jugular foramen. It occupies the <u>posterior aspect</u> of the carotid sheath <u>between the internal jugular vein laterally and the internal and common carotid arteries medially</u> The vagus runs down the neck on the prevertebral muscles and fascia. The <u>internal jugular vein lies behind it</u>, and the <u>internal and common carotid arteries are in front of it</u>, all the way down to the superior thoracic aperture (thoracic output).</p> <p>It lies on the prevertebral muscles and fascia. Enters thorax through its inlet: <u>Right Vagus</u> descends in front of the subclavian artery. <u>Left Vagus</u> descends between the left common carotid and left subclavian arteries. It runs upwards and medially alongside the trachea, and passes behind the lower pole of the thyroid gland. The recurrent laryngeal nerve gives motor supply to all the muscles of the larynx, except the cricothyroid. It also provides sensation to the larynx below the vocal folds</p>		
Component of fiber:G	SVE fibers:	originate from Nucleus Ambiguus	to muscles of pharynx and larynx
	GVE fibers:	originate from Dorsal Nucleus of Vagus synapses in parasympathetic ganglia	Short postganglionic fibers innervate cardiac muscle, smooth muscles and glands of viscera. Moto
	SVA fibers:	sensation from auricle, external acoustic meatus and cerebral dura mater,	To Spinal Tract & Nucleus of Trigeminal (5th nerve is Responsible for all sensation of head&neck)
	GVA fibers :	carry impulse from viscera in neck, thoracic and abdominal cavities	to Nucleus of Solitary Tract. Sensory
GANGLIA	<u>Superior ganglion:</u> in the jugular foramen		<u>Inferior ganglion:</u> below the jugular foramen
COMMUNICATIONS:D	<u>Superior ganglion:</u> 1-Inferior ganglion of glossopharyngeal nerve. 2-Superior cervical sympathetic ganglion 3-Facial nerve.		<u>Inferior ganglion:</u> 1-Cranial part of accessory nerve. 2-Hypoglossal nerve. 3-Superior cervical sympathetic ganglion. 4- 1 st cervical nerve.
Branches:H	<u>Meningeal :</u> (SVA)		to the Dura Matter
	<u>Auricular nerve:</u> (SVA)		To the external acoustic meatus and tympanic membrane .
	<u>Pharyngeal :</u> It enters the wall of the pharynx. It supplies the mucous membrane of the pharynx, superior and middle constrictor muscles, and all the muscles of the palate except the tensor palati .		
	<u>Superior Laryngeal:</u> It divides into:	(1) Internal Laryngeal : It provides sensation to the hypopharynx, the epiglottis, and the part of the larynx that lies above the vocal folds.	(2) External Laryngeal : supplies the cricothyroid muscle.
	<u>Recurrent Laryngeal :</u>	the recurrent laryngeal nerve goes round the subclavian artery on the right, and round the arch of the aorta on the left	

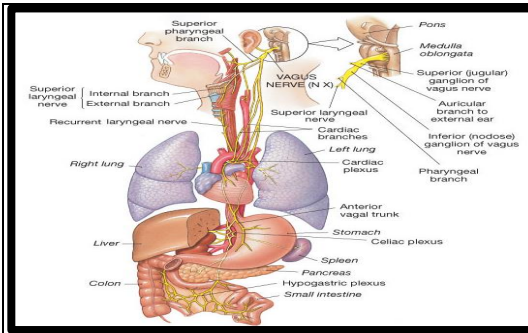
Motor fiber is the cranial fiber of accessory nerve

SVE fibers = special visceral efferent

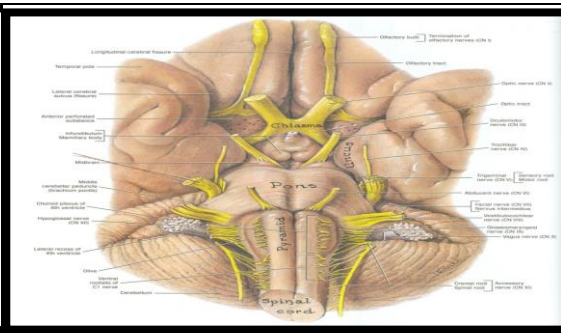
GVE fibers = general visceral efferent

SVA fibers = special visceral afferent

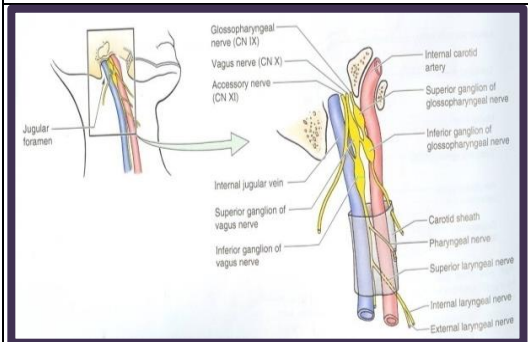
GVA fibers = General visceral Afferent



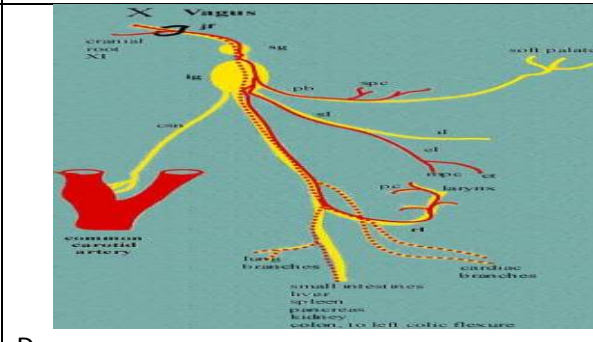
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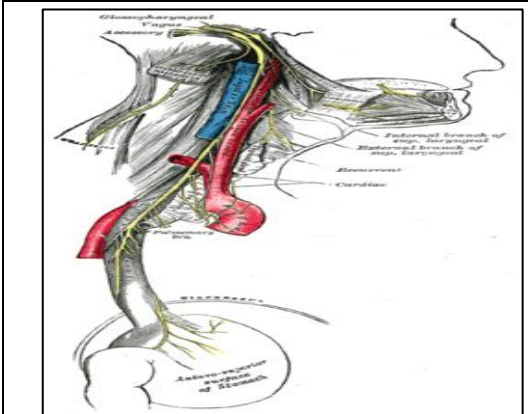
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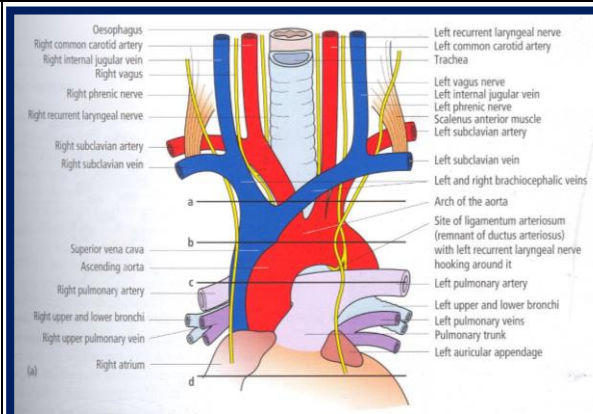
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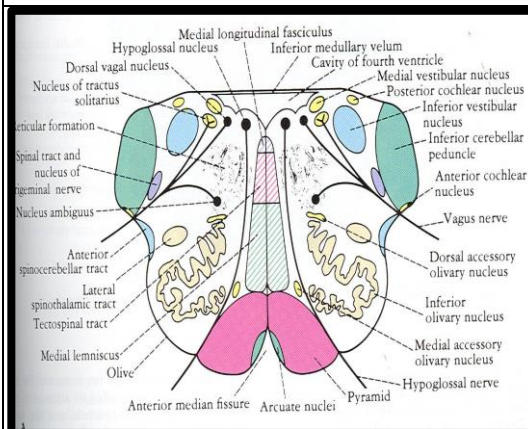
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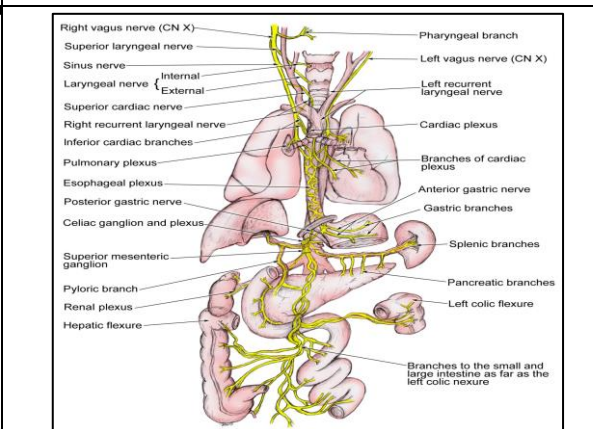
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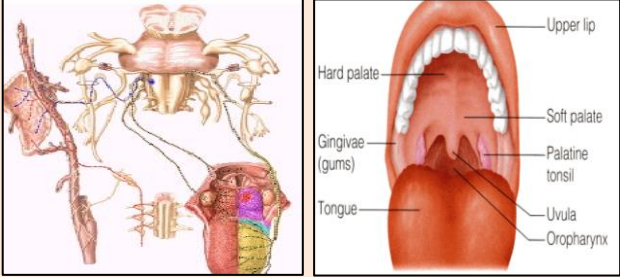
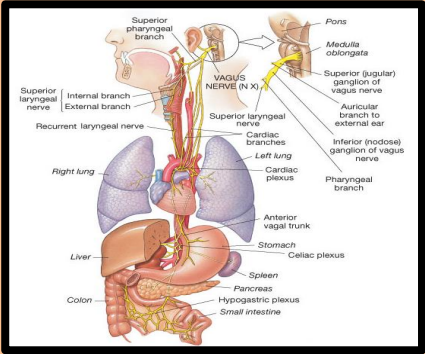

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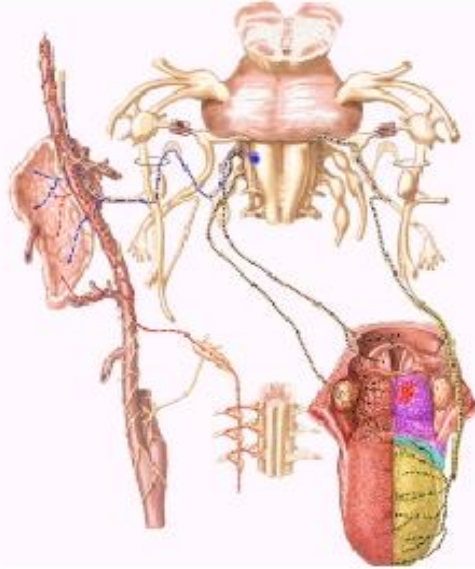
Nerve lesion:

	<u>Glossopharyngeal nerve lesions</u>	<u>Vagus nerve Lesions</u>
<p>It produces:</p> <p>??</p>	<p>1-Difficulty of swallowing. 2-Impairment of taste and sensation over the posterior one-third of the tongue, palate and pharynx. 3-Absent gag reflex. 4-Dysfunction of the parotid gland (dry mouth).</p>	<p>1-palatal and pharyngeal and laryngeal paralysis; 2-Abnormalities of esophageal motility, gastric acid secretion, gallbladder emptying, and heart rate; and other autonomic dysfunction.</p>
		
<p>How to Test for it:</p>	<p>1-Have the patient open the mouth and inspect the <u>palatal arch on each side for asymmetry</u>. 2-Use a tongue blade to <u>depress the base of the tongue</u> gently if necessary. 3-Ask the patient to <u>say "ahhh"</u> as long as possible. 4-Observe the palatal arches as they contract and the soft palate as it swings up and back in order to close off the nasopharynx from the oropharynx. *Normal palatal arches will constrict and elevate, and the uvula will remain in the midline as it is elevated. *With paralysis there is no elevation or constriction of the affected side *Warn the patient that you are going to test the gag reflex. Gently touch first one and then the other palatal arch with a tongue blade, waiting each time for gagging</p>	<p>1-Listen to the patient talk as you are taking the history. 2-Hoarseness, <u>whispering, nasal speech</u>, or the complaint of aspiration or regurgitation of liquids through the nose should make you especially mindful of abnormality. 3-Give the patient a glass of water to see if there is <u>choking</u> or any complaints as it is <u>swallowed</u>. 4-Laryngoscopy is necessary to evaluate the <u>vocal cord</u>.</p>
<p>Causes of IX & X nerve lesions</p>	<p>1. Lateral medullary syndrome: A degenerative disorder seen over age of 50 mostly due to Thrombosis of the Inferior Cerebellar Artery 2. Tumors compressing the cranial nerves in their exiting foramina from the cranium via the skull Manifested by: Ipsilateral paralysis of the muscles of the Palate, Pharynx and Larynx. Ipsilateral loss of Taste from the Posterior Third of tongue.</p>	



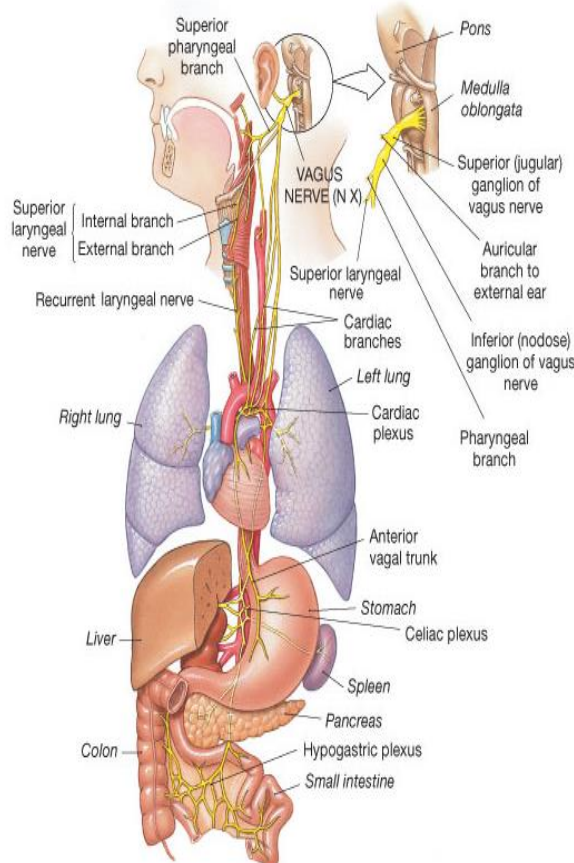
Summary

Glossopharyngeal Nerve and Branches



A mixed nerve, it carries motor fibers to pharyngeal muscles for swallowing and parasympathetic motor fibers to salivary glands. Sensory fibers carry messages from the pharynx, tonsils, posterior of tongue (taste). Glossopharyngeal fibers also carry afferent messages from the carotid sinus baroreceptors.

Vagus Nerve and Branches



X is a mixed nerve.

It contains afferent, motor, and parasympathetic fibers.

The afferent fibers convey information from:

esophagus, tympanic membrane, external auditory meatus and part of concha of the middle ear. End in trigeminal sensory nucleus.

Chemoreceptors in aortic bodies and baroreceptors in aortic arch.

Receptors from thoracic & abdominal viscera, end in **nucleus solitarius.**

The motor fibers arise from (nucleus ambiguus of medulla to innervate muscles of soft palate, pharynx, larynx, and upper part of esophagus.

The parasympathetic fibers originate from dorsal motor nucleus of vagus in medulla distributed to cardiovascular, respiratory, and gastrointestinal systems.

- There is no difference between male and female slides



Quiz:

1- IX CRANIAL NERVE called and has a function ?

- A) GLOSSOPHARYNGEAL , sensory and preganglionic parasympathetic
- B) GLOSSOPHARYNGEAL , motor and postganglionic parasympathetic
- C) GLOSSOPHARYNGEAL , mixed and preganglionic parasympathetic
- D) Vagus , motor

2- which one of the cranial nerve arise in groove between olive and inferior cerebellar peduncle.

- A) XI
- B) IX
- C) XII

3- GLOSSOPHARYNGEAL CRANIAL NERVE leaves the cranial cavity by passing through the jugular foramen in company with the ?

- A) Vagus , Accessory nerves and the Internal carotid artery
- B) trigeminal , Accessory nerves and the Internal carotid artery
- C) Vagus , abducens nerve and the Internal jugular vein
- D) Vagus , Accessory nerves and the Internal jugular vein



4- during course of glossopharyngeal nerve it pass ?

- A) between Internal jugular vein and internal carotid artery
- B) between Internal and external jugular vein and External carotid artery
- C) between Internal jugular vein and External carotid artery

5- glossopharyngeal nerve reaches the pharynx by passing between ?

- A) middle and superior constrictors, deep to Hyoglossus
- B) middle and lateral constrictors, deep to Hyoglossus
- C) lateral and inferior constrictors, deep to Hyoglossus
- D) middle and inferior constrictors, deep to Hyoglossus

6- where the IX cranial nerve break into terminal branch?

- A) in the posterior triangle
- B) in the pelvic
- C) in front of Stylopharyngeus
- D) deep to Hyoglossus



7- Inferior ganglion of IX cranial nerve is ?

- A) Small, with no branches and It is connected to the Superior Cervical sympathetic ganglion
- B) Large , carries general sensations from pharynx, soft palate, tonsil and It is connected to the Superior Cervical sympathetic ganglion
- C)) Large , carries general sensations from pharynx, soft palate, tonsil and It is connected to Auricular Branch of aorta
- D) Large , carries general sensations from pharynx, soft palate, tonsil and It is connected to Auricular Branch of vagus

8- which branch of IX cranial nerve supply the parotid gland ?

- A) Pharyngeal
- B) Tonsillar
- C) Tympanic
- D) Lingual

9- branch of IX cranial nerve carries sensory branches, general and special (taste) from the posterior third of the tongue ?

- A) Lingual
- B) Recurrent Laryngeal
- C) Superior Laryngeal
- D) Meningeal



10- Glossopharyngeal nerve lesions cause ?

- A) palatal and pharyngeal and laryngeal paralysis
- B) Abnormalities of esophageal motility
- C) Abnormalities of gastric acid secretion
- D) Absent gag reflex

11- the VAGUS CRANIAL NERVE ?

- A) Mixed nerve , longest and most widely distributed spinal nerve.
- B) sensory nerve , longest and most widely distributed cranial nerve.
- C) motor , longest and most widely distributed cranial nerve.
- D) mixed , longest and most widely distributed cranial nerve.

12- the X cranial nerve occupies the aspect of the carotid sheath between the internal jugular vein and the internal and common carotid arteries ?

- A) superior , laterally , medially
- B) posterior , laterally , medially
- C) anterior , latterly , medially
- D) medial , laterally , medially



13- ganglion of the X cranial nerve in the jugular foramen connected to ?

- A) superior ganglion of glossopharyngeal nerve
- B) posterior ganglion of glossopharyngeal nerve
- C) 1st cervical nerve
- D) inferior ganglion of glossopharyngeal nerve

14- branch of X cranial nerve which supplies superior and middle constrictor muscles, and all the muscles of the palate except the?

- A) Pharyngeal , cricothyroid muscle
- B) Meningeal , tensor palati
- C) Pharyngeal , tensor palate

15 – which branch of X cranial nerve provide sensation to larynx above the vocal fold ?

- A) External Laryngeal
- B) Recurrent Laryngeal
- C) Internal Laryngeal
- D) Pharyngeal



Q	ANS
1	C
2	B
3	D
4	C
5	D
6	D
7	D
8	C
9	A
10	D
11	D
12	B
13	D
14	C
15	C

GOOD LUCK

Anatomy Team Leaders:

Fahad AlShayhan & Eman AL-Bedica.