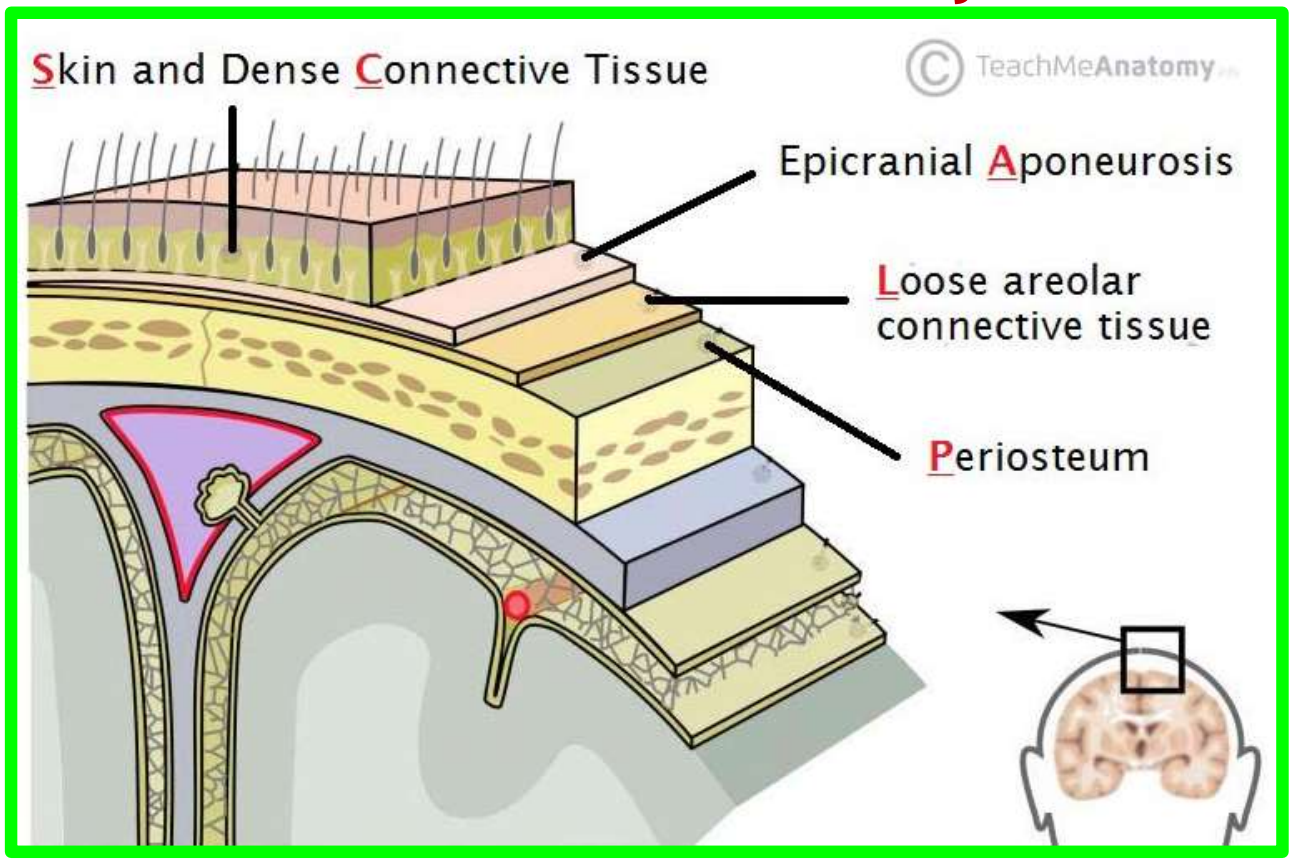
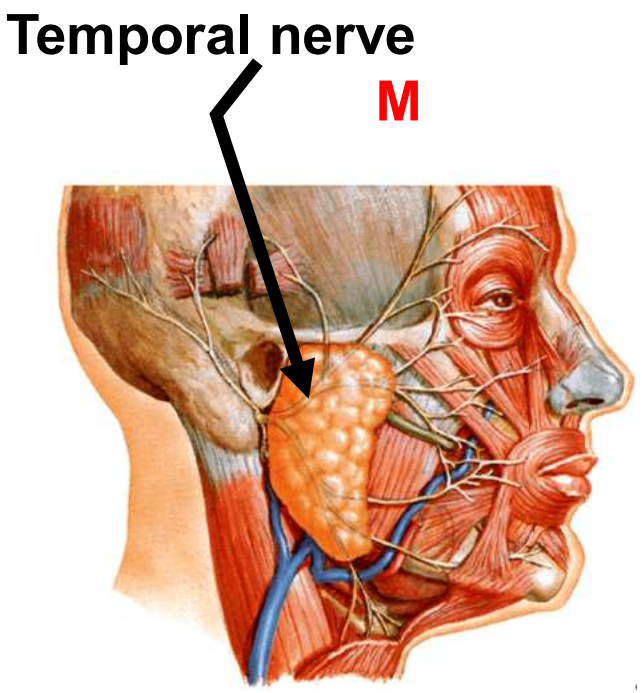
The Scalp

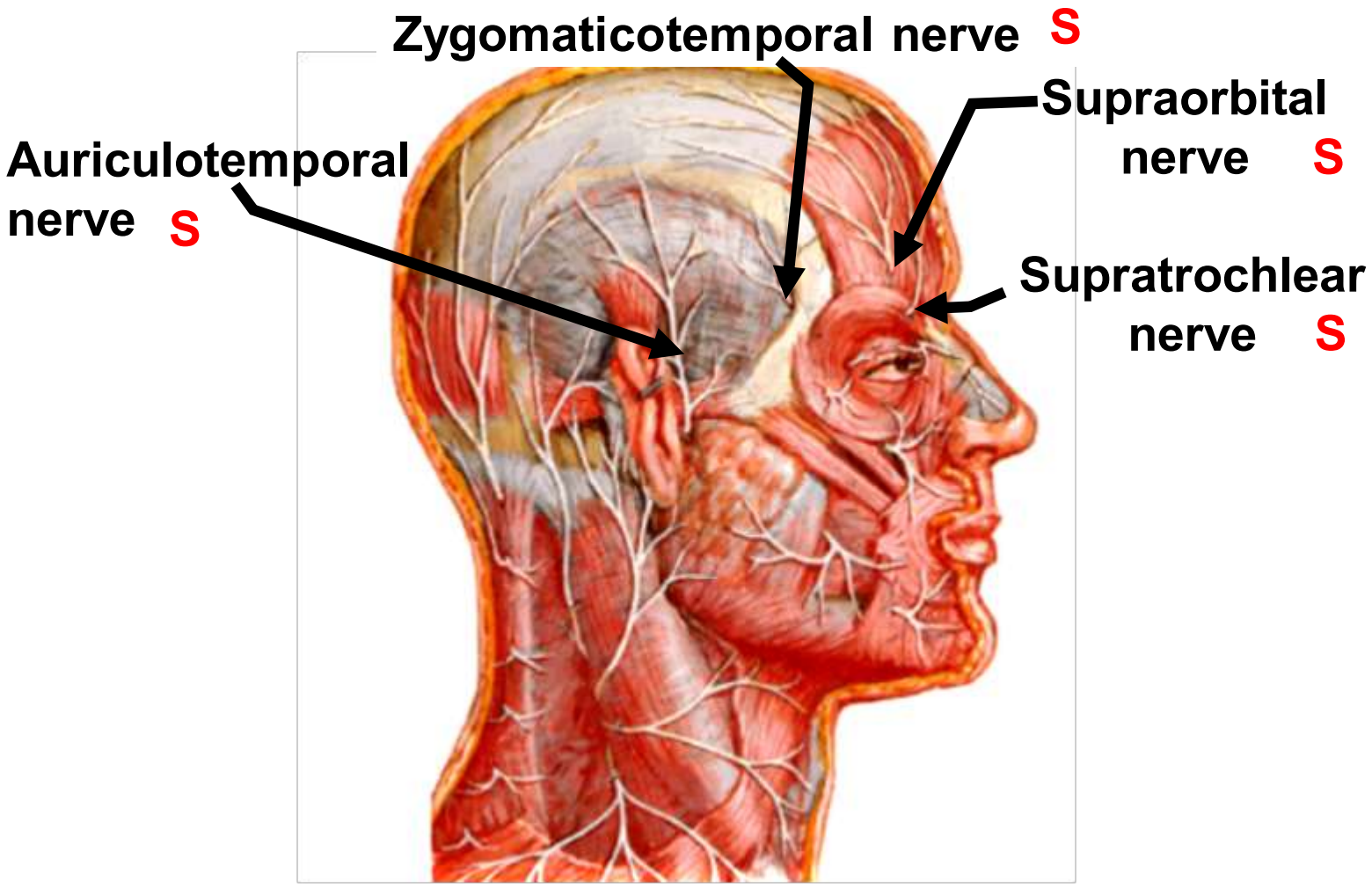
- **Skin**, which is thick and hair bearing and contains numerous sebaceous glands
- **Connective tissue** beneath the skin, which is fibrofatty

Numerous arteries and veins are found in this layer.



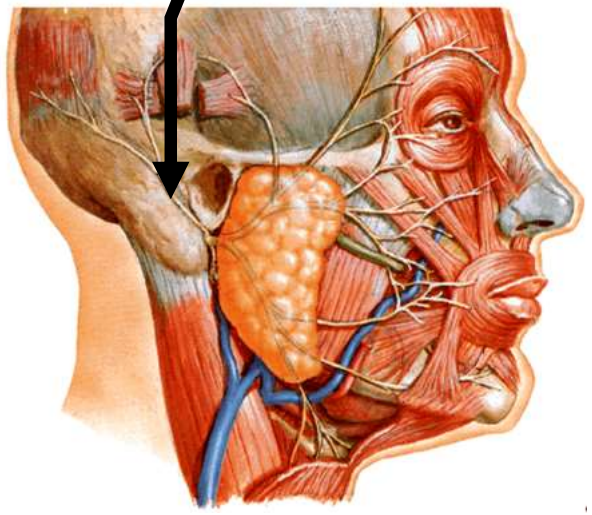
Nerves in front auricle





Nerves behind auricle

Posterior auricular nerve M

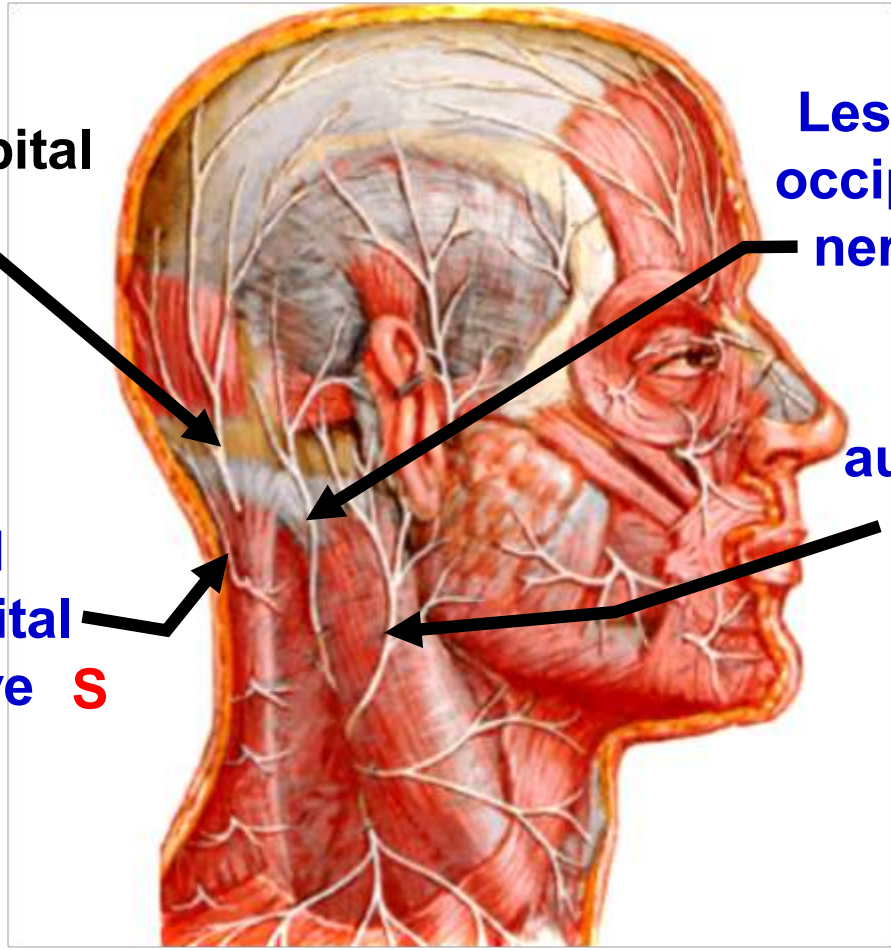


Greater occipital nerve S

Lesser occipital nerve S

Great auricular nerve S

3rd occipital nerve S

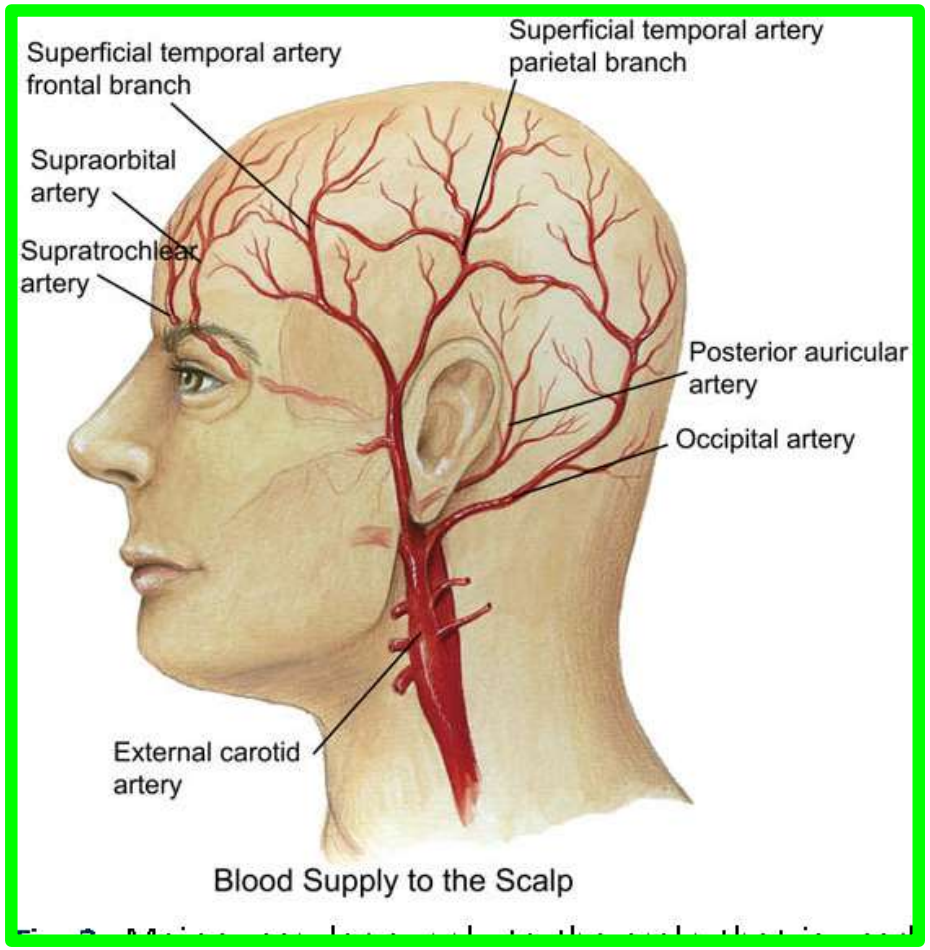


The arterial supply is from the external carotid arteries:

✓**The superficial temporal artery**, the **smaller terminal branch of the external carotid artery.**

✓**The posterior auricular artery**,

✓**The occipital artery**, ascends in company with **the greater occipital nerve**



Blood Supply to the Scalp

❖**The arteries of the scalp supply little blood to the neurocranium, which is supplied primarily by the middle meningeal artery.**

Bones of the Face

Dr. Aiman Al Maathydi

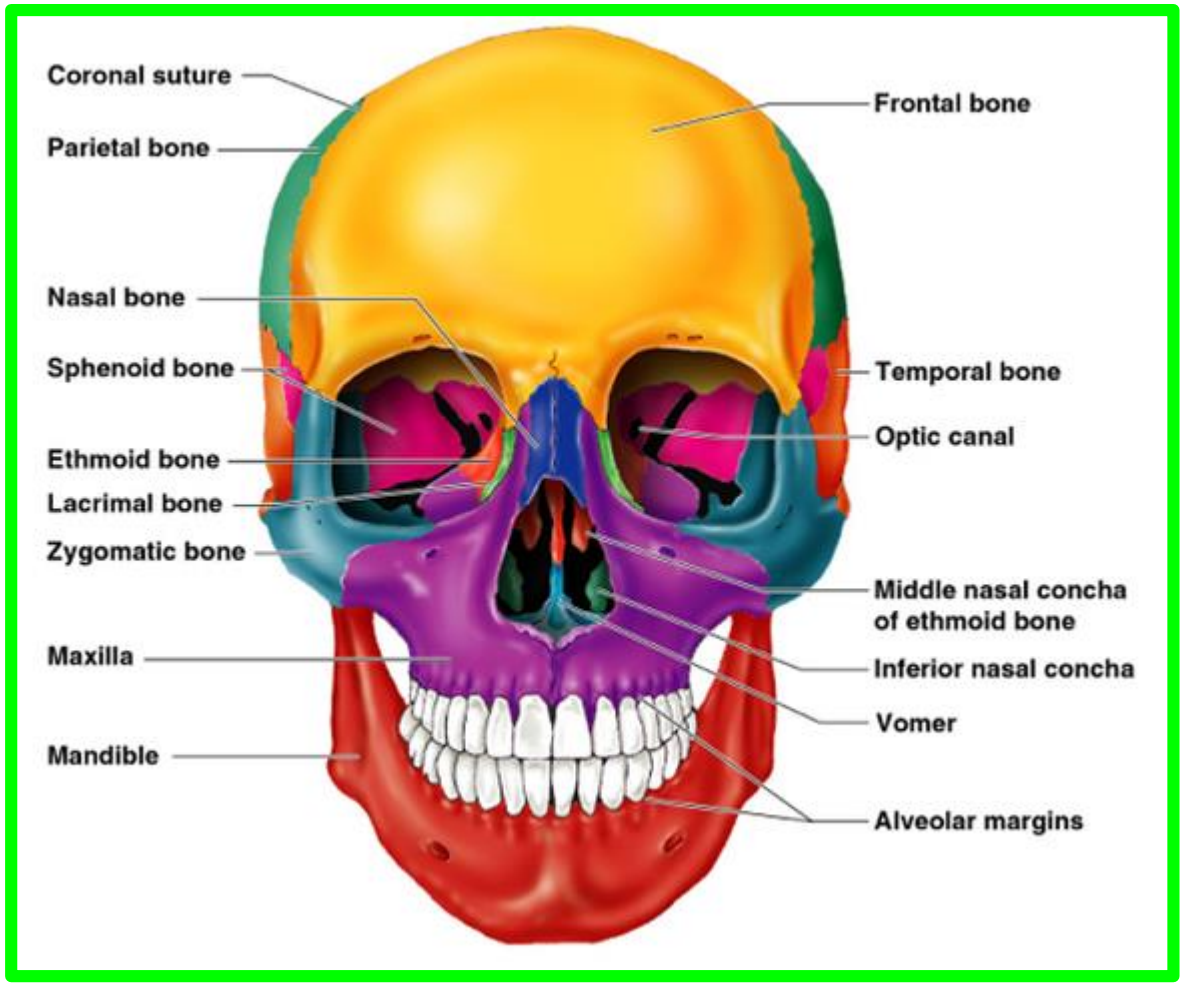
Monday 27. 2. 2023

2

✓The superior orbital margin formed by the frontal bone, which contains the frontal air sinuses.

✓The lateral orbital margin is formed by the zygomatic bone and the inferior orbital margin is formed by the zygomatic bone and the maxilla.

✓The root of the nose is formed by the nasal bones, which articulate below with the maxilla and above with the frontal bones.



✓The important central bone of the middle third of the face is the maxilla, containing its teeth and the maxillary air sinus.

✓The bone of the lower third of the face is the mandible, with its teeth.

❖Branches of the facial artery:

■■ **The submental artery** It supplies the skin of the chin and lower lip.

■■ **The inferior labial artery** It runs medially in the **lower lip** and anastomoses with its fellow of the opposite side.

■■ **The superior labial artery** It runs medially in the **upper lip** and gives branches to **the septum** and **ala of the nose**.

■■ **The lateral nasal artery** It supplies the skin on the side and dorsum of the nose.

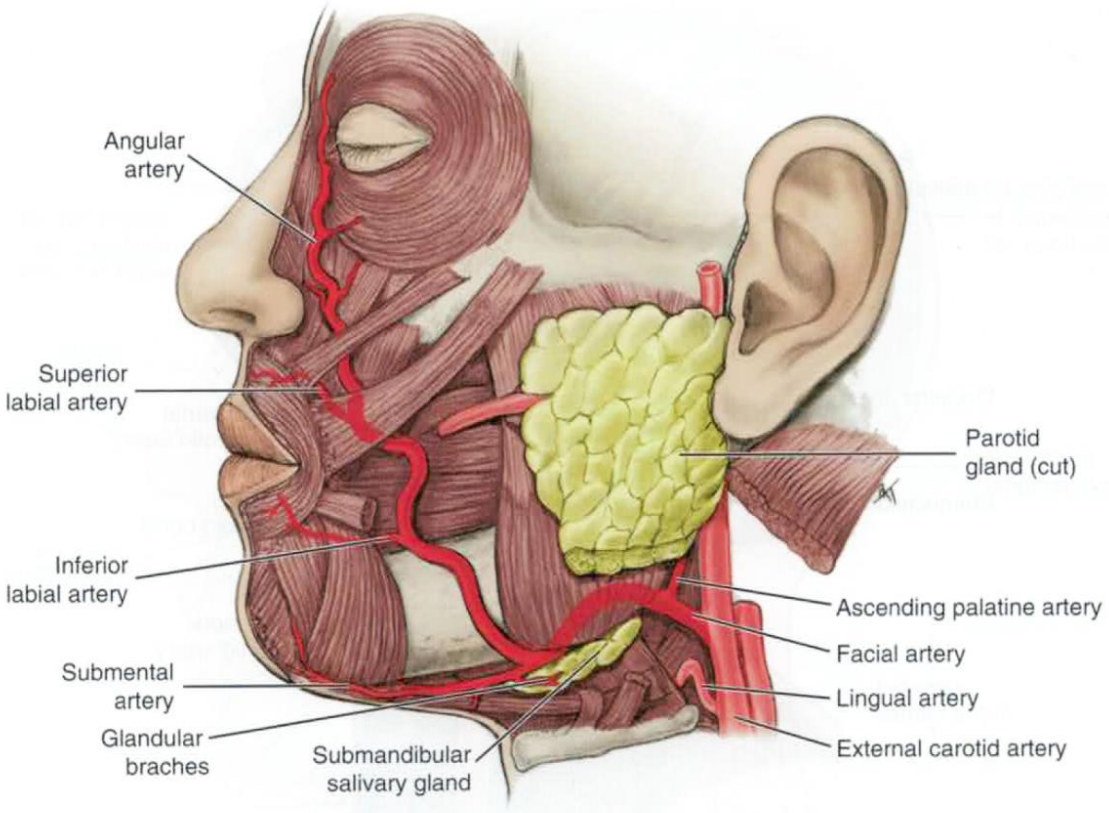


FIGURE 6-6 Pathway of the facial artery.

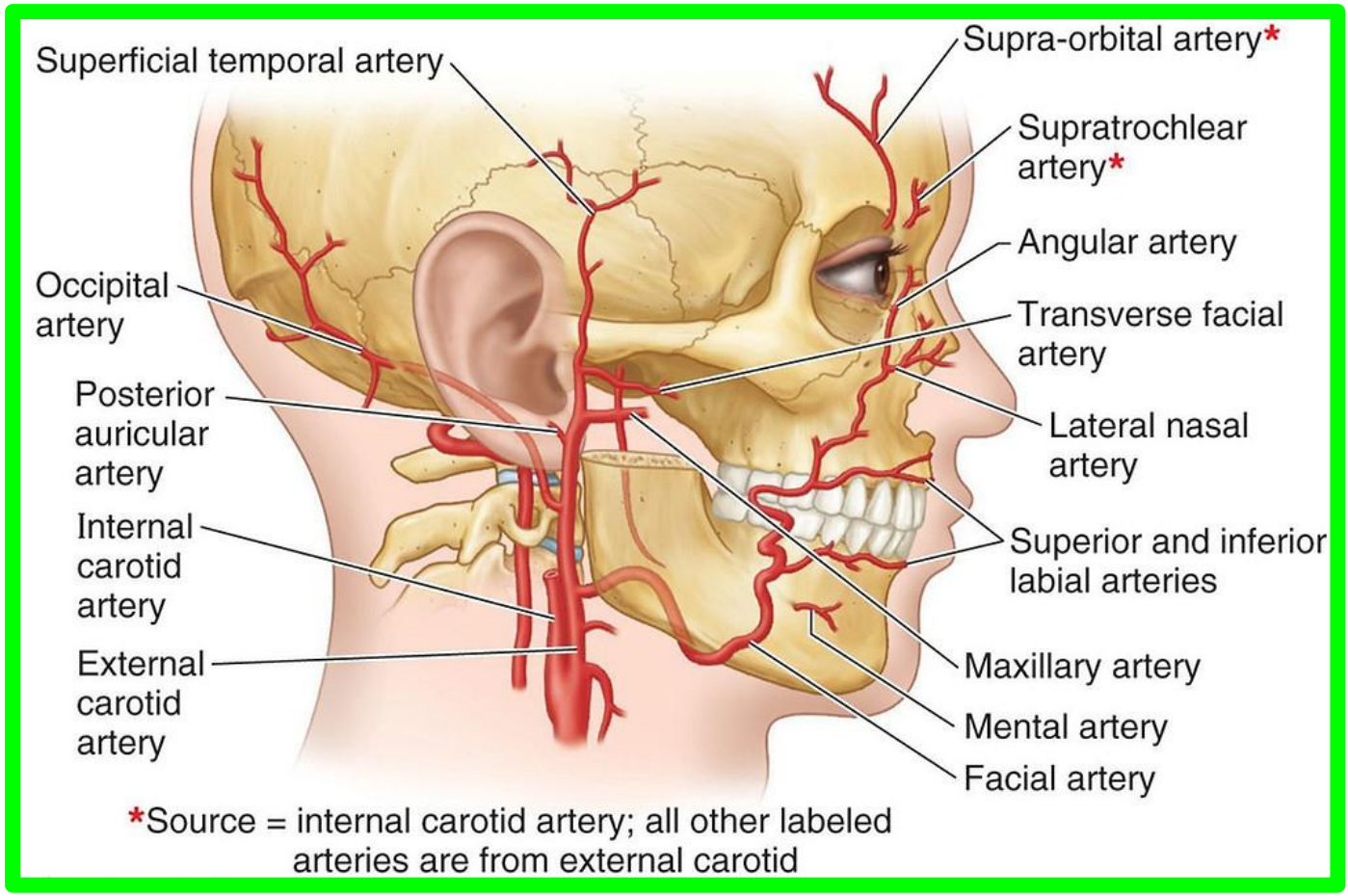
Arterial Supply of the Face

❖■The superficial temporal artery

The smaller terminal branch of the external carotid artery, commences in the parotid gland. It ascends in front of the auricle to supply the scalp)

❖■The transverse facial artery

A branch of the superficial temporal artery, arises within the parotid gland. It runs forward across the cheek just above the parotid duct



❖ ■ The supraorbital and supratrochlear arteries

branches of the ophthalmic artery, supply the skin of the forehead

The orbicularis oculi

- It is the sphincter of the eye.
- It is formed of 3 portions.

1- Orbital portion;

- It is a thin sheath surround the orbital cavity.

* **Origin;** from the **medial palpebral ligament** and adjacent bones.

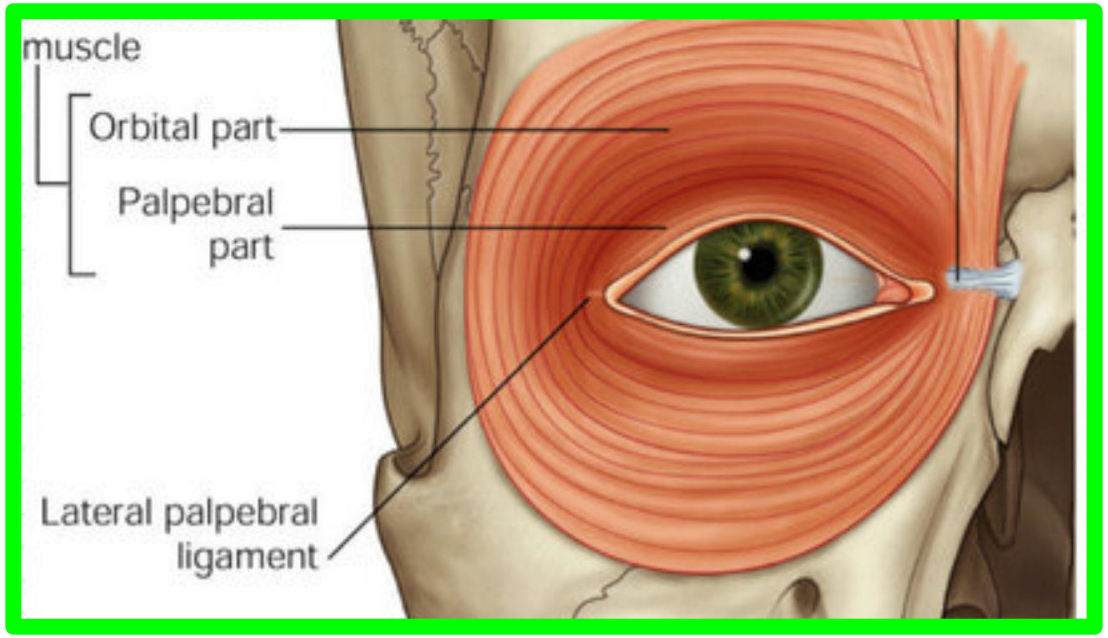
- Its fibers form complete circle around the orbit without bony attachment on the lateral side.

* **Insertion,** into the **lower border of the medial palpebral ligament.**

2- Palpebral part: a thin sheet related to the eye lids.

•**Origin** from the **medial palpebral ligament.**

* **Insertion** into the **lateral palpebral ligament.**



Trigeminal Nerve

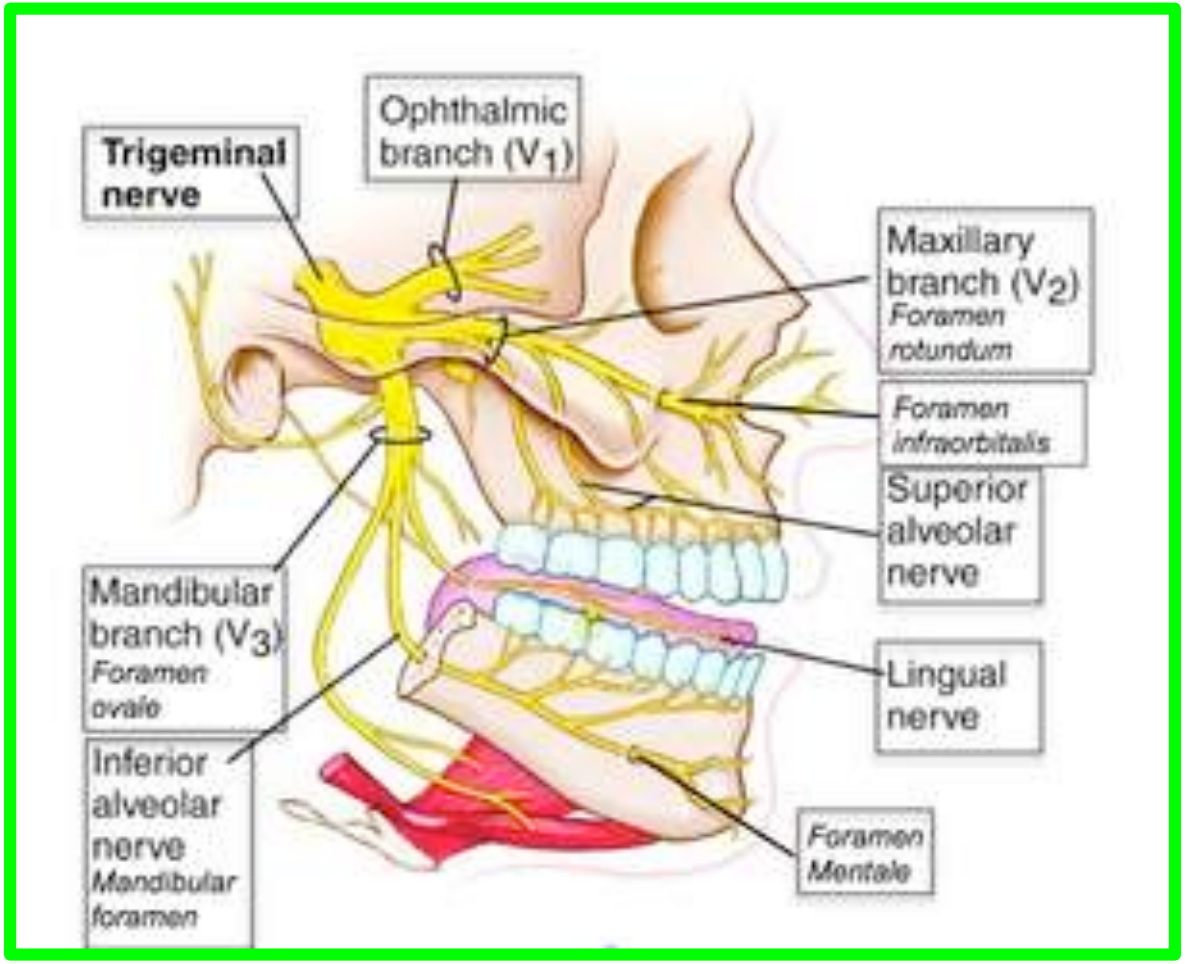
Ophthalmic Nerve (V1)

✓ *Is purely sensory.*

✓ *It runs forward in the lateral wall of the cavernous sinus in the middle cranial fossa and divides into three branches:*

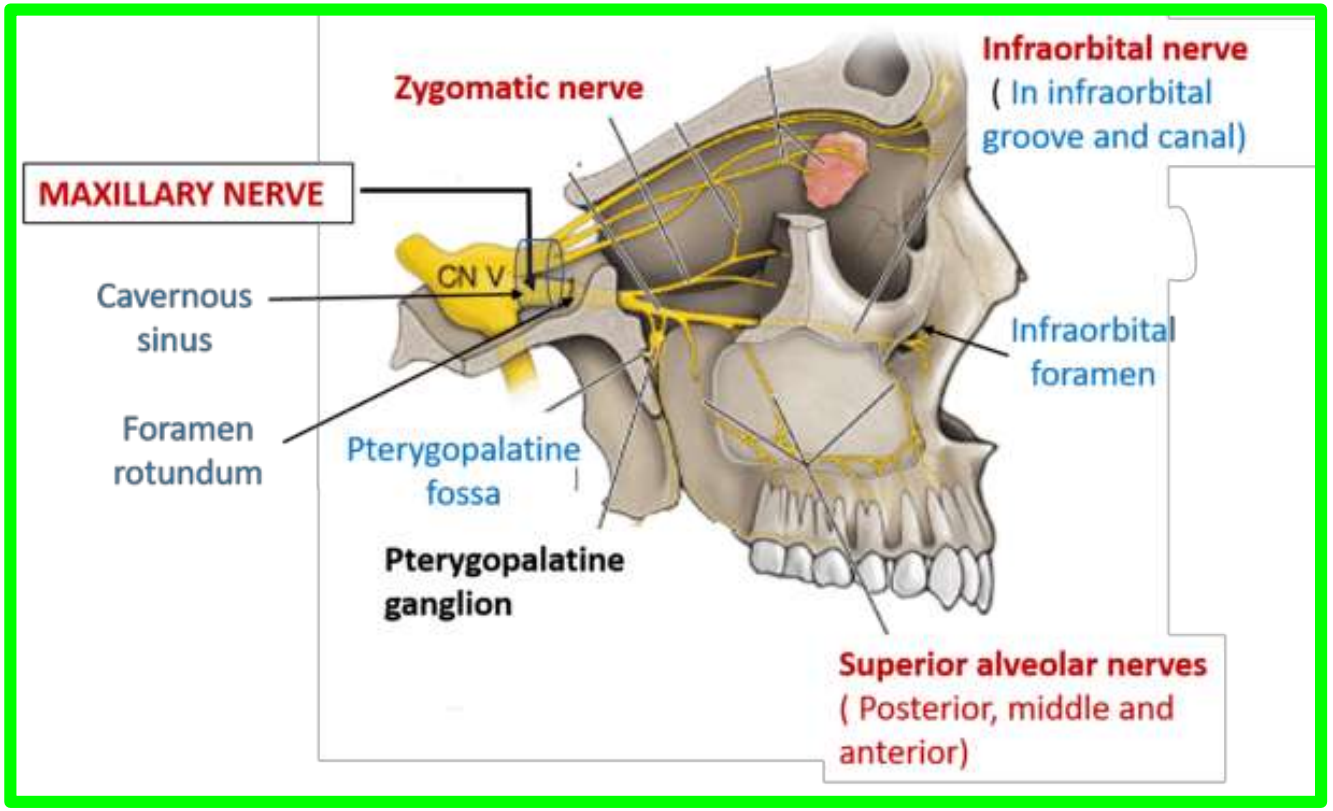
- ❖ *The Lacrimal,*
- ❖ *Frontal,*
- ❖ *Nasociliary nerves,*

which enter the orbital cavity through the superior orbital fissure



Maxillary Nerve (V2)

■■ ***Ganglionic branches***, *which are* ***two short nerves*** *that suspend* ***the pterygopalatine ganglion*** *in the* ***pterygopalatine fossa.***



They contain sensory fibers that have passed through the ganglion from the nose, the palate, and the pharynx. They also contain postganglionic parasympathetic fibers that are going to the lacrimal gland

Pterygopalatine Ganglion

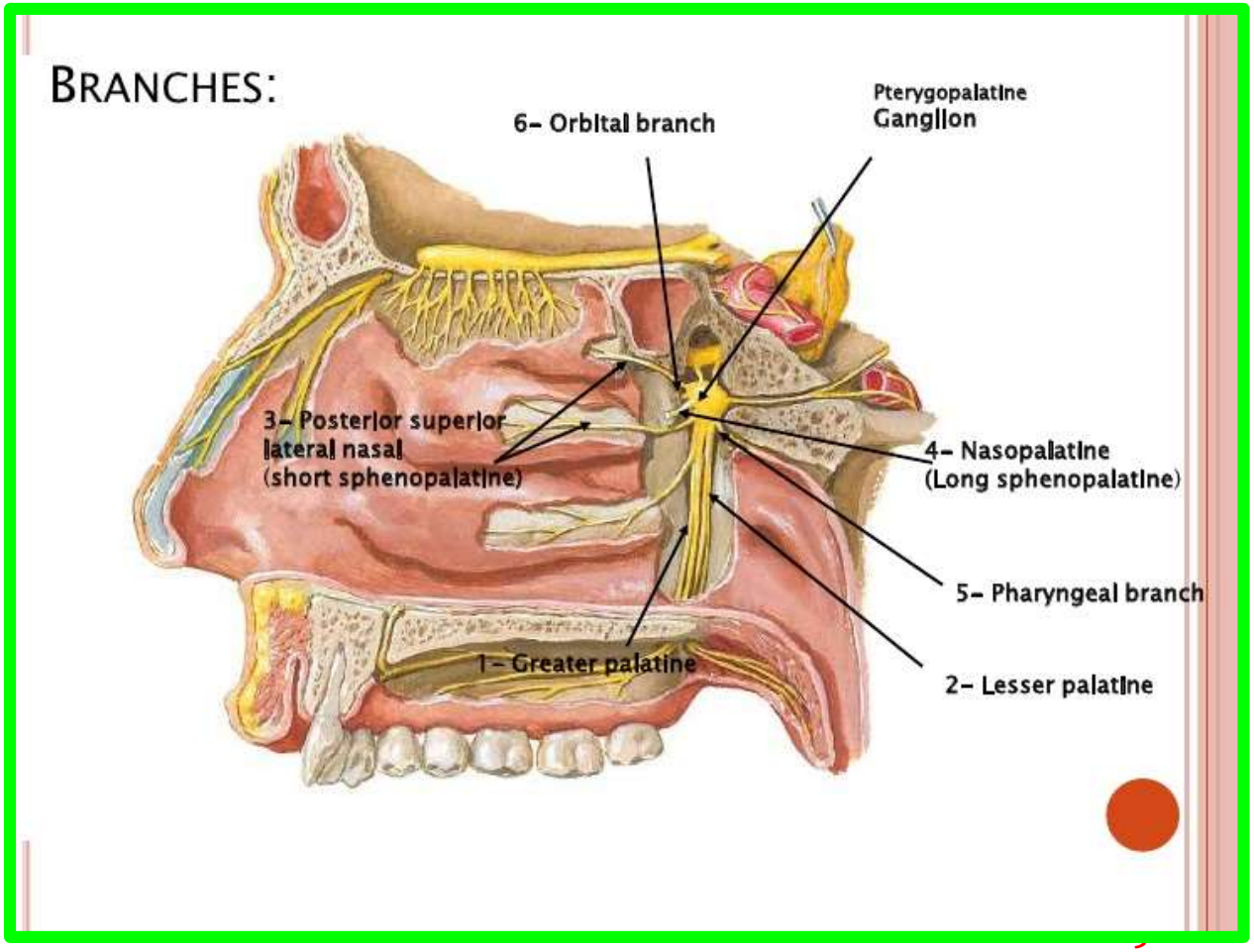
Dr. Aiman Qais Afar
Wednesday 2 March 2022

Branches

■■ Orbital branches, which enter the orbit through the inferior orbital fissure

■■ Greater and lesser palatine nerves which supply the palate, the tonsil, and the nasal cavity

■■ Pharyngeal branch, which supplies the roof of the nasopharynx

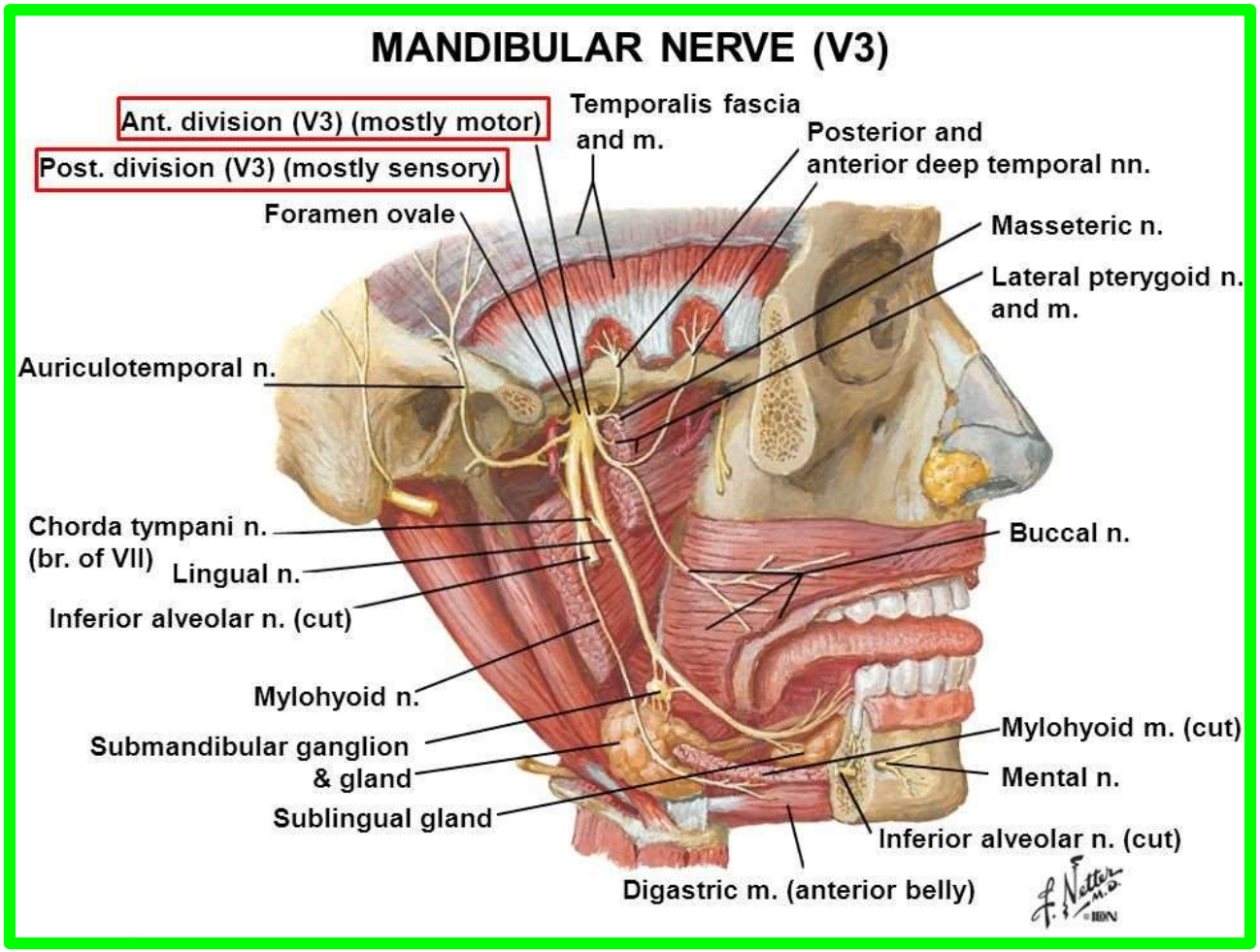


Mandibular Nerve (V3)

Dr. Aiman Qais Afar Wednesday 2 March 2022

✓ Is both motor and sensory

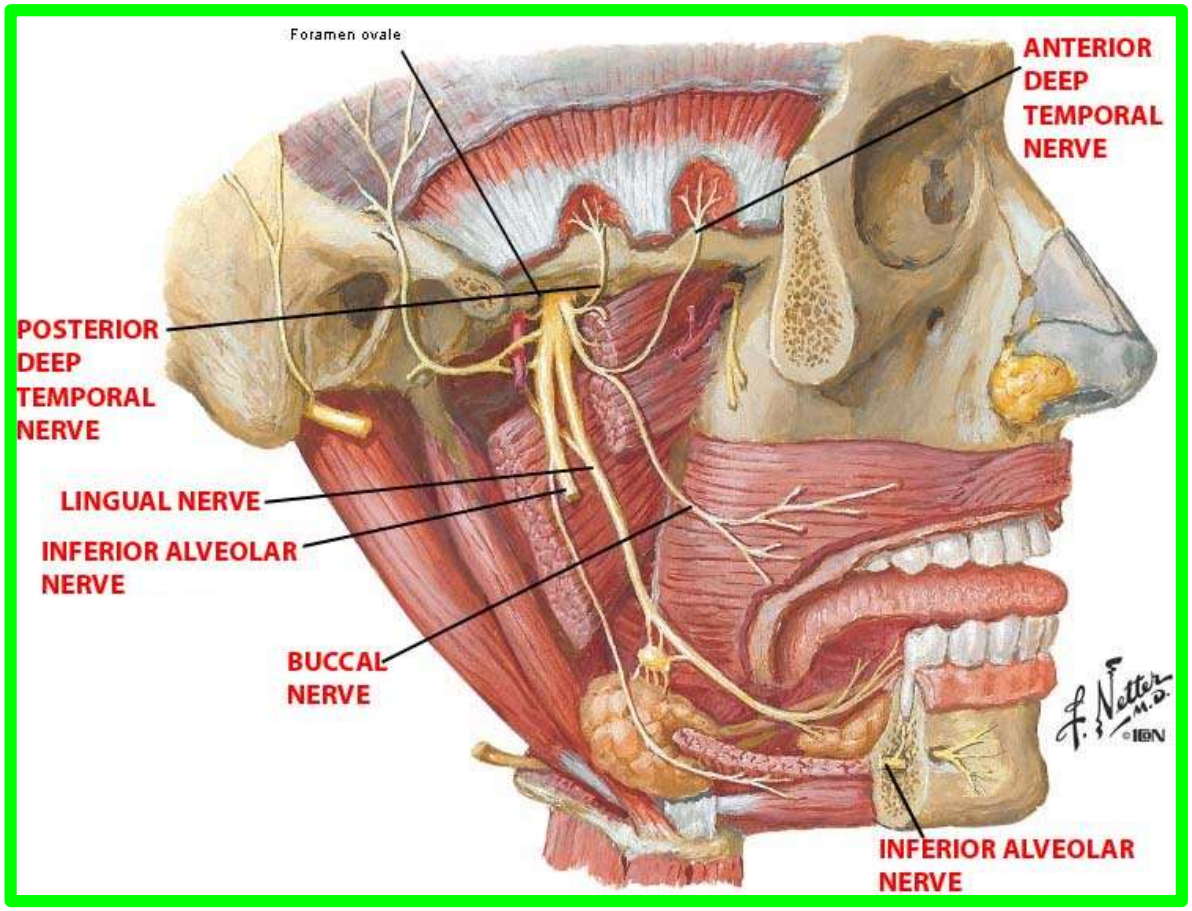
✓ The sensory root leaves the trigeminal ganglion and passes out of the skull through the foramen ovale to enter the infratemporal fossa.



✓ The motor root of the trigeminal nerve also leaves the skull through the foramen ovale and joins the sensory root to form the trunk of the mandibular nerve, and then divides into a small anterior and a large posterior division

Branches from the Posterior Division of the Mandibular Nerve

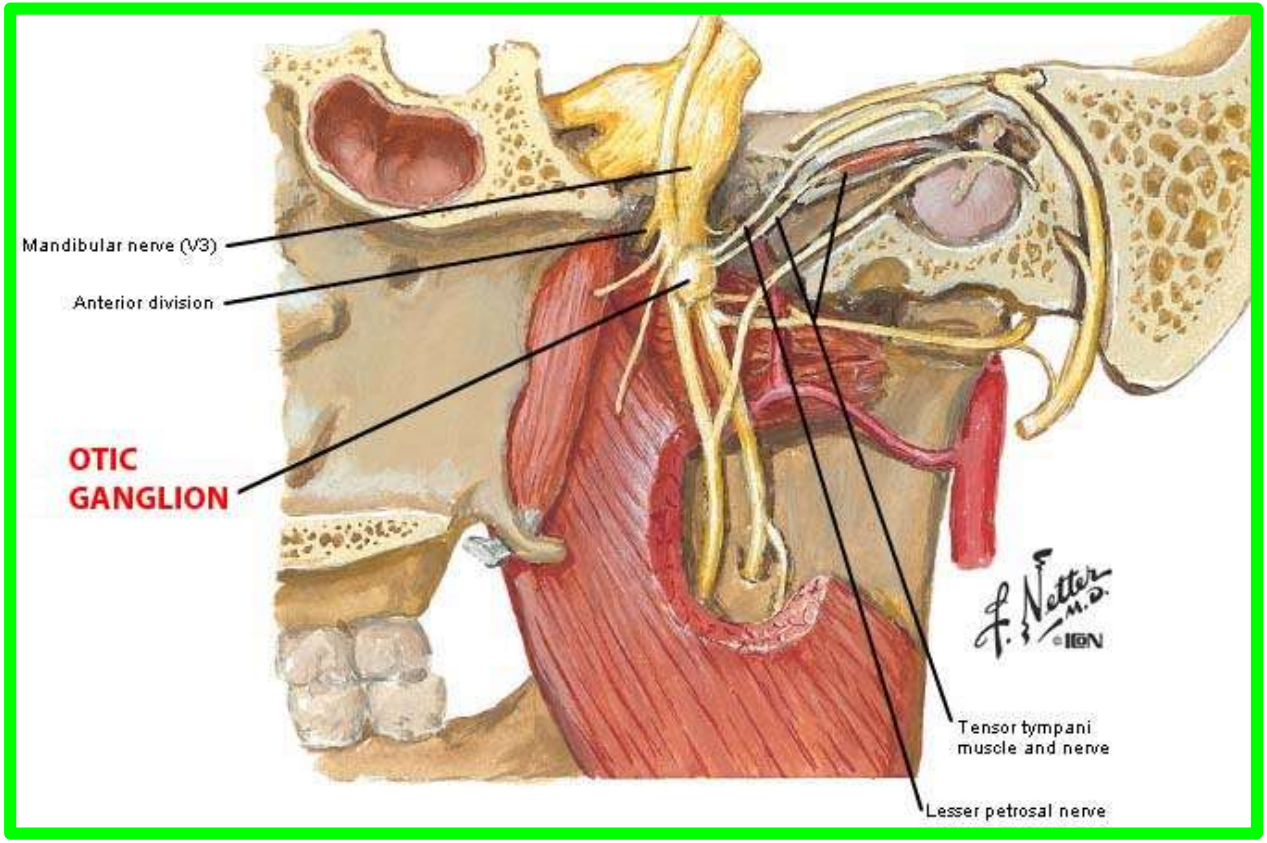
■■ *Lingual nerve*, *It runs forward* ***on the side of the tongue*** *and* ***crosses the submandibular duct.*** *In its course, it is joined by* ***the chorda tympani nerve***, *and it* ***supplies the mucous membrane of the anterior two thirds of the tongue*** *and* ***the floor of the mouth***.



It also gives off preganglionic parasympathetic secretomotor fibers to the submandibular ganglion.

The otic ganglion

is a parasympathetic ganglion that is located medial to the **mandibular nerve** *just below the skull, and it is adherent to the nerve to the medial pterygoid muscle.*



✓*The preganglionic fibers* originate in the glossopharyngeal nerve, and they reach the ganglion via *the lesser petrosal nerve*

✓*The postganglionic secretomotor* fibers reach the parotid salivary gland via *the auriculotemporal nerve.*

Course and relations;

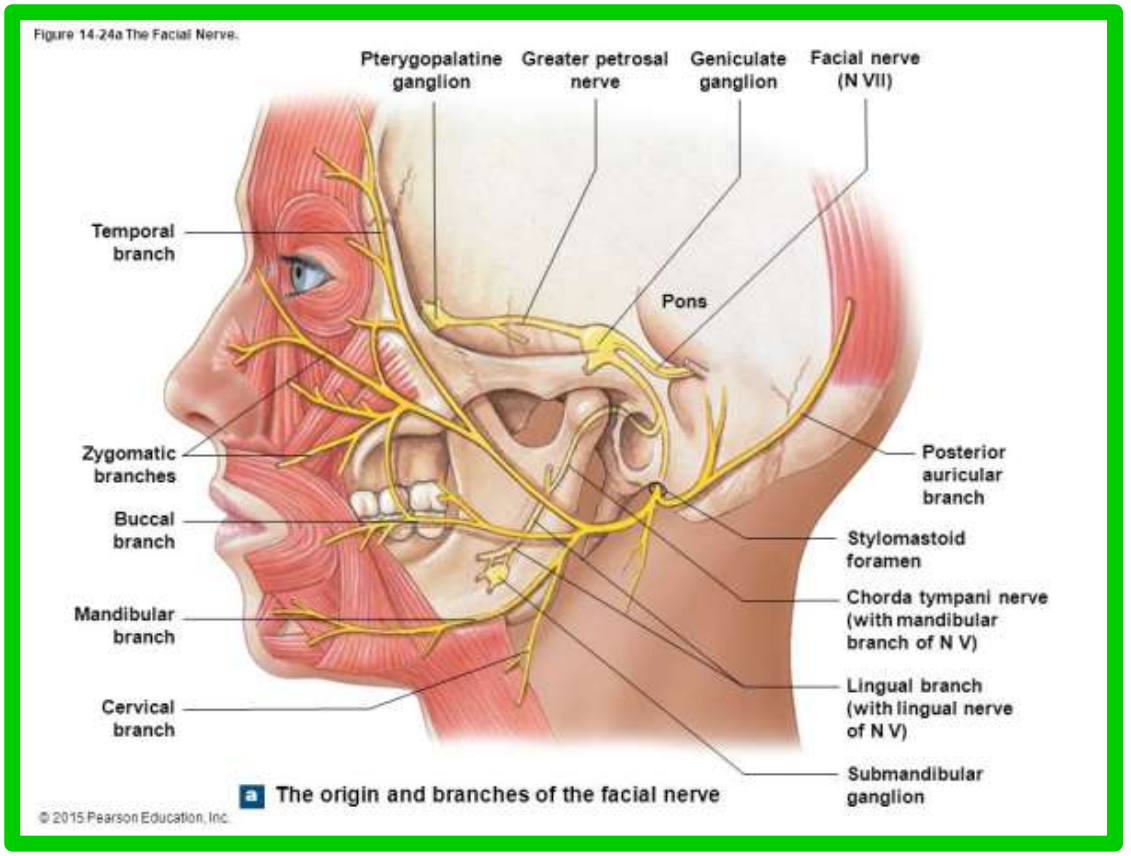
B – Extracranial course of facial nerve:

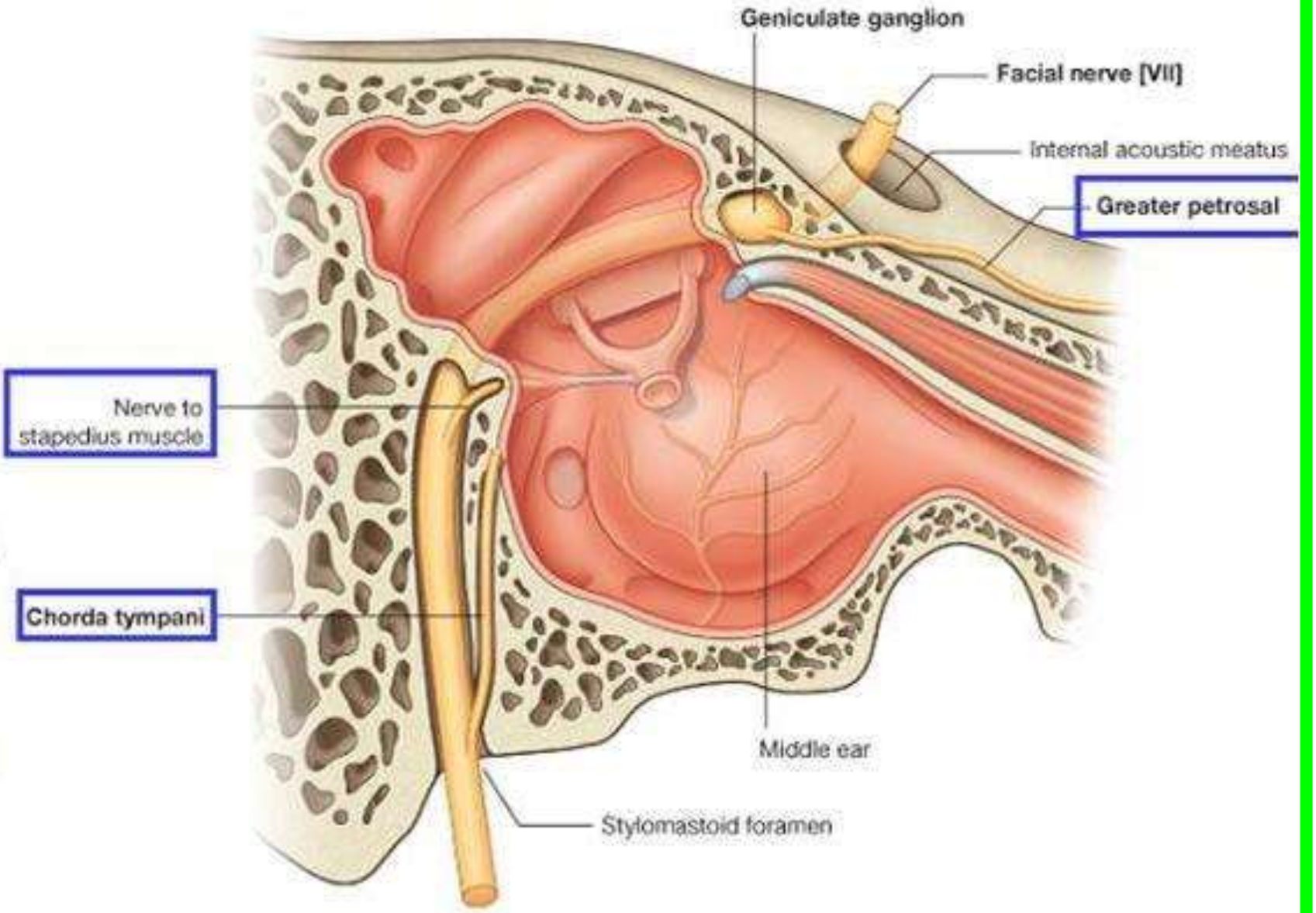
(1) It leaves the facial canal through the stylomastoid foramen.

(2) It turns forwards making a curve around the lateral side of the styloid process.

(3)It enters the posteromedial surface of parotid gland (lying superficial to external carotid artery and retromandibular vein)VAN

(4) It ends inside the substance of the gland by dividing into 5 terminal branches

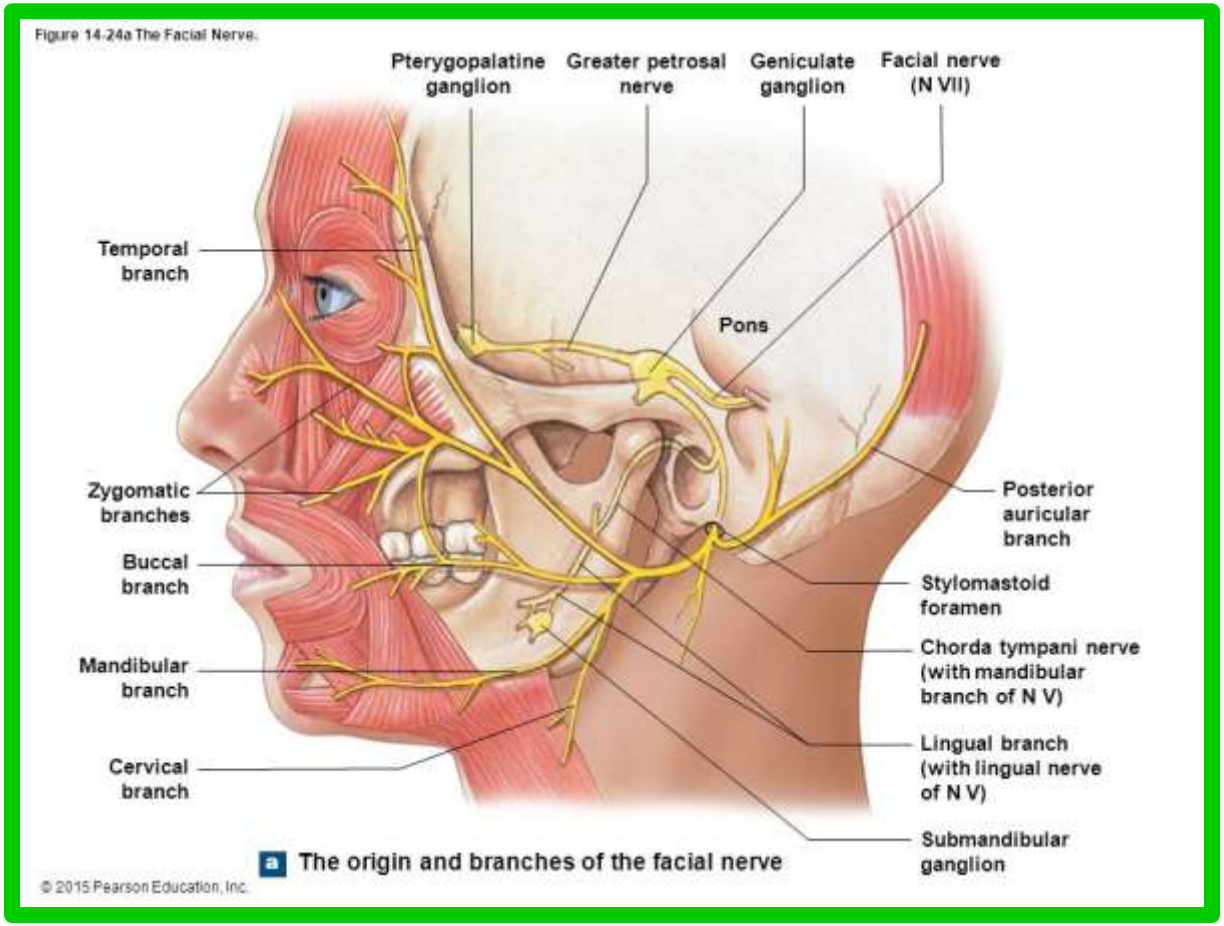



Geniculate ganglion
Facial nerve [VII]
Internal acoustic meatus
Greater petrosal
Nerve to stapedius muscle
Chorda tympani
Middle ear
Stylomastoid foramen

FACIAL NERVE (CN VII)

❑Somatic Motor

The facial nerve supplies the muscles of facial expression and auricular muscles. It also supplies the posterior bellies of the digastric, stylohyoid, and stapedius muscles.



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FACIAL NERVE (CN VII)

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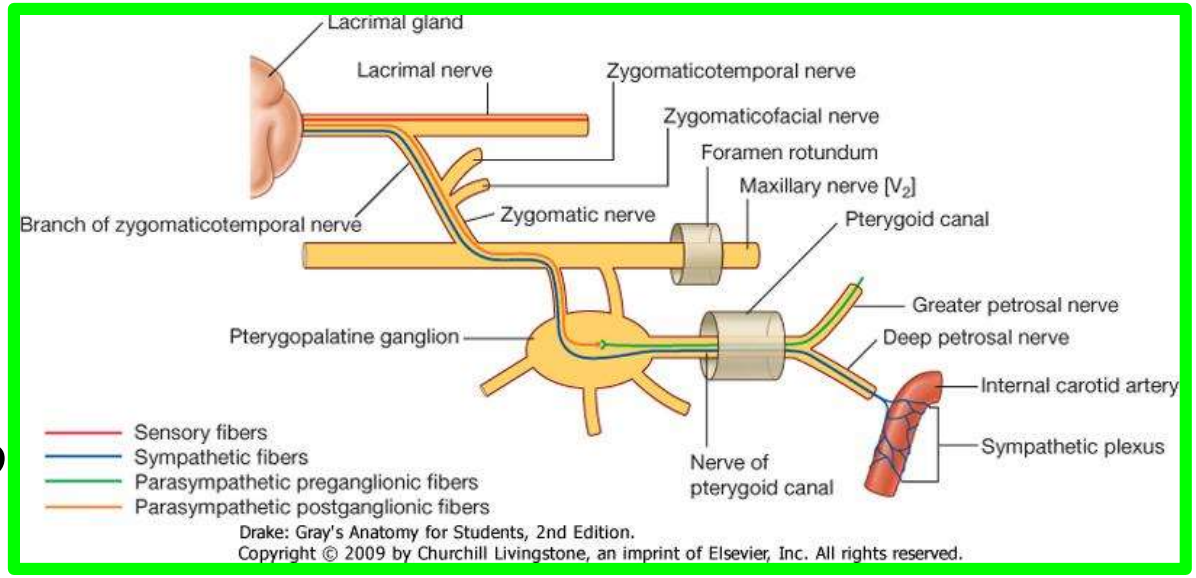
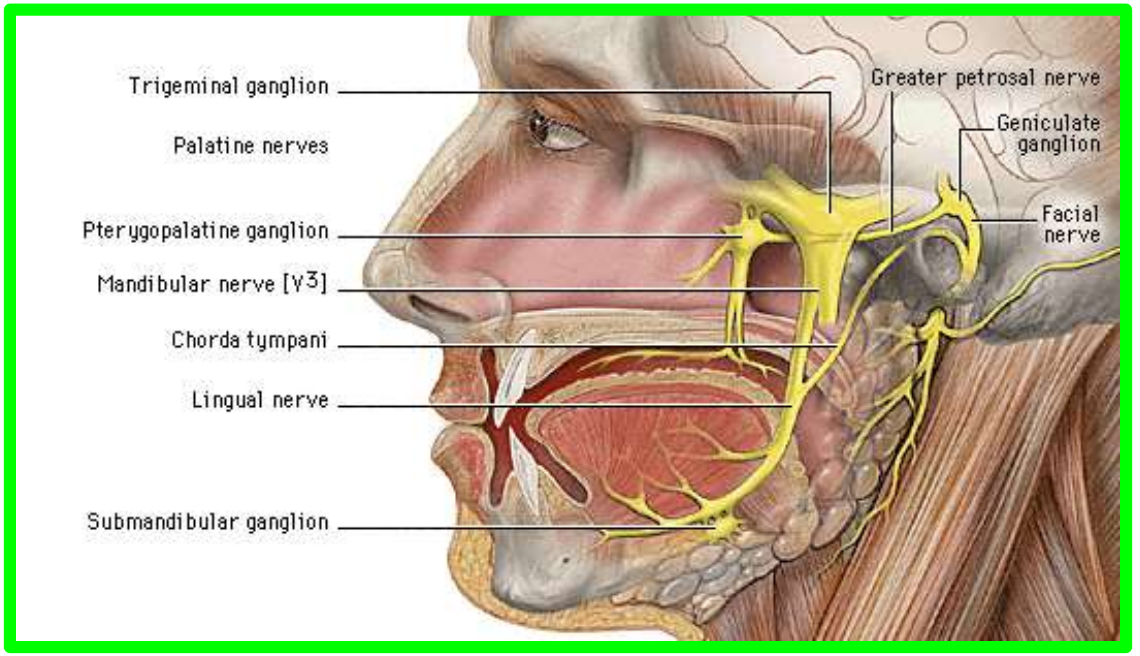
❑Visceral (Parasympathetic) Motor

CN VII provides presynaptic parasympathetic fibers to the **pterygopalatine ganglion** for innervation of **the lacrimal glands** and to **the submandibular ganglion** for innervation of **the sublingual and submandibular salivary glands.**



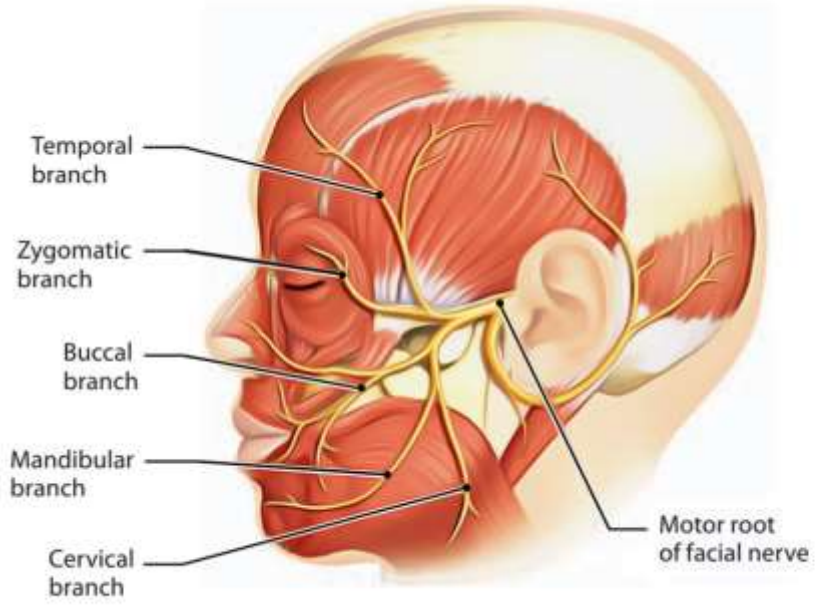


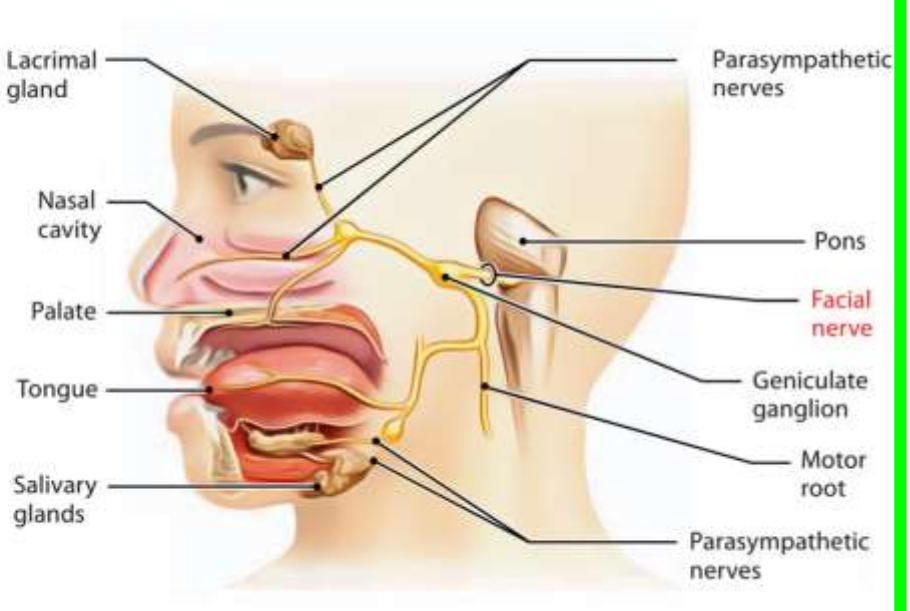
FACIAL NERVE (CN VII)

Dr. Aiman Qais Afar

Sunday 6 March 2022

- *The pterygopalatine ganglion is associated with the maxillary nerve (CN V_2), which distributes its postsynaptic fibers, whereas the submandibular ganglion is associated with the mandibular nerve (CN V_3).*
- *Parasympathetic fibers synapse in these ganglia, whereas sympathetic and other fibers pass through them.*





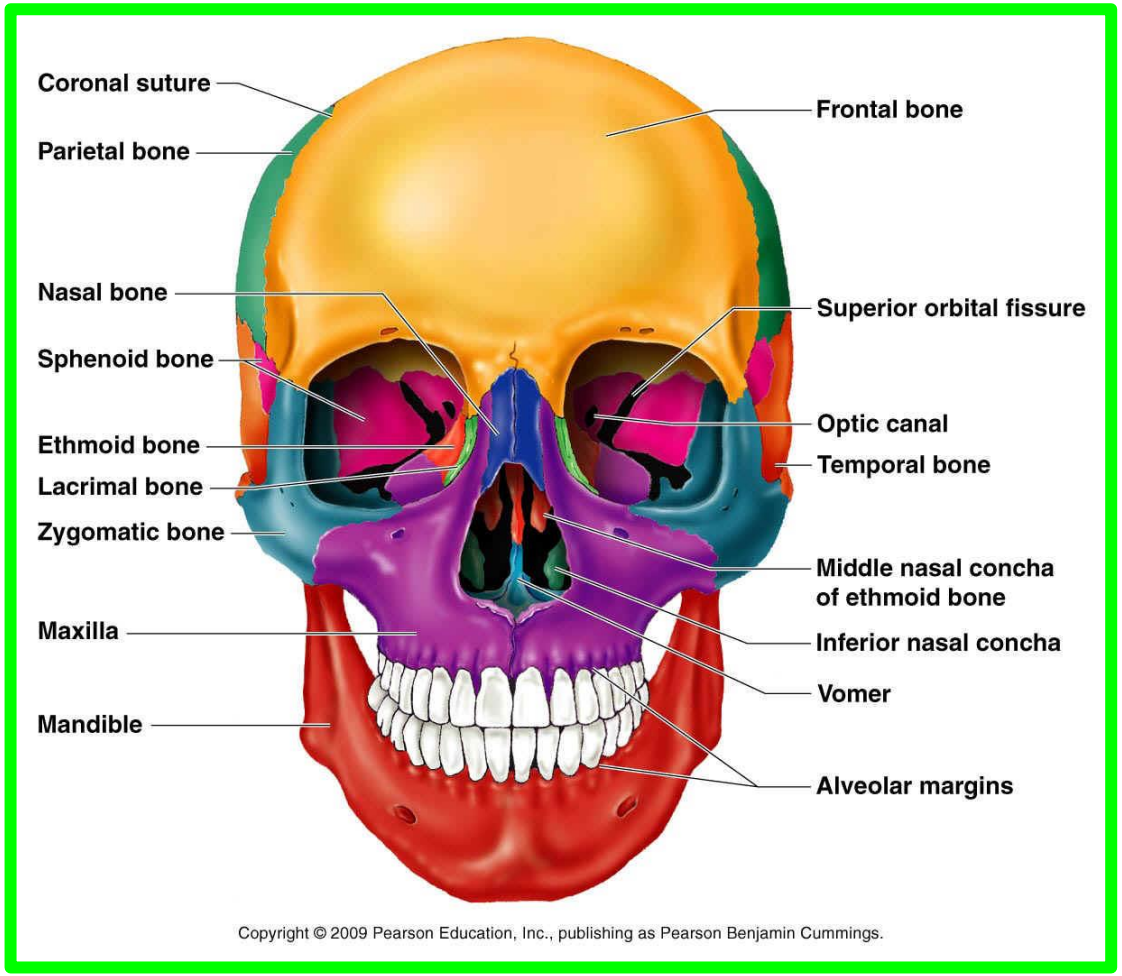
Orbits

The quadrangular pyramidal orbit has a base, four walls, and an apex

❖The base

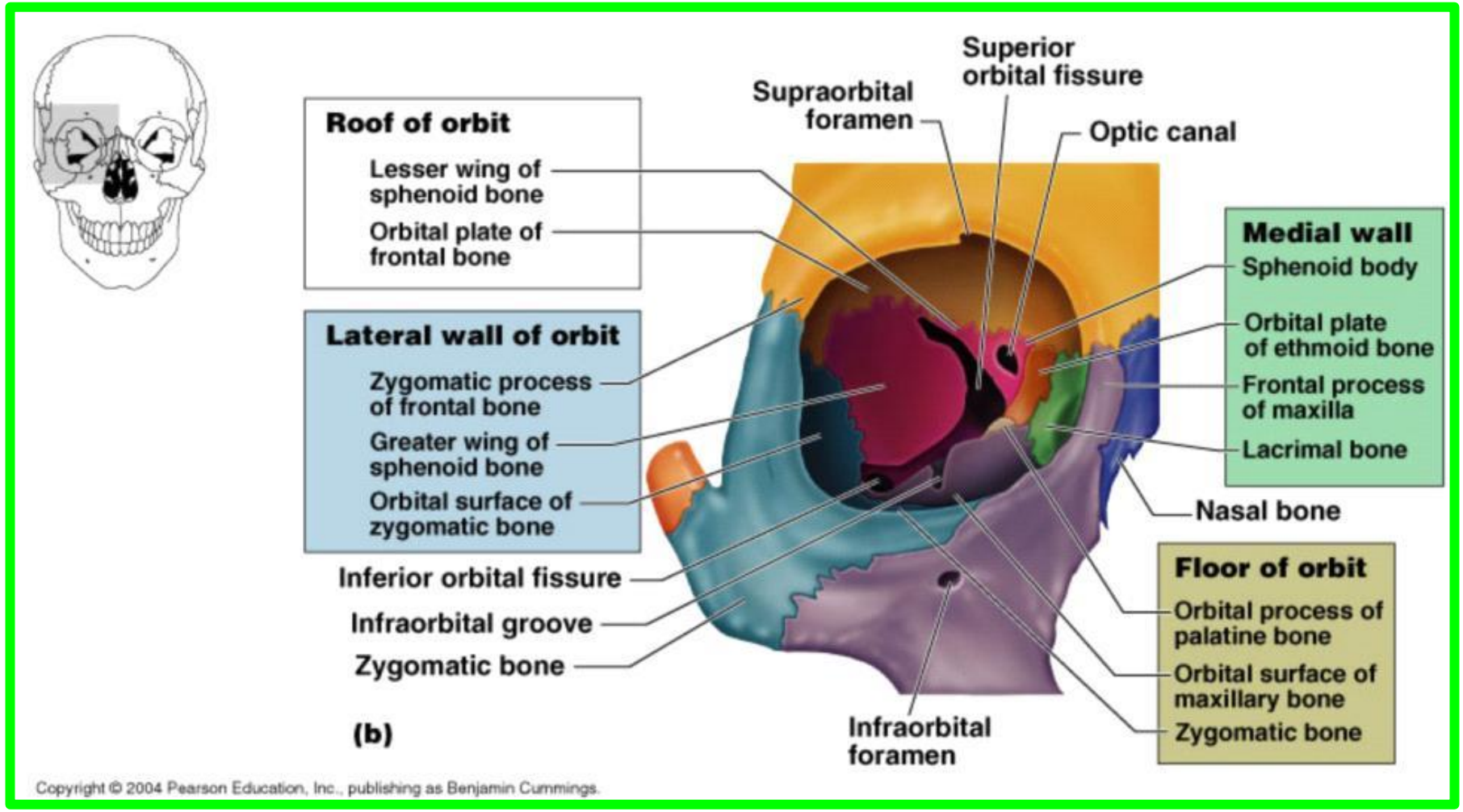
above by the frontal bone, the lateral margin the processes of the frontal and zygomatic bones, the inferior margin is the zygomatic bone and the maxilla, the medial margin the processes of the maxilla and the frontal bone.

❖The apex is at the optic canal in the lesser wing of the sphenoid just medial to the superior orbital fissure.



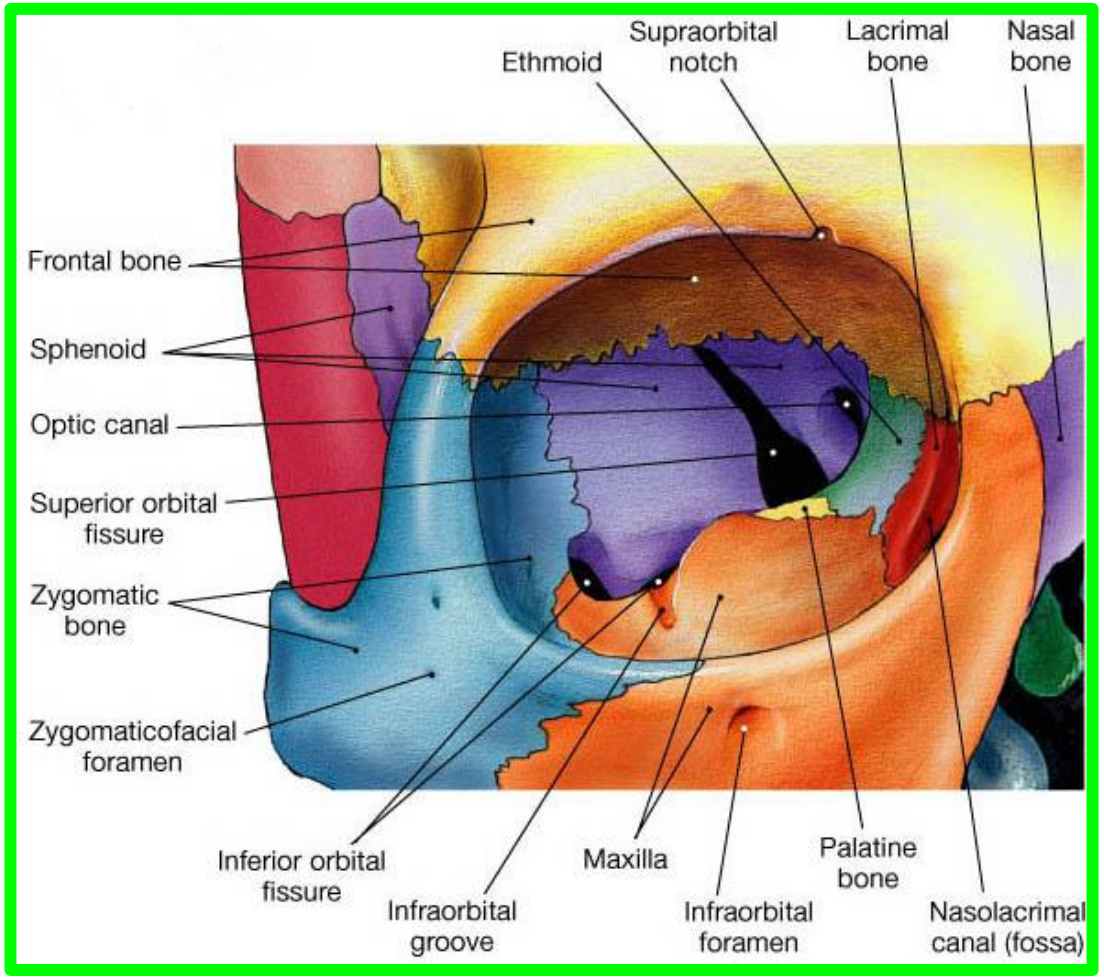
Orbits

- ❖The superior wall (roof)
- ❖The medial walls
- ❖The inferior wall (orbital floor)
- ❖The lateral wall



Openings into the Orbital Cavity

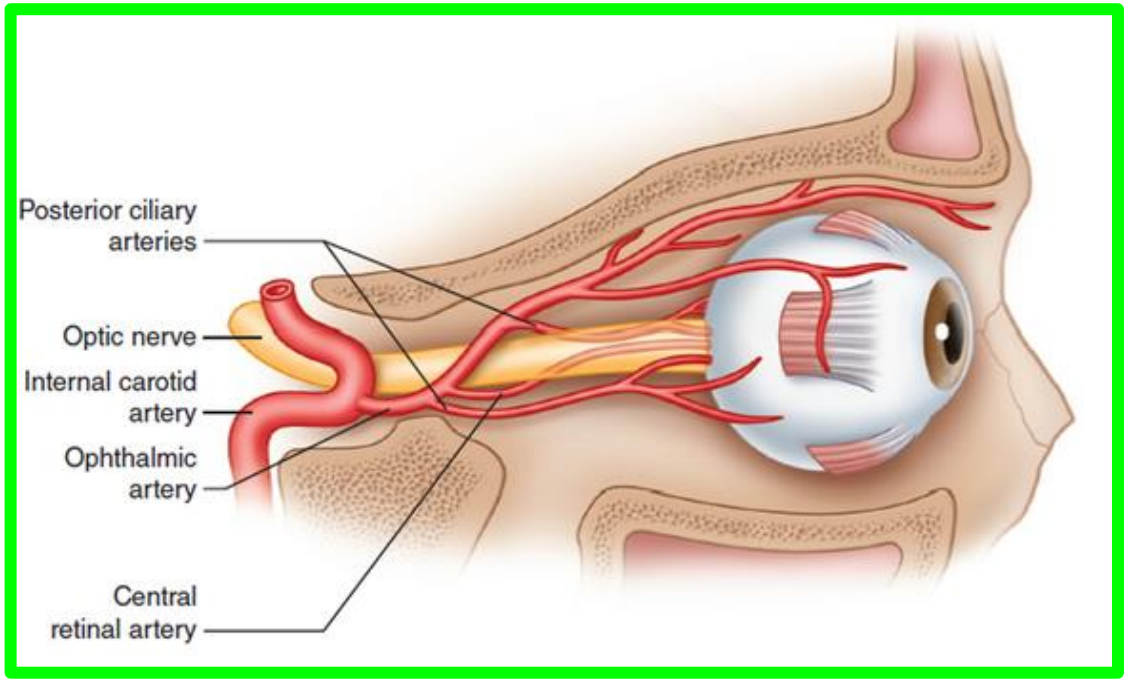
- **Orbital opening:** About one sixth of the eye is exposed; the remainder is protected by the walls of the orbit.
- **Supraorbital notch (Foramen):** It transmits the supraorbital nerve and blood vessels
- **Infraorbital groove and canal:** in the orbital plate of the maxilla, they transmit the infraorbital nerve and blood vessels.
- **Nasolacrimal canal:** Located anteriorly on the medial wall; it communicates with the inferior meatus of the nose It transmits the nasolacrimal duct.



Blood Vessels of the Orbit

Ophthalmic Artery

- *is a branch of the internal carotid artery after that vessel emerges from the cavernous sinus.*
- *It enters the orbit through the optic canal with the optic nerve.*

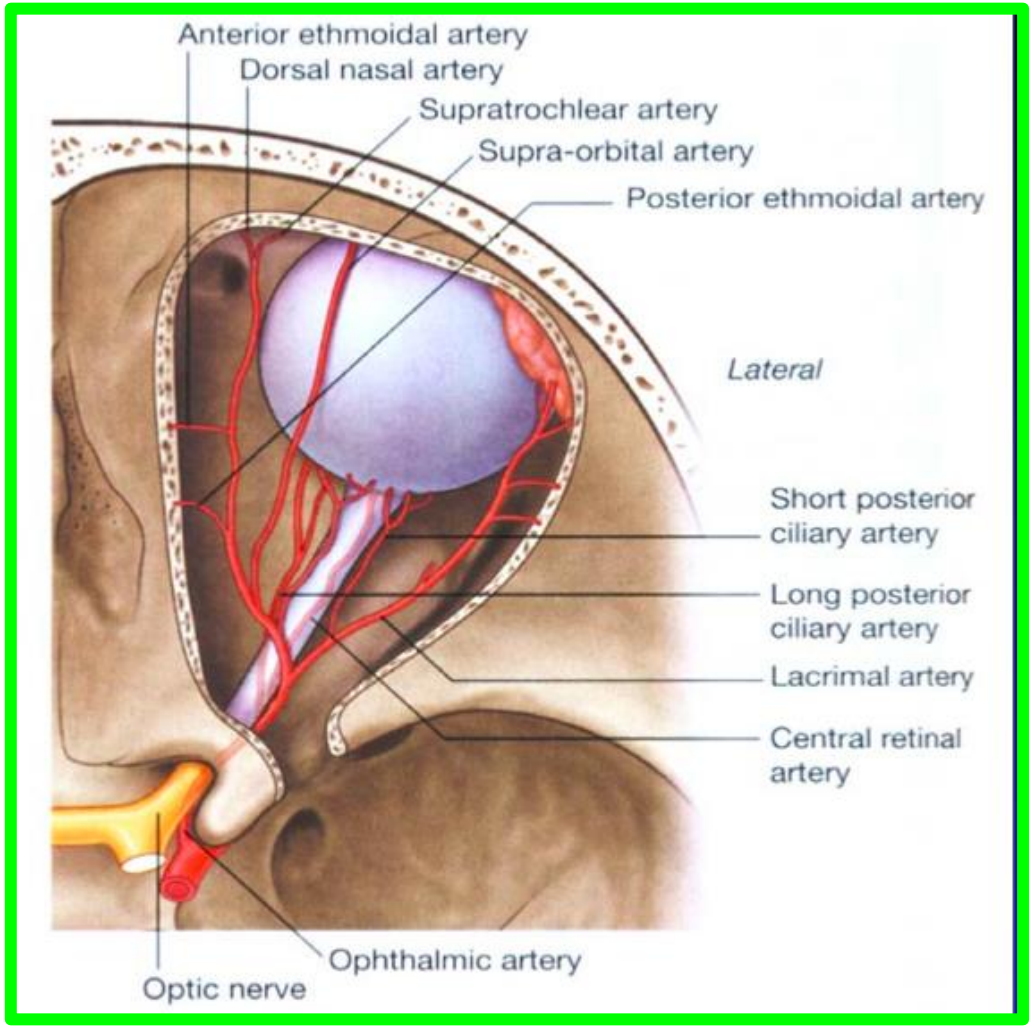


- *It runs forward and crosses the optic nerve to reach the medial wall of the orbit.*
- *It gives off numerous branches, which accompany the nerves in the orbital cavity.*

Branches of the Ophthalmic Artery

- **The central artery of the retina** is a small branch that pierces the meningeal sheaths of the optic nerve to gain entrance to the nerve and enters the eyeball at the center of the optic disc.

- **The muscular branches**
- **The ciliary arteries** can be divided into **anterior** and **posterior groups**. The former group enters the eyeball near the corneoscleral junction; the latter group enters near the optic nerve.
- **The lacrimal artery** to the **lacrimal gland**
- **The supratrochlear and supraorbital arteries** are distributed to the skin of the forehead



Eyelids

✓The superficial surface of the eyelids is covered by skin, and the deep surface is covered by a mucous membrane called the conjunctiva.

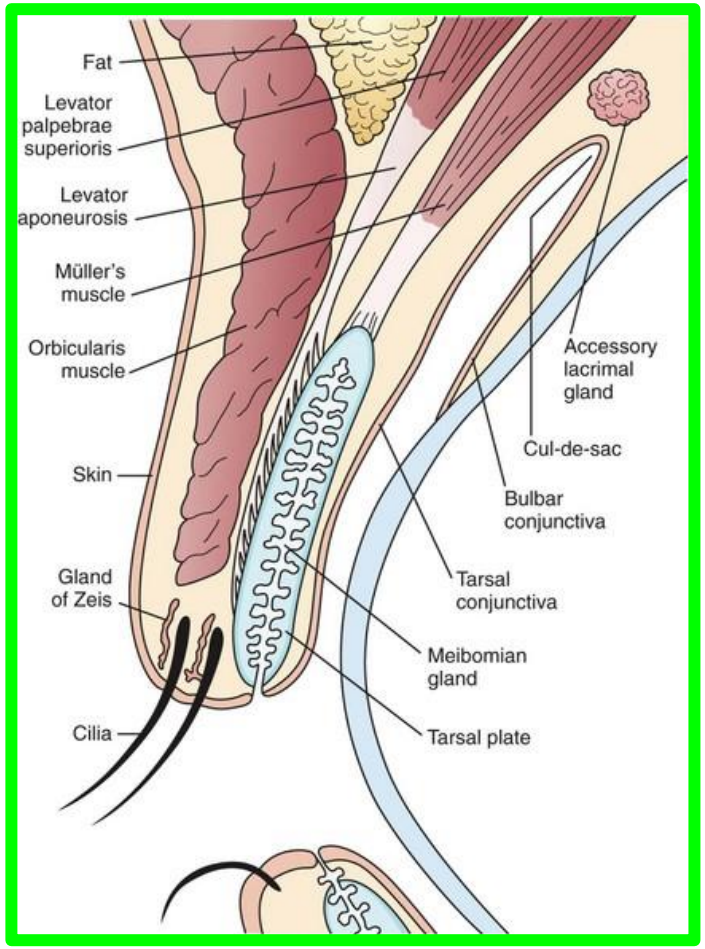
✓The eyelashes are short, curved hairs on the free edges of the eyelids

✓They are arranged in double or triple rows at the mucocutaneous junction.

✓The sebaceous glands (glands of Zeis) open directly into the eyelash follicles.

✓The ciliary glands (glands of Moll) are modified sweat glands that open separately between adjacent lashes

✓The tarsal glands are long, modified sebaceous glands that pour their oily secretion onto the margin of the lid; their openings lie behind the eyelashes

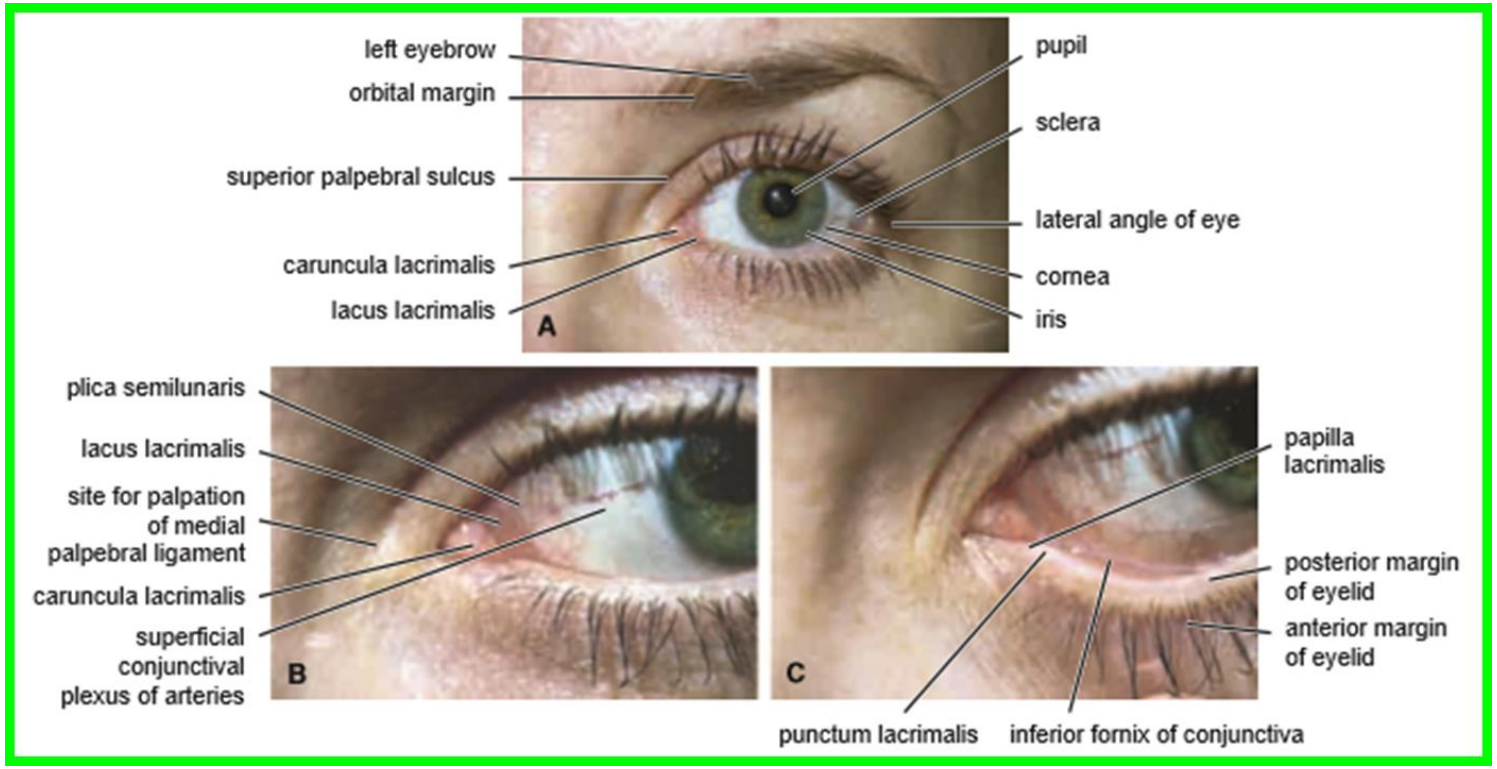


Eyelids

✓Near the medial angle of the eye a small elevation, the papilla lacrimalis, is present.

✓On the summit of the papilla is a small hole, the punctum lacrimale, which leads into the canaliculus lacrimalis

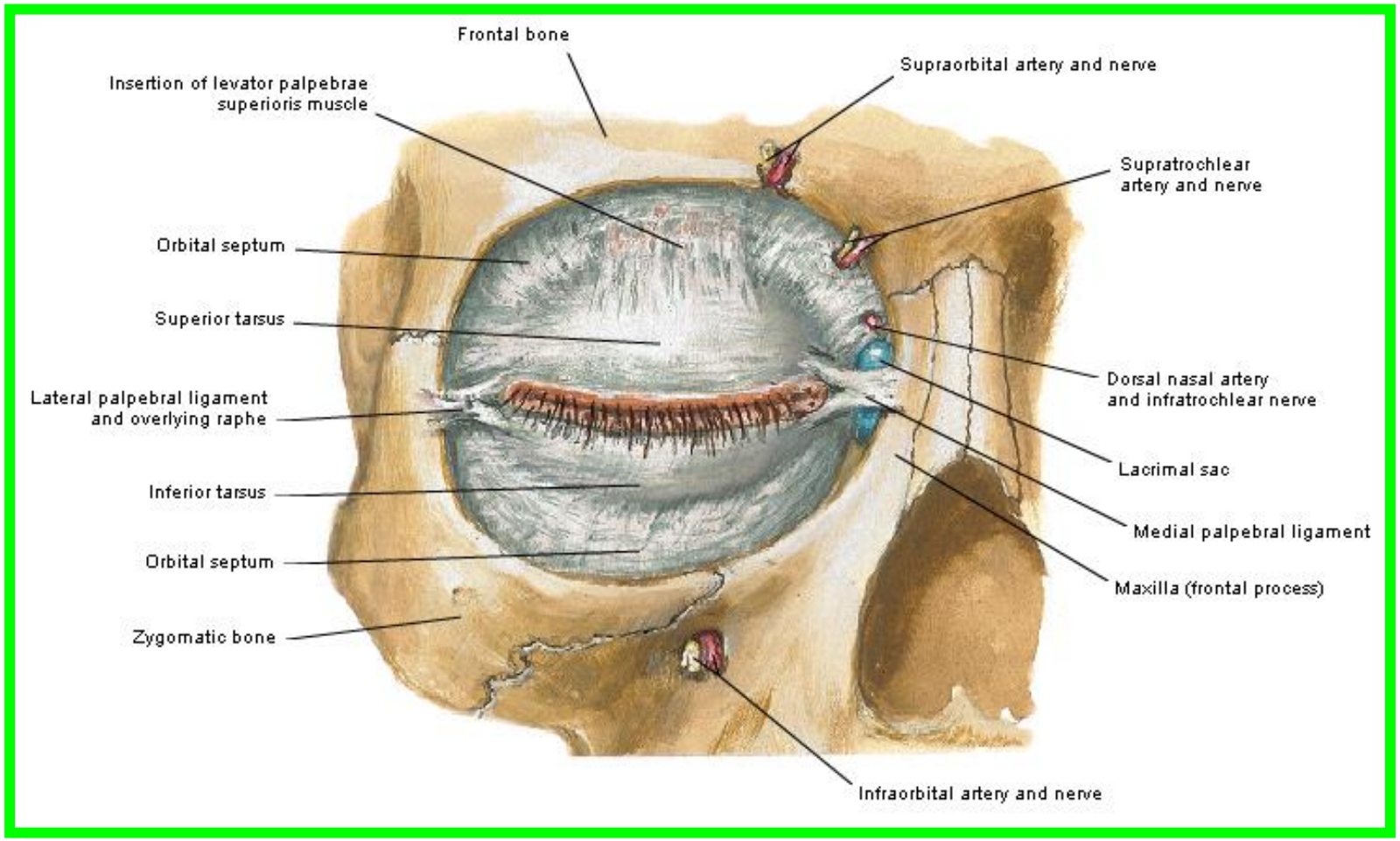
✓The papilla lacrimalis projects into the lacus, and the punctum and canaliculus carry tears down into the nose



Eyelids

- ✓The framework of the eyelids is formed by a fibrous sheet, the orbital septum
- ✓This is attached to the periosteum at the orbital margins.
- ✓The orbital septum is thickened at the margins of the lids to form the superior and inferior tarsal plates.

- ✓The tarsal glands are embedded in the posterior surface of the tarsal plates.



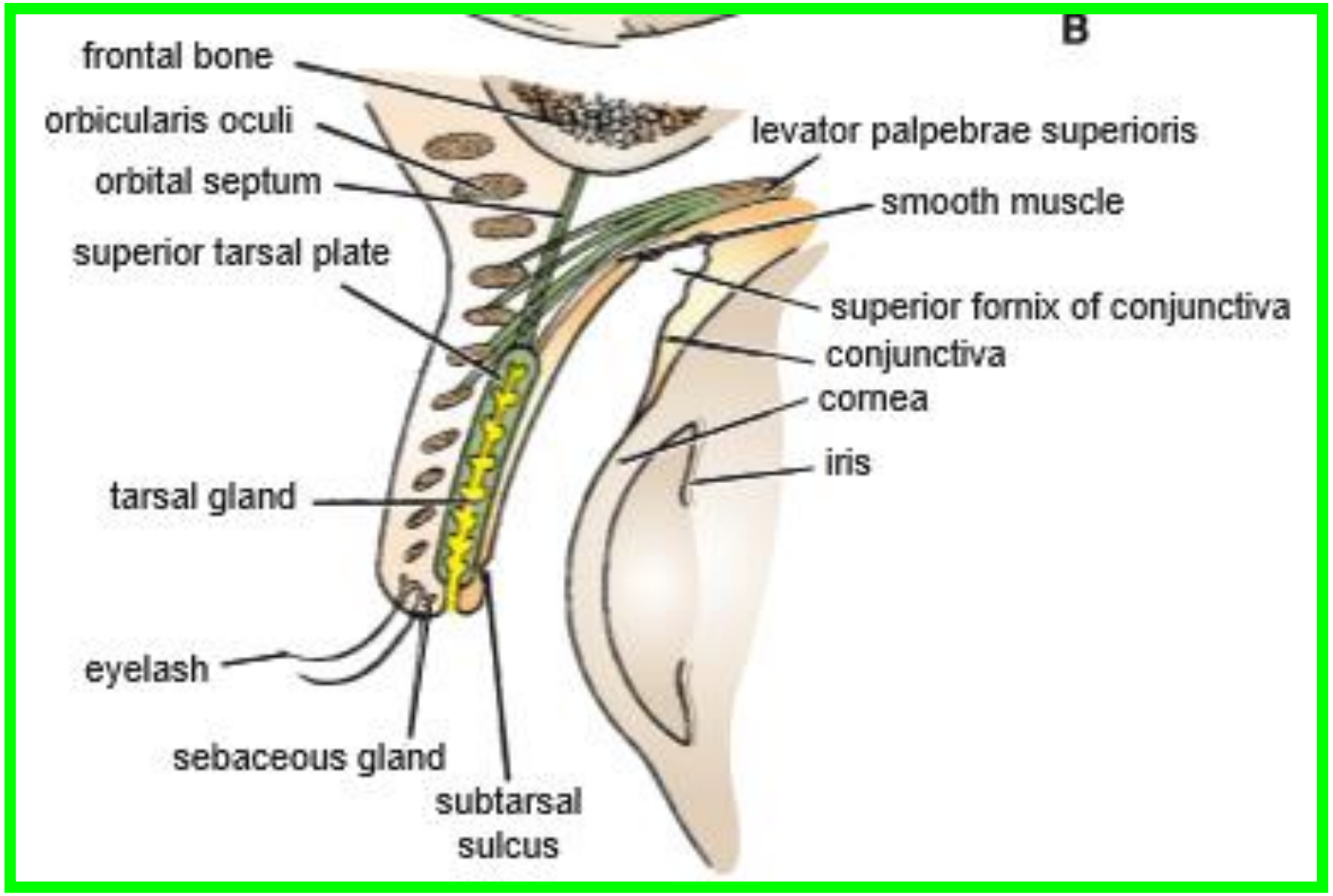
Eyelids

✓Beneath the eyelid is a groove, the subtarsal sulcus, which runs close to and parallel with the margin of the lid.

✓The sulcus tends to trap small foreign particles introduced into the conjunctival sac and is thus clinically important.

✓The superficial surface of the tarsal plates and the orbital septum are covered by the palpebral fibers of the orbicularis oculi muscle

✓ The aponeurosis of insertion of the levator palpebrae superioris muscle pierces the orbital septum to reach the anterior surface of the superior tarsal plate and the skin



Lacrimal Apparatus

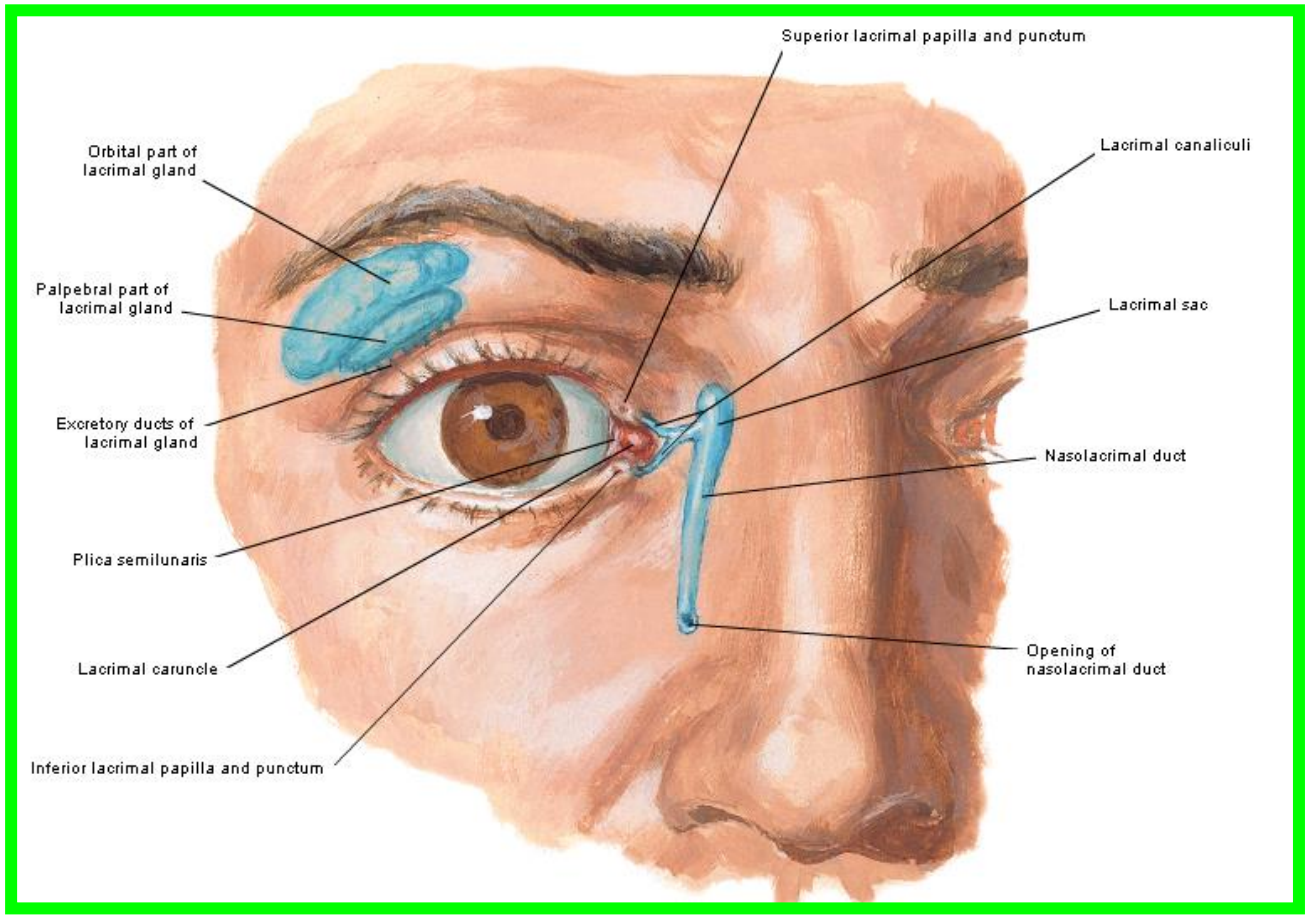
Lacrimal Gland

The gland is consist of

- Large orbital part
- Small palpebral part

✓It is situated above the eyeball in the anterior and upper part of the orbit posterior to the orbital septum

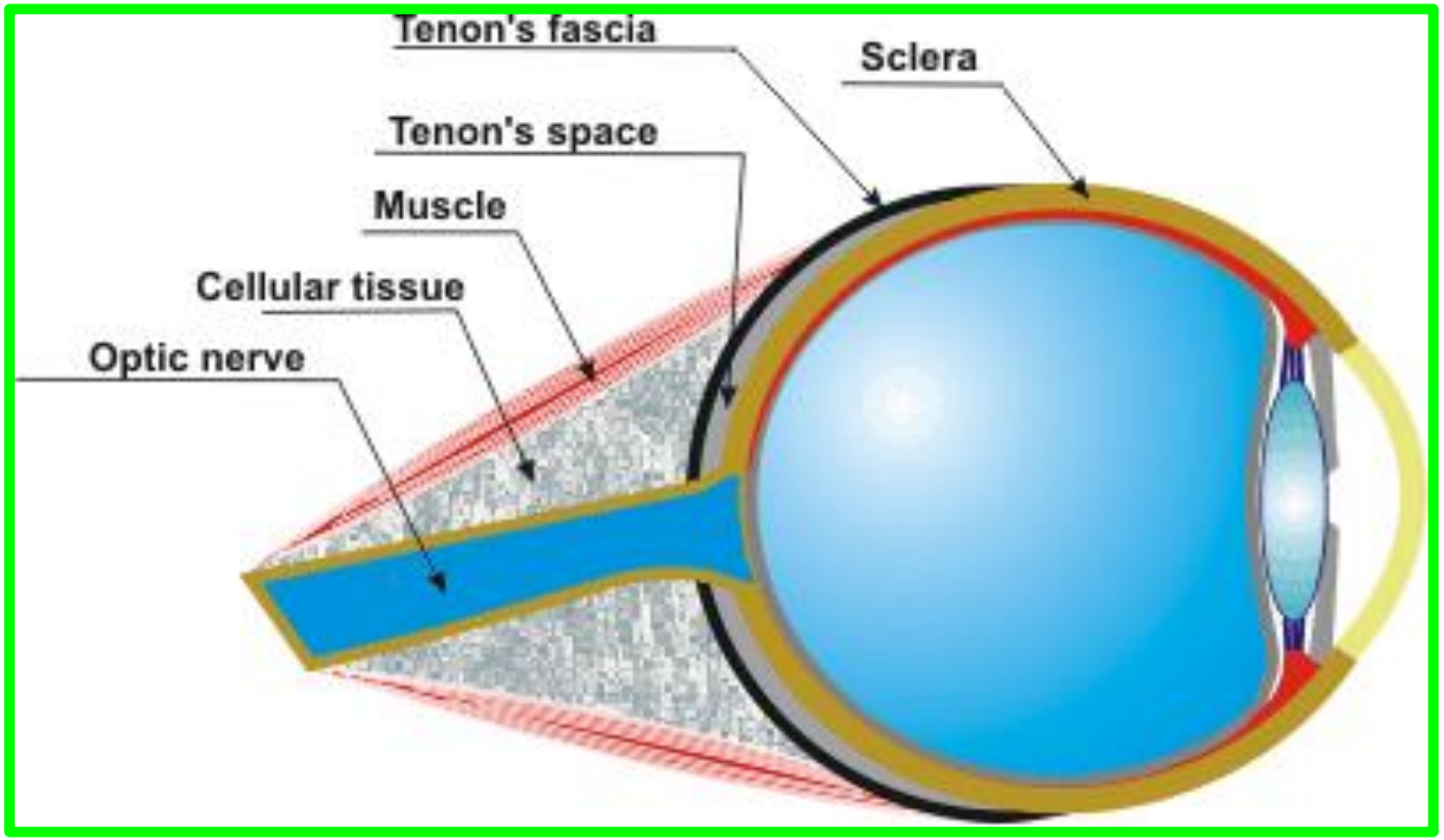
✓The gland opens into the lateral part of the superior fornix of the conjunctiva by 12 ducts.



Eyeball

The eyeball proper has three layers; however, there is an additional connective tissue layer that surrounds the eyeball, supporting it within the orbit.

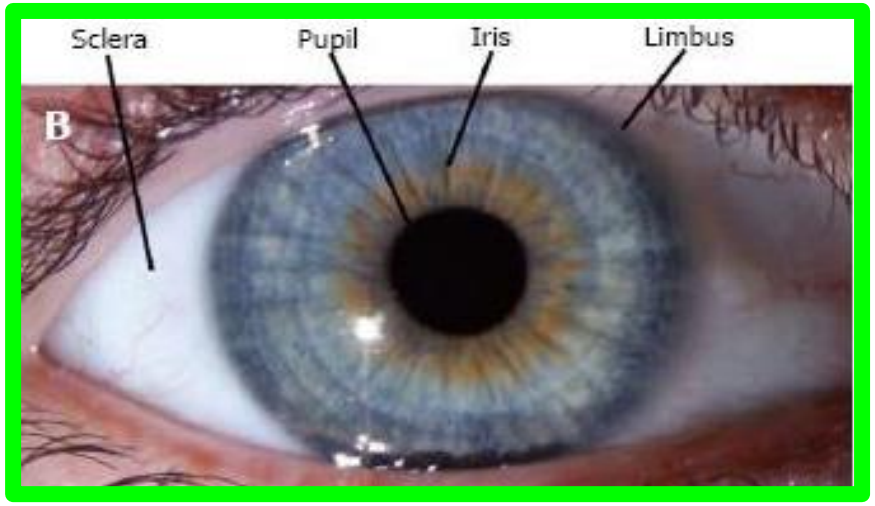
The connective tissue layer is composed posteriorly of the fascial sheath of the eyeball (bulbar fascia or Tenon capsule), which forms the actual socket for the eyeball, and anteriorly of bulbar conjunctiva

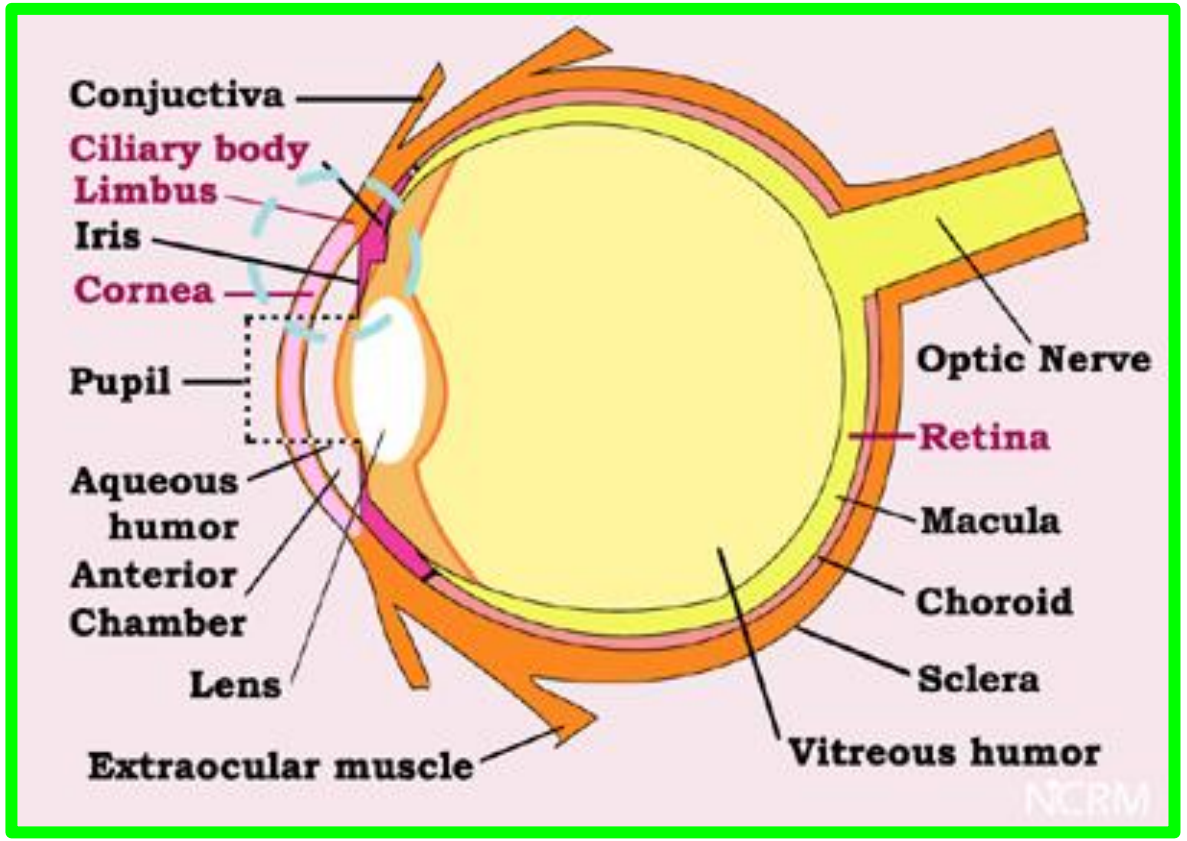


1. FIBROUS LAYER OF EYEBALL

The cornea is highly sensitive to touch; its innervation is provided by the ophthalmic nerve (CN V1). Even very small foreign bodies (e.g., dust particles) elicit blinking, flow of tears, and sometimes severe pain. Drying of the corneal surface may cause ulceration

The limbus of the cornea is the angle formed by the intersecting curvatures of sclera and cornea at the corneoscleral Junction.





The junction is a 1-mm wide, gray, and translucent circle including numerous capillary loops involved in nourishing the avascular cornea.

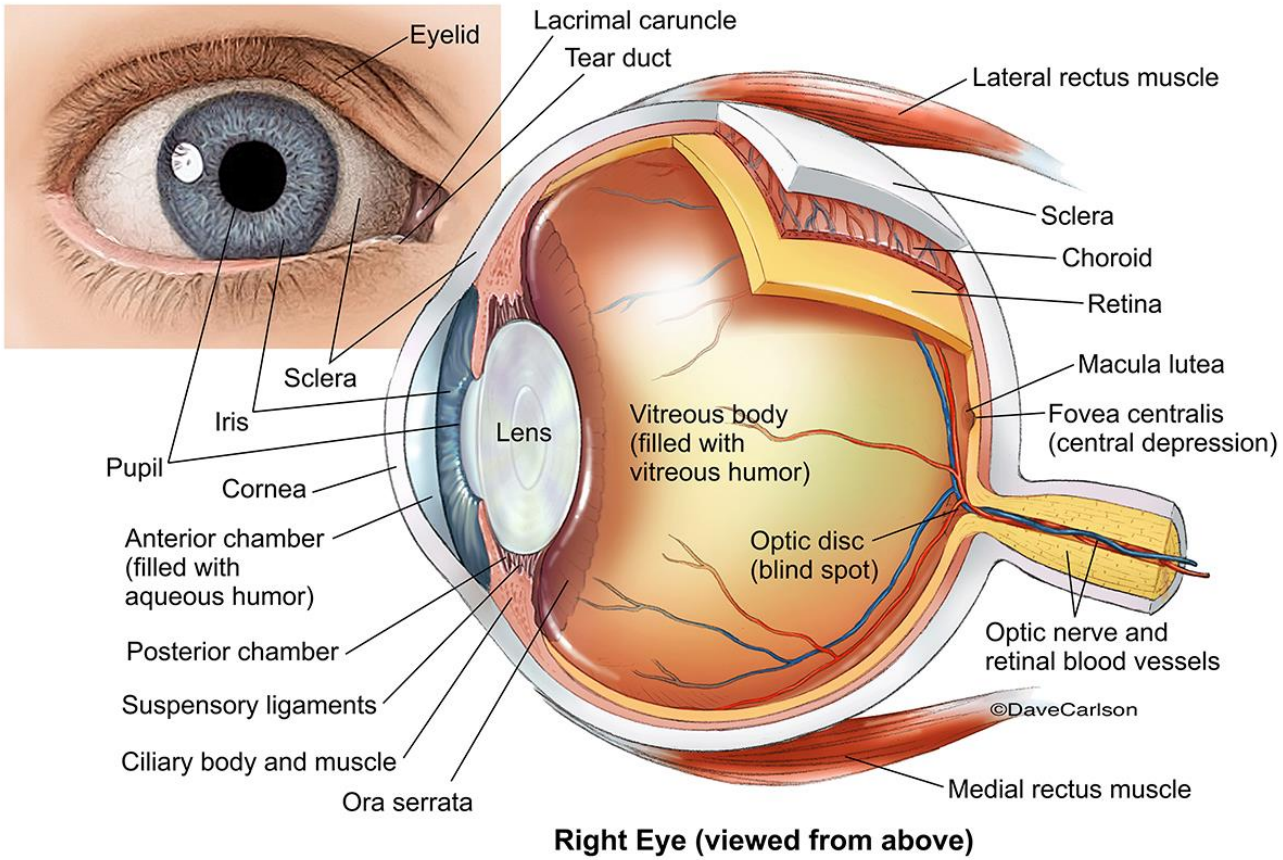
2. VASCULAR LAYER OF EYEBALL

Dr. Aiman Al Maathidy

Wednesday 8 March 2023

The vascular layer of the eyeball (also called the uvea or uveal tract) consists of the choroid, ciliary body, and iris.

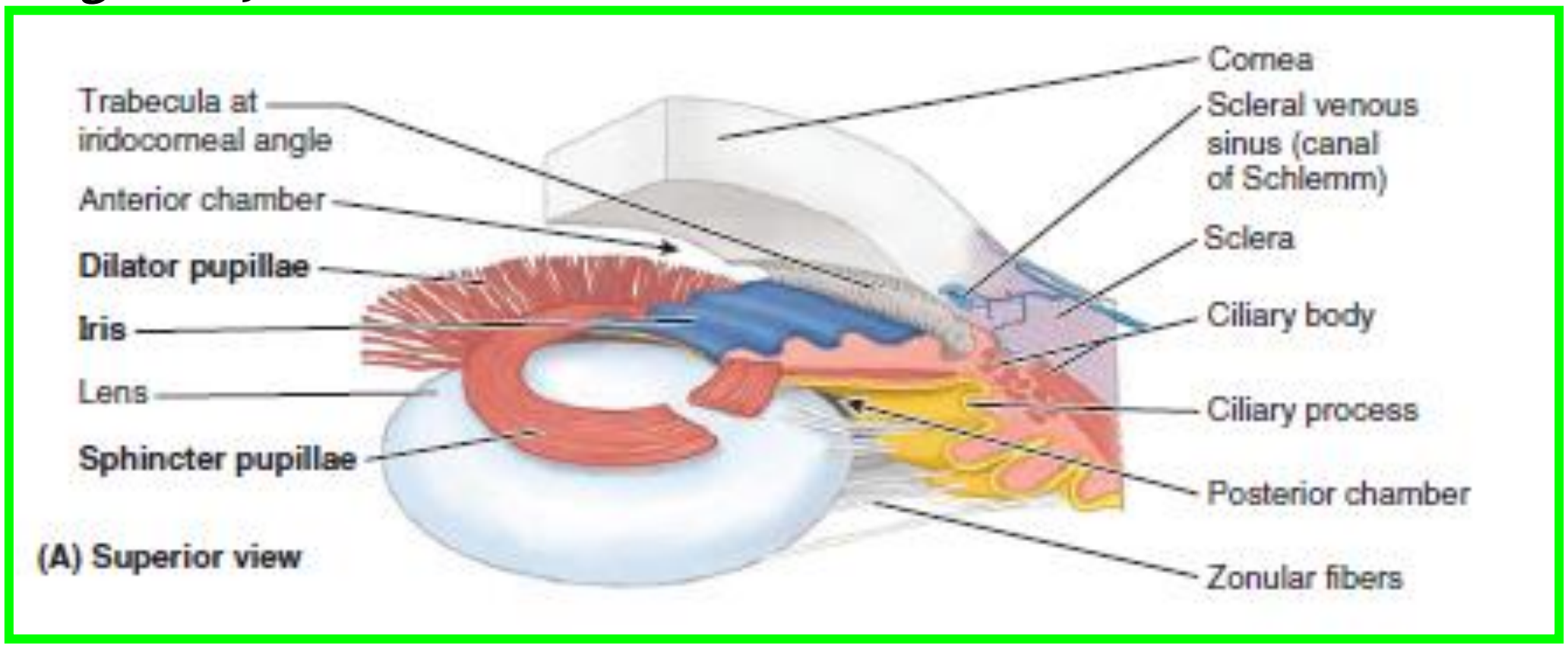
The choroid, a dark reddish-brown layer between the sclera and the retina, forms the largest part of the vascular layer of the eyeball and lines most of the sclera.



Within this pigmented and dense vascular bed, larger vessels are located externally (near the sclera).

2. VASCULAR LAYER OF EYEBALL

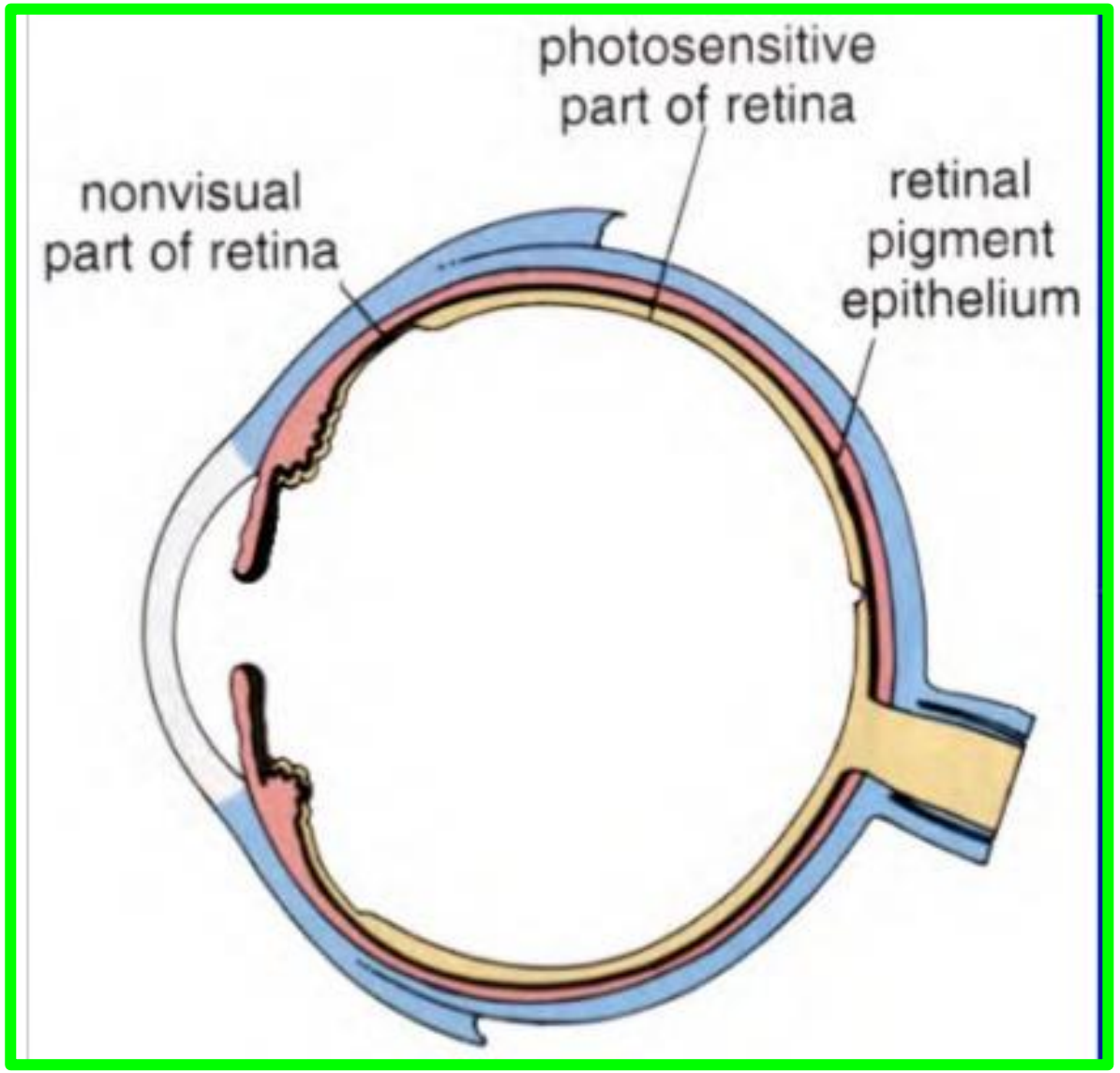
***The iris*, which literally lies on the anterior surface of the lens, is a *thin contractile diaphragm* with a central aperture, *the pupil*, for transmitting light . When awake, the size of the pupil varies continually to regulate the amount of light entering the eye**



3. INNER LAYER OF EYEBALL

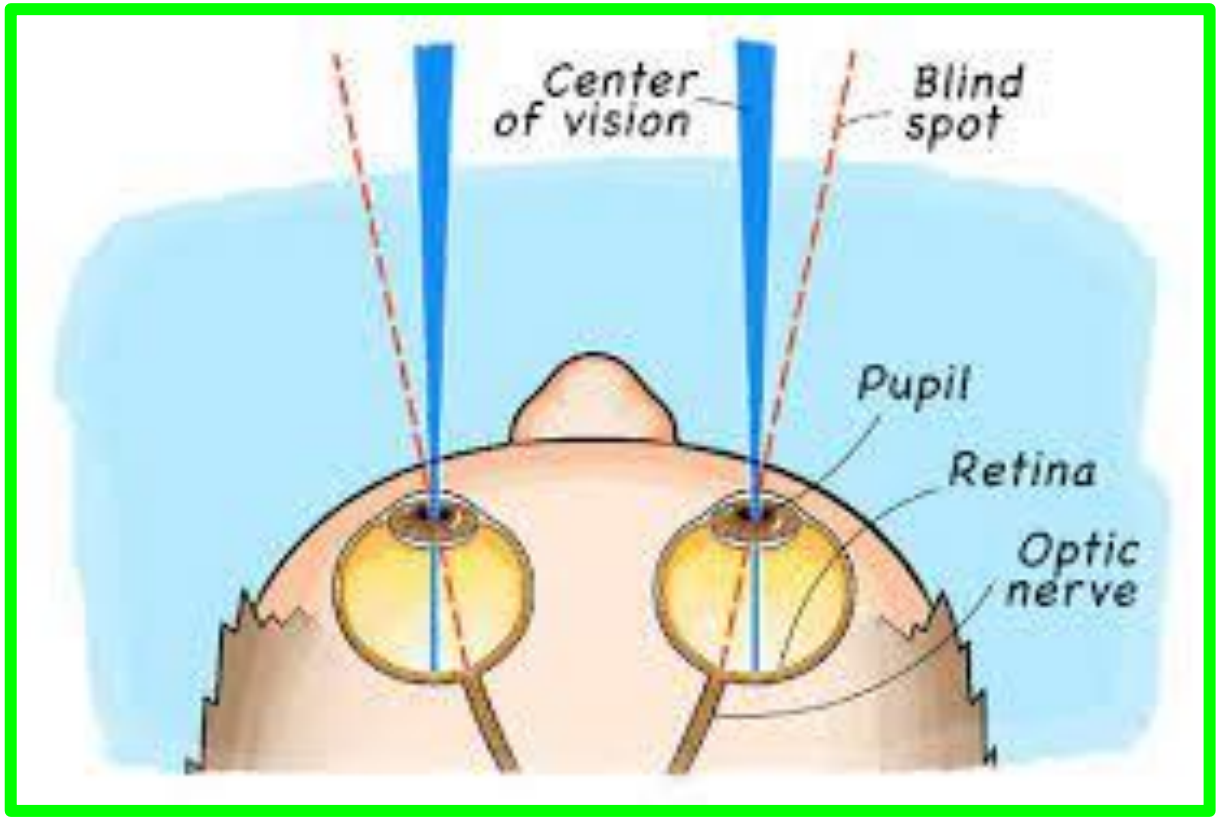
✓ **B. The nonvisual retina** *is an anterior continuation of the pigmented layer and a layer of supporting cells.*

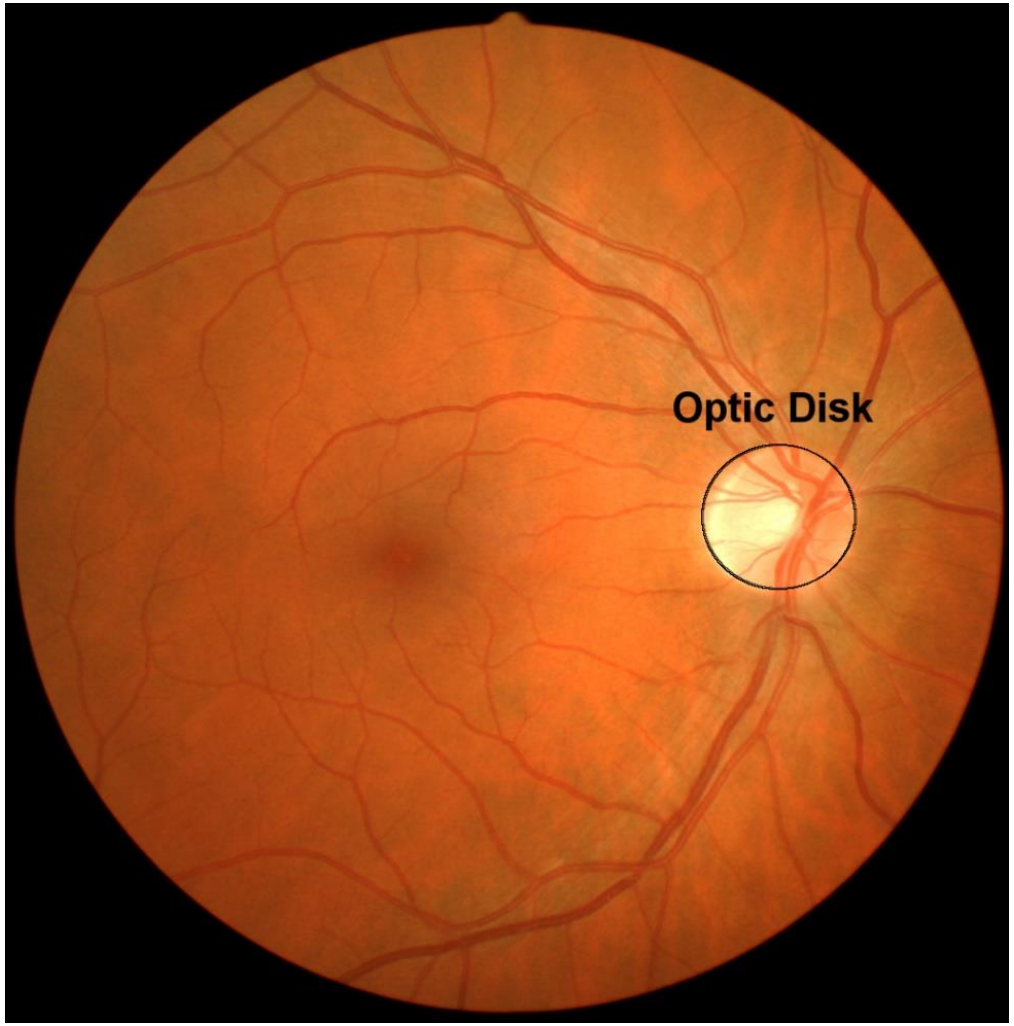
The nonvisual retina *extends over* **the ciliary body** *(ciliary part of the retina) and the posterior surface of* **the iris** *(iridial part of the retina) to the pupillary margin*



3. INNER LAYER OF EYEBALL

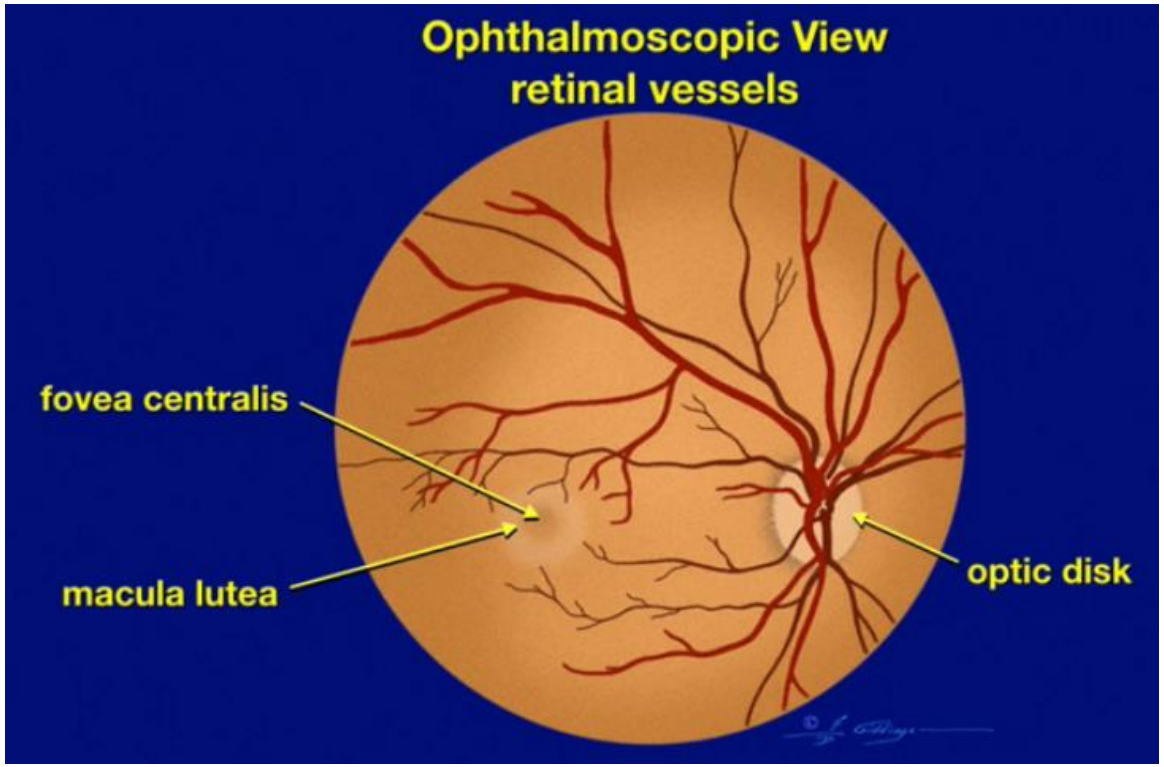
Because it contains no photoreceptors, the optic disc is insensitive to light. Hence, it is commonly called the blind spot.

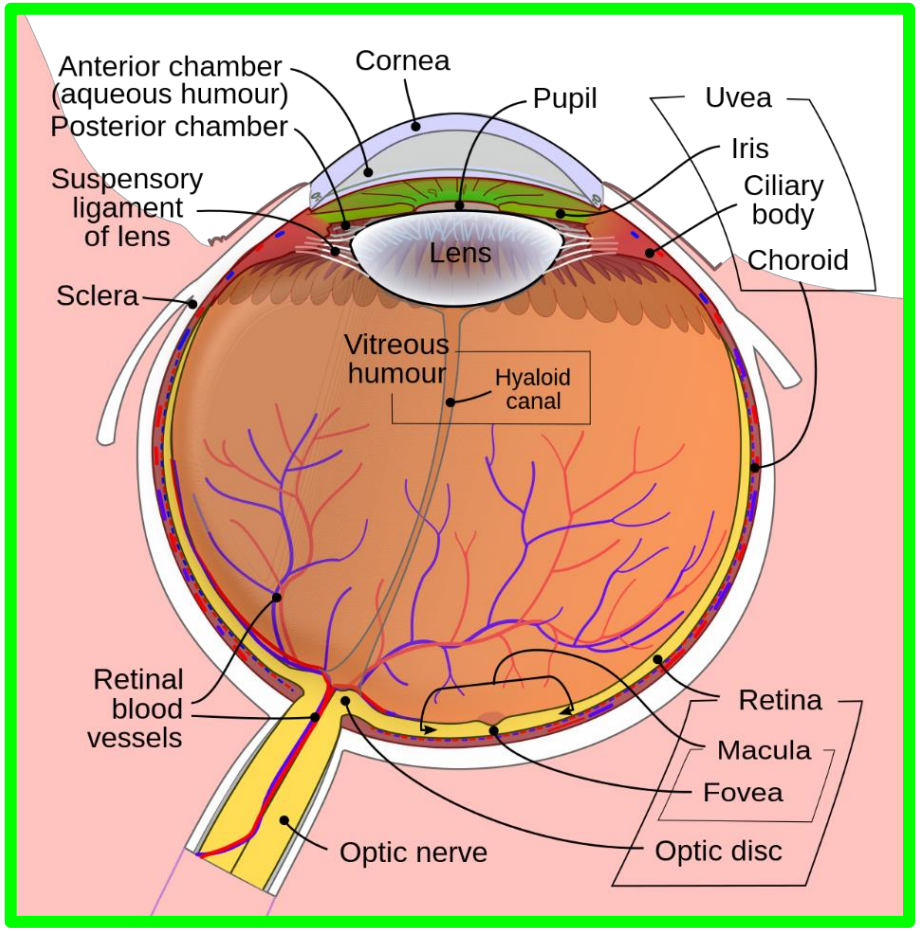




3. INNER LAYER OF EYEBALL

At the center of the macula lutea is a depression, the fovea centralis (L. central pit), the area of most acute vision.





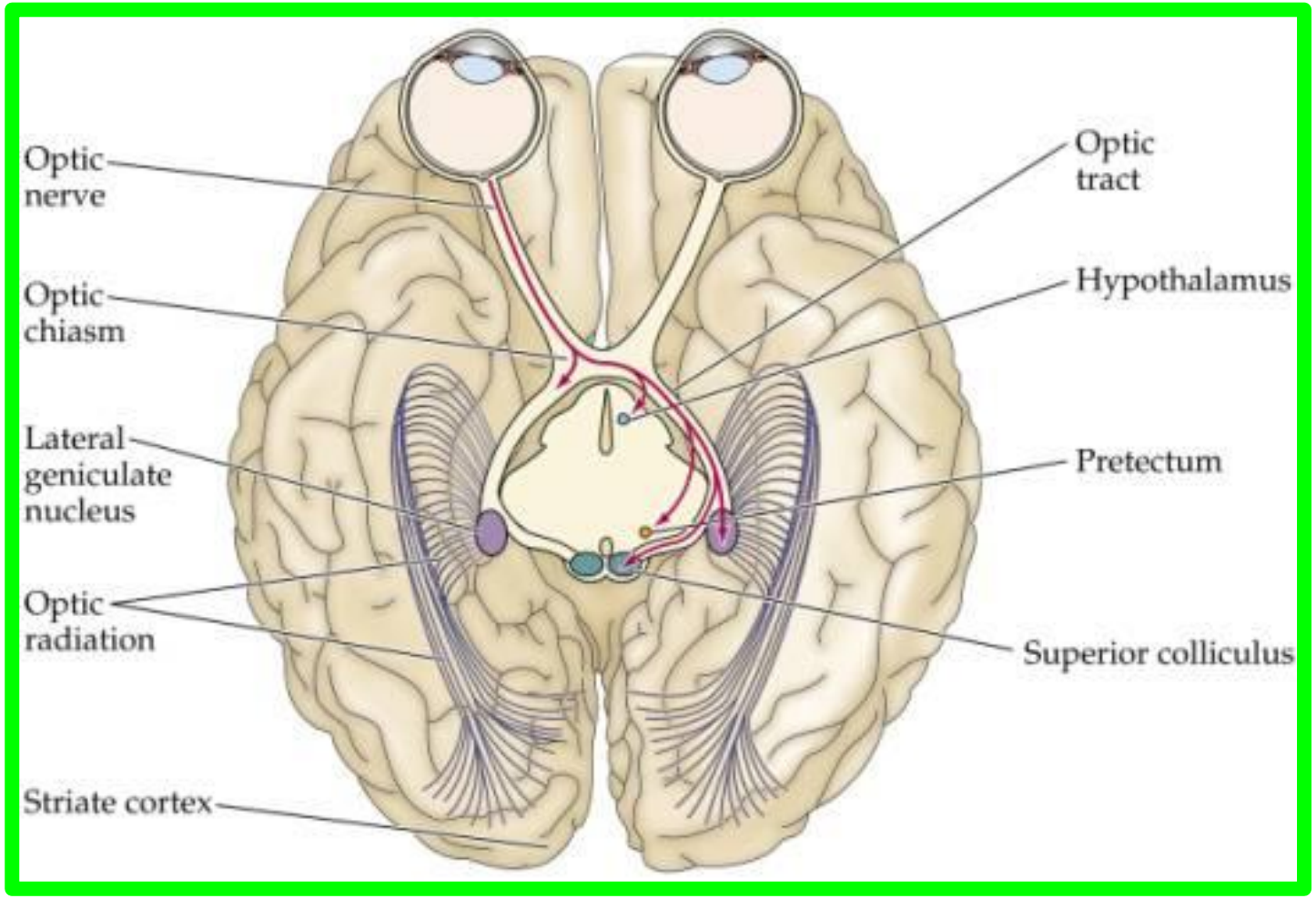
The fovea is approximately 1.5 mm in diameter; its center, the foveola, does not have the capillary network visible elsewhere deep to the retina.

OPTIC NERVE (CRANIAL NERVE II)

✓ Lateral Geniculate Body

✓The lateral geniculate body is a small, oval swelling projecting from the pulvinar of the thalamus.

✓It consists of six layers of cells, on which synapse the axons of the optic tract.



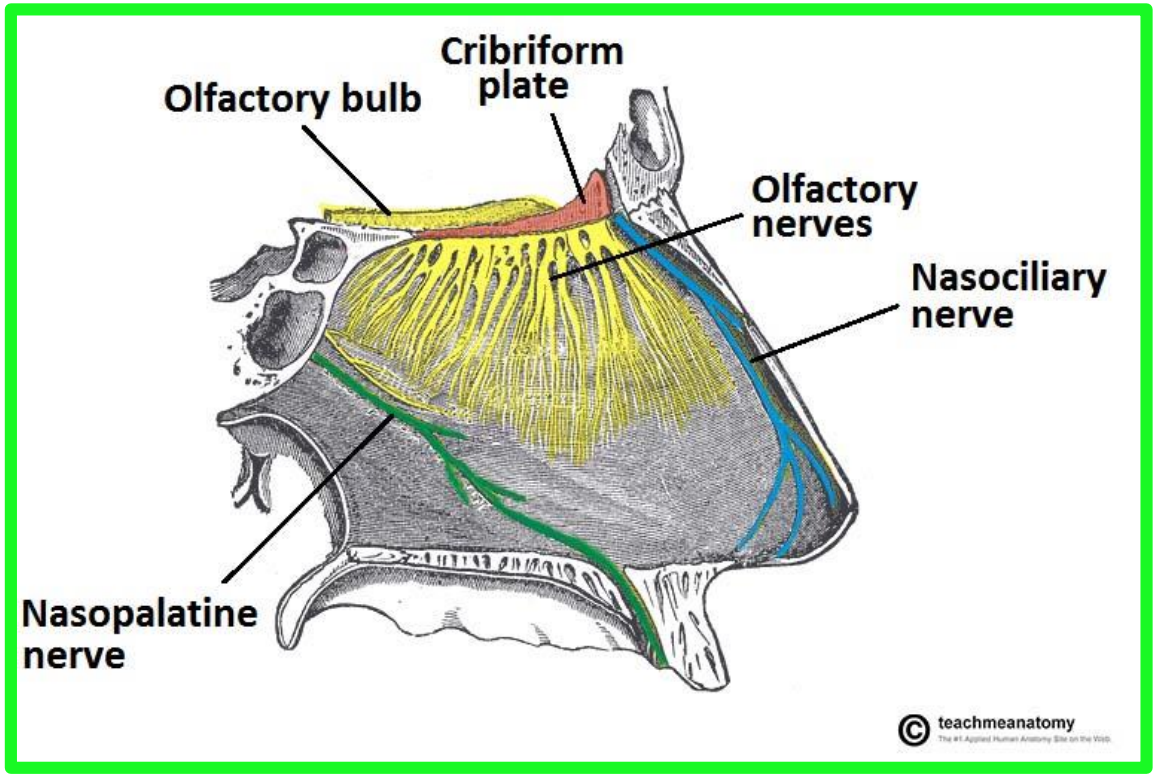
✓The axons of the nerve cells within the geniculate body leave it to form the optic radiation

OLFACTORY NERVES (CRANIAL NERVE I)

Dr. Aiman AL Maathidy

The olfactory nerves arise from the olfactory receptor nerve cells in the olfactory mucous membrane located in the upper part of the nasal cavity above the level of the superior concha.

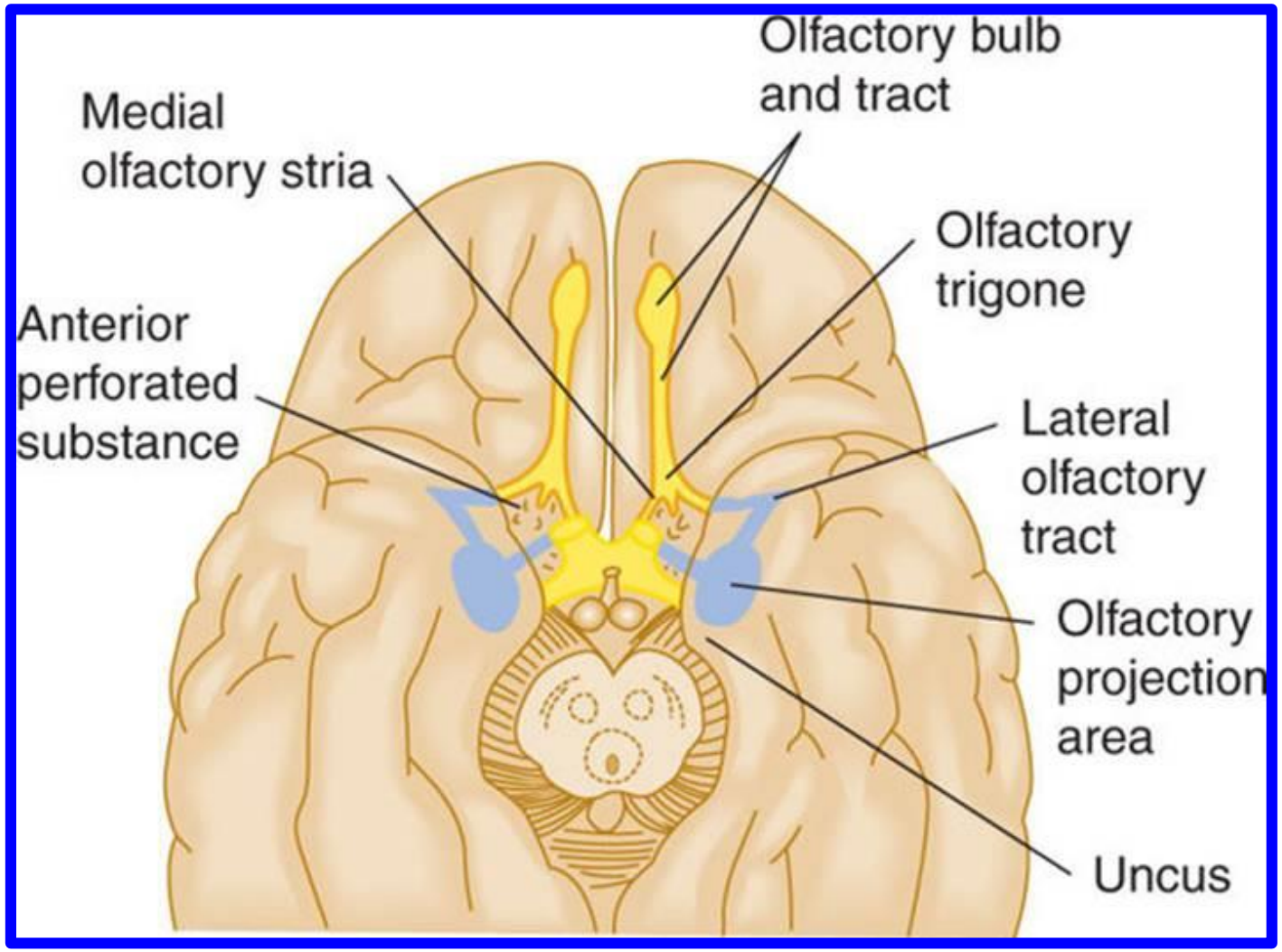
- The fine central processes form the olfactory nerve fibers.
- Bundles of these nerve fibers pass through the openings of the cribriform plate of the ethmoid bone to enter the olfactory bulb.
- The olfactory nerve fibers are unmyelinated and are covered with Schwann cells.



Olfactory Tract

- This narrow band of white matter runs from the posterior end of the olfactory bulb beneath the inferior surface of the frontal lobe of the brain

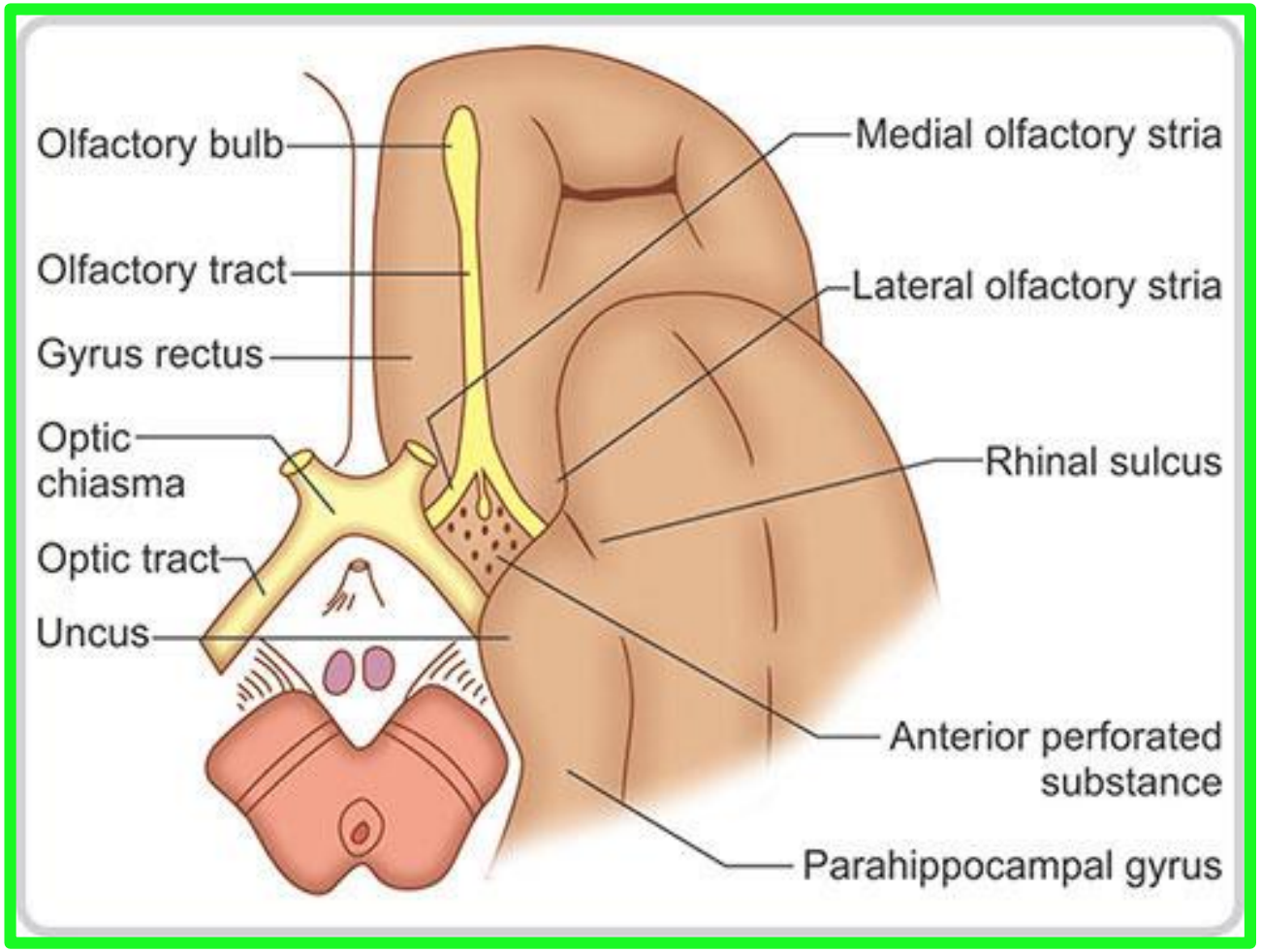
- It consists of the central axons of the mitral and tufted cells of the bulb and some centrifugal fibers from the opposite olfactory bulb.



Olfactory Tract

- ✓ As the olfactory tract reaches the anterior perforated substance, it divides into medial and lateral olfactorys triae.

- ✓ The lateral stria carries the axons to the olfactory area of the cerebral cortex, namely, the periamygdaloid and prepiriform areas



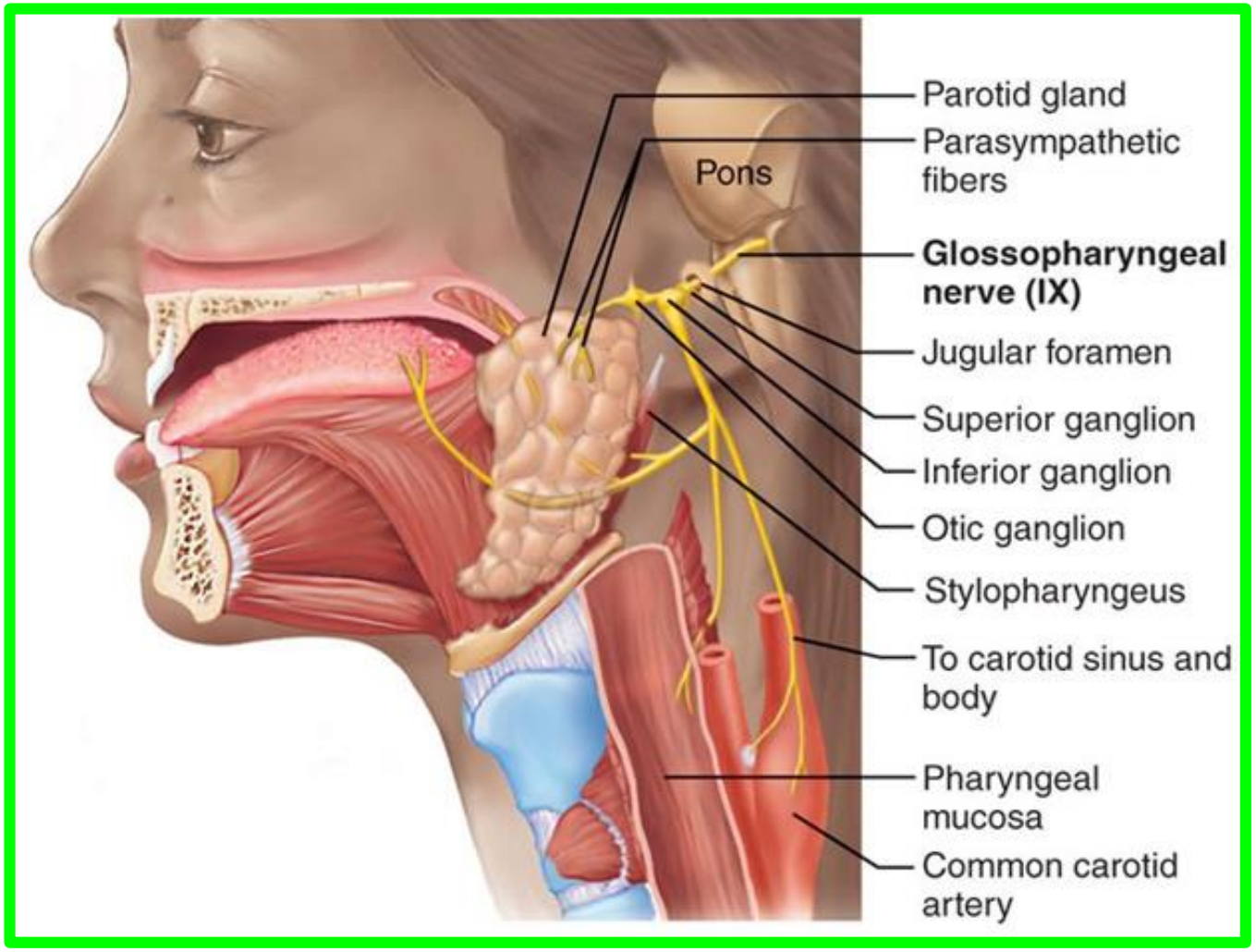
- ✓ The medial olfactory stria carries the fibers that cross the median plane in the anterior commissure to pass to the olfactory bulb of the opposite side.

Glossopharyngeal Nerve CN IX

❖ The glossopharyngeal nerve is a motor and sensory nerve

❖ It emerges from the anterior surface of the medulla oblongata between the olive and the inferior cerebellar peduncle.

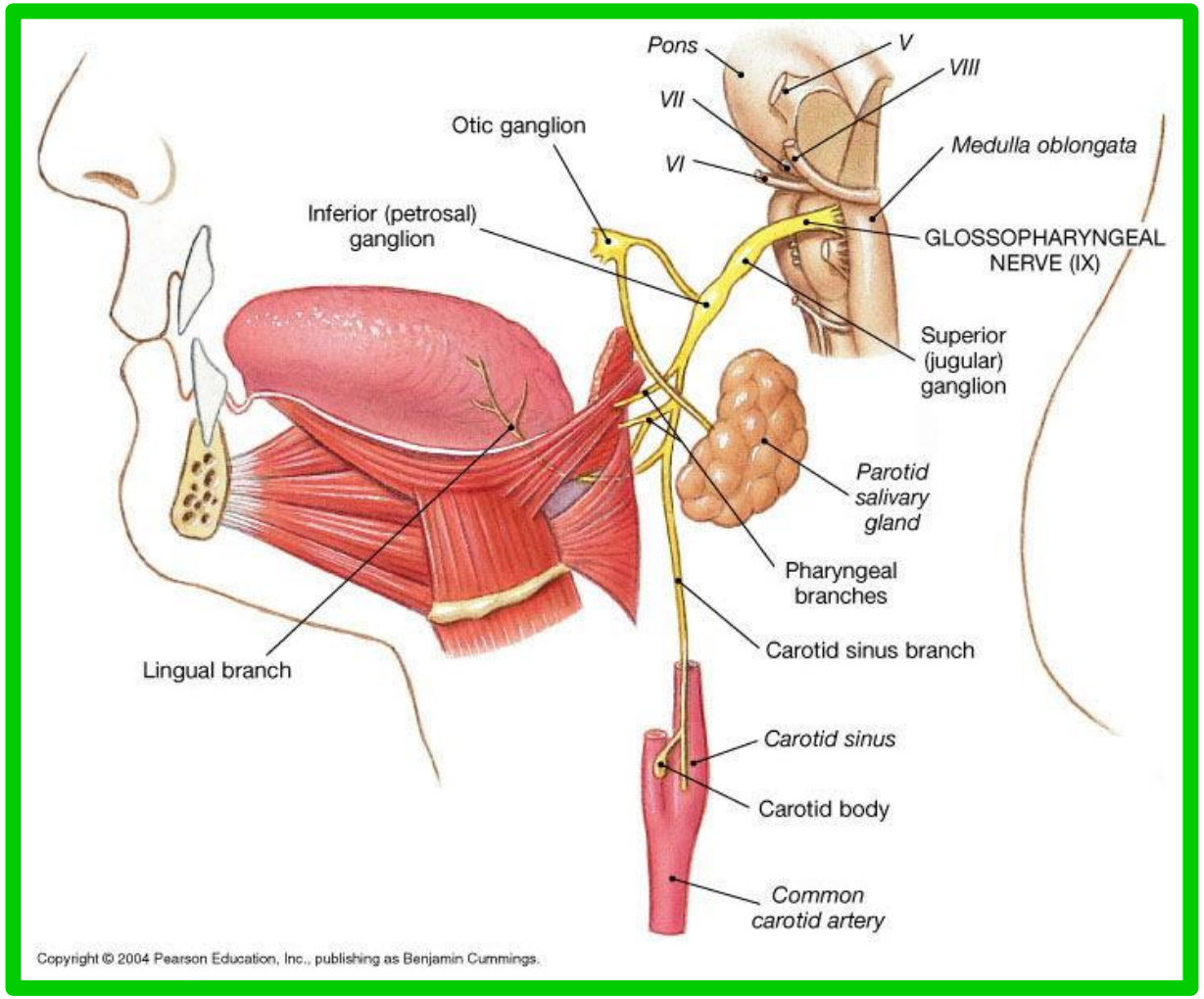
❖ It passes laterally in the posterior cranial fossa and leaves the skull by passing through the jugular foramen.



Glossopharyngeal Nerve CN IX

❖*The superior and inferior sensory ganglia are located on the nerve as it passes through the foramen.*

❖*The glossopharyngeal nerve then descends through the upper part of the neck to the back of the tongue*



Glossopharyngeal Nerve CN IX

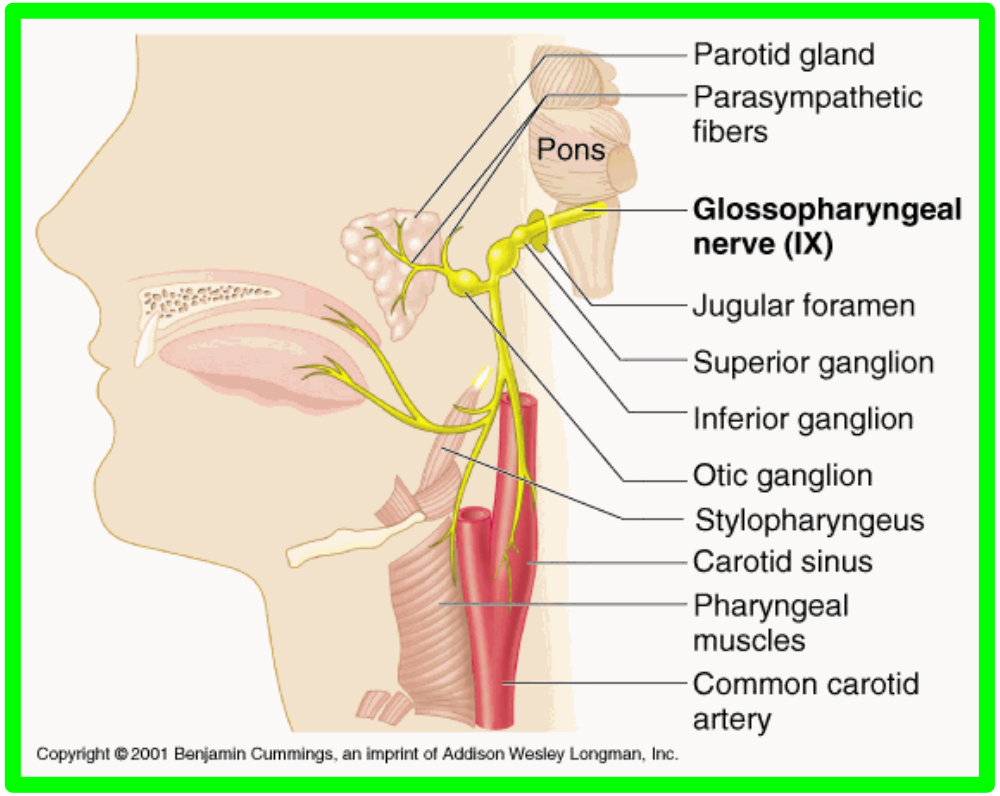
Dr. Aiman Al Maathidy

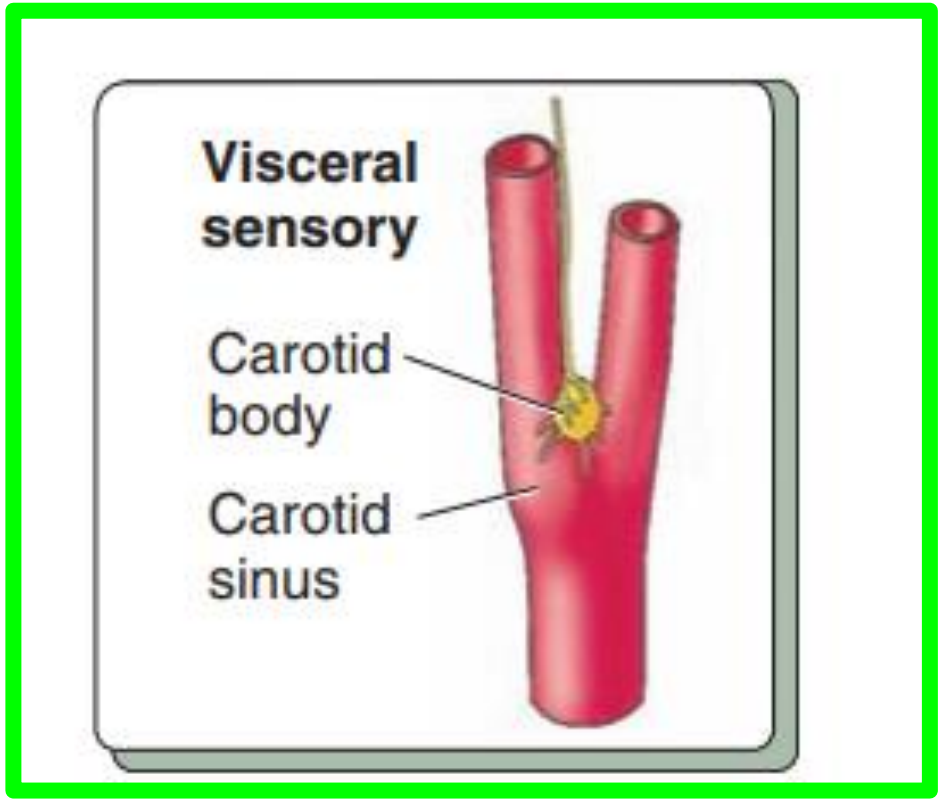
Monday 13 March 2023

❑ *Visceral Sensory*

✓The carotid sinus nerve to the carotid sinus, a baro-(presso-) receptor sensitive to changes in blood pressure,

✓and the carotid body, a chemoreceptor sensitive to blood gas (oxygen and carbon dioxide levels).

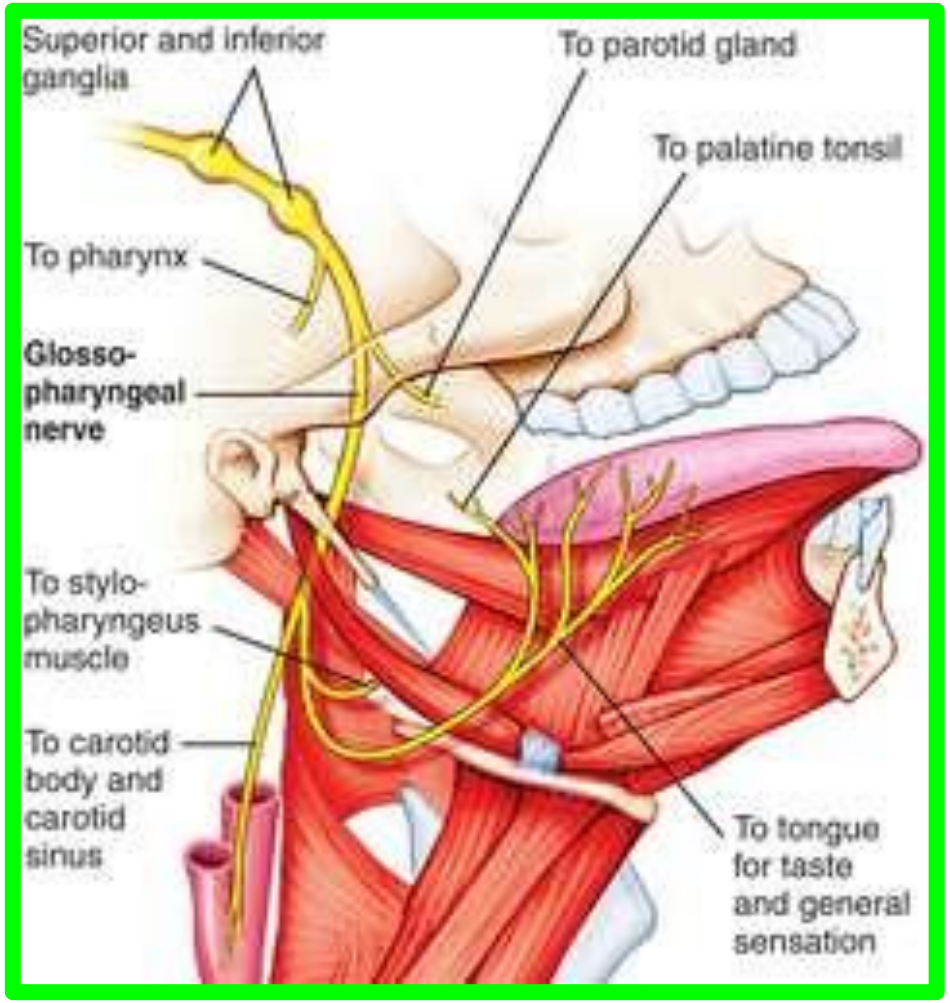




Glossopharyngeal Nerve CN IX

❑Special Sensory (Taste)

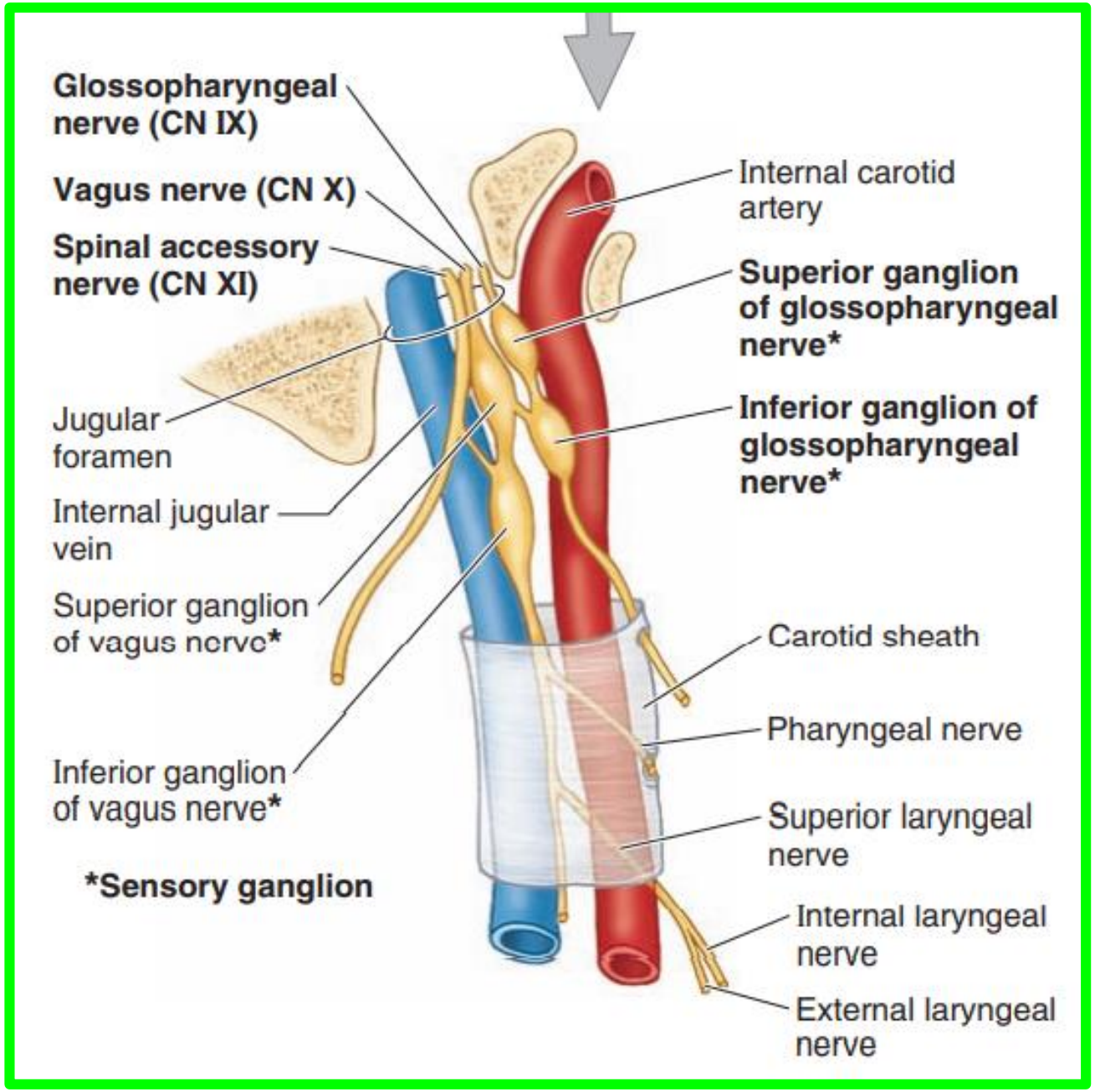
Taste fibers are conveyed from the posterior third of the tongue to the sensory ganglia, the superior and inferior ganglia of CN IX



Vagus Nerve CN X

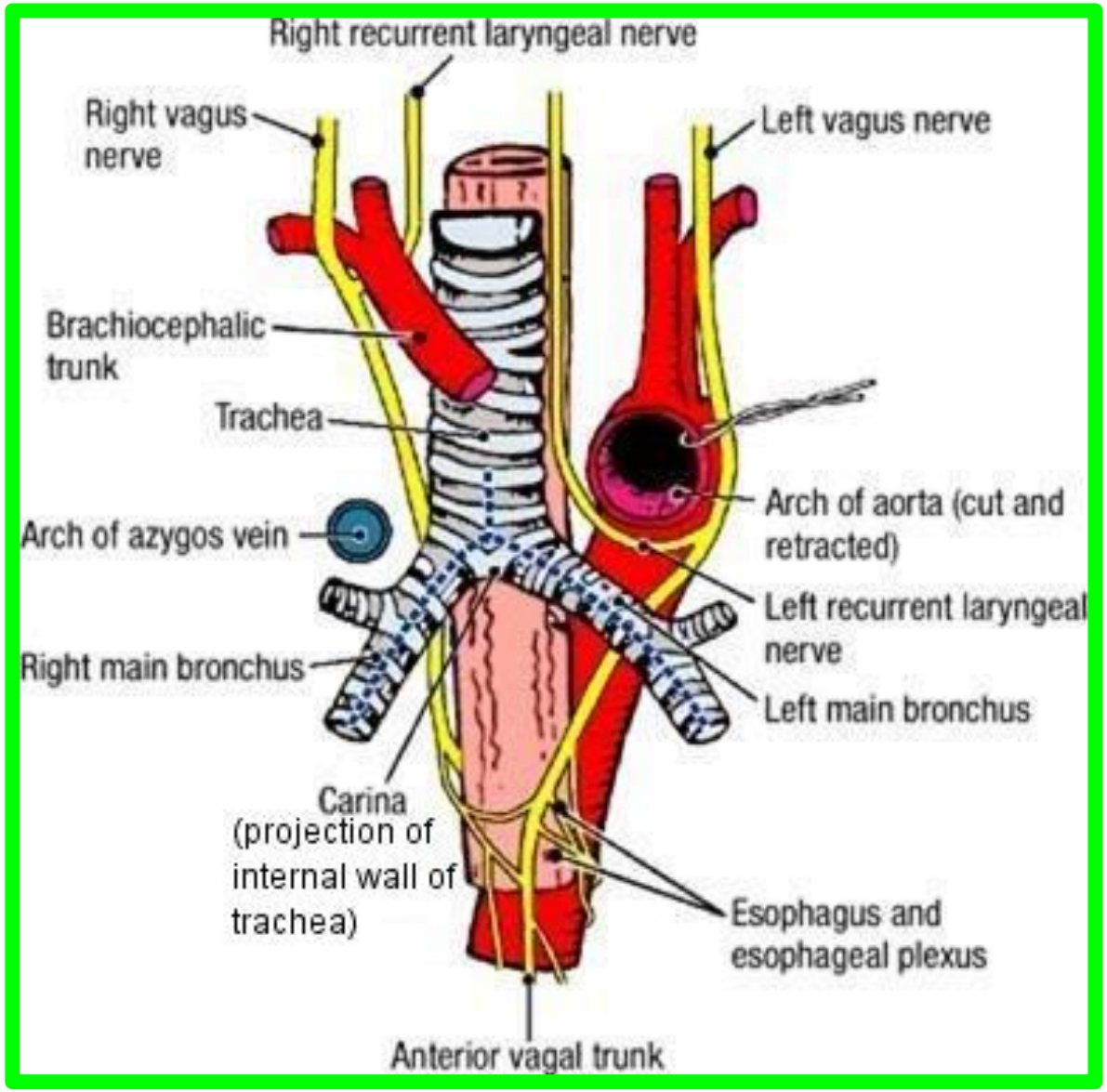
The vagus nerve has both superior and inferior sensory ganglia.

❑***Below the inferior ganglion, the cranial root of the accessory nerve joins the vagus nerve and is distributed mainly in its pharyngeal and recurrent laryngeal branches.***



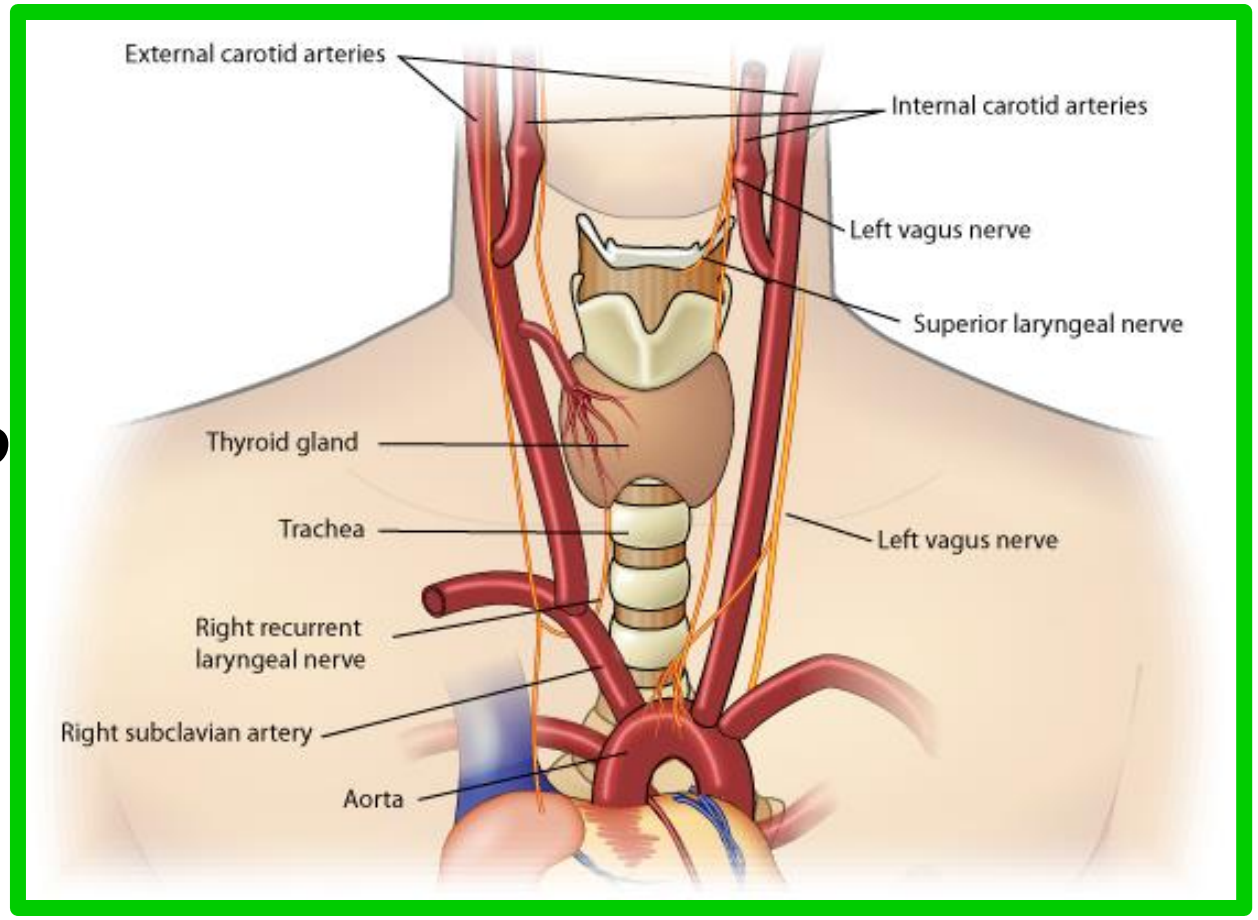
Vagus Nerve CN X

- ***The vagus nerve descends through the neck alongside the carotid arteries and internal jugular vein within the carotid sheath***
- ***It passes through the mediastinum of the thorax passing behind the root of the lung, and enters the abdomen through the esophageal opening in the diaphragm***



Important Branches of the Vagus Nerve in the Neck

- **Meningeal and auricular branches**
- **Pharyngeal branch** contains nerve fibers from the cranial part of the accessory nerve.
- **Superior laryngeal nerve** divides into the internal and the external laryngeal nerves.



✓The internal laryngeal nerve is sensory to the piriform fossa and the larynx down as far as the vocal cords.

✓The external laryngeal nerve is motor and it supplies the cricothyroid muscle.

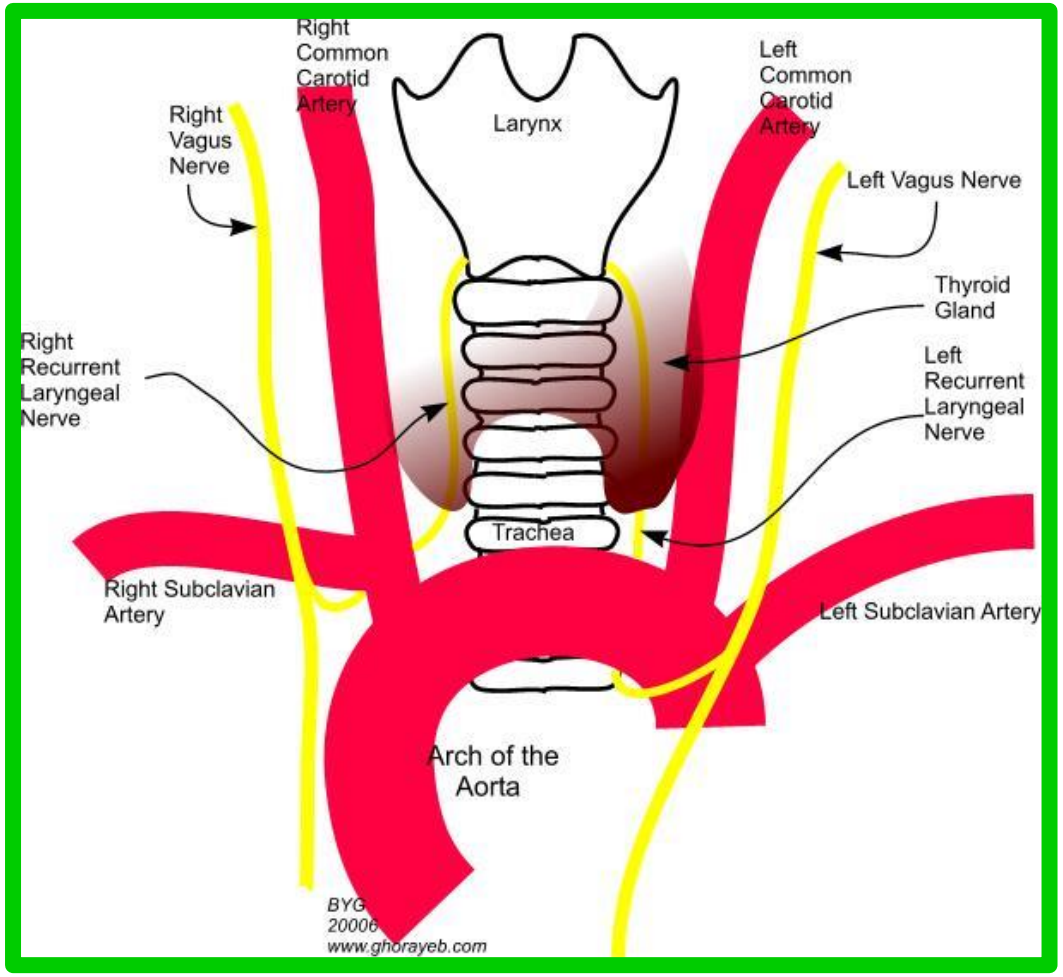
Important Branches of the Vagus Nerve in the Neck

■ Recurrent laryngeal nerve

On the right side, the nerve hooks around the first part of the subclavian artery

On the left side, the nerve hooks around the arch of the aorta

The nerve is closely related to the inferior thyroid artery, and it supplies all the muscles of the larynx, except the cricothyroid muscle, the mucous membrane of the larynx below the vocal cords, and the mucous membrane of the upper part of the trachea.



■■ Cardiac branches (two or three) arise in the neck, descend into the thorax, and end in the cardiac plexus

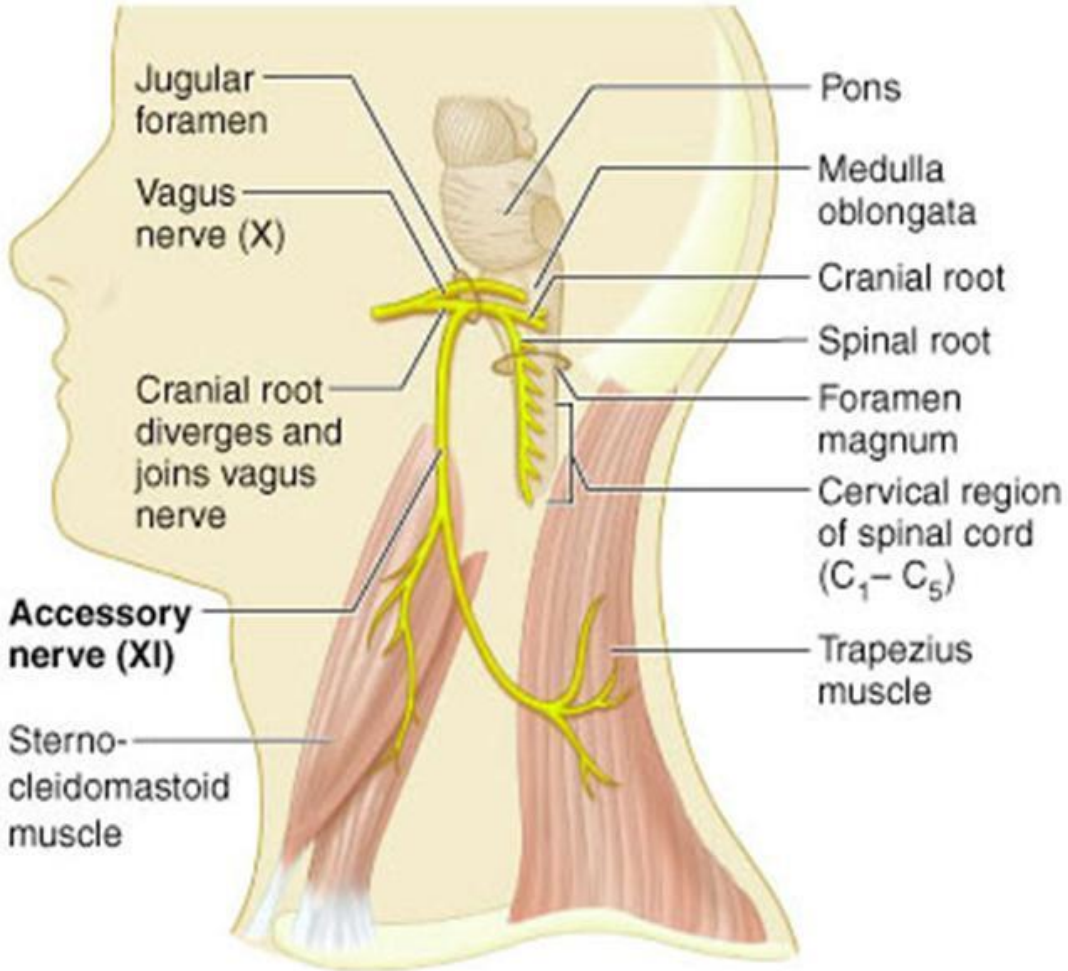
Accessory Nerve CN XI

- *The accessory nerve is a motor nerve.*
- *It consists of a cranial root (part) and a spinal root (part)*

Cranial Root

Emerges from the anterior surface of the medulla oblongata between the olive and the inferior cerebellar peduncle

The nerve runs laterally in the posterior cranial fossa and joins the spinal root

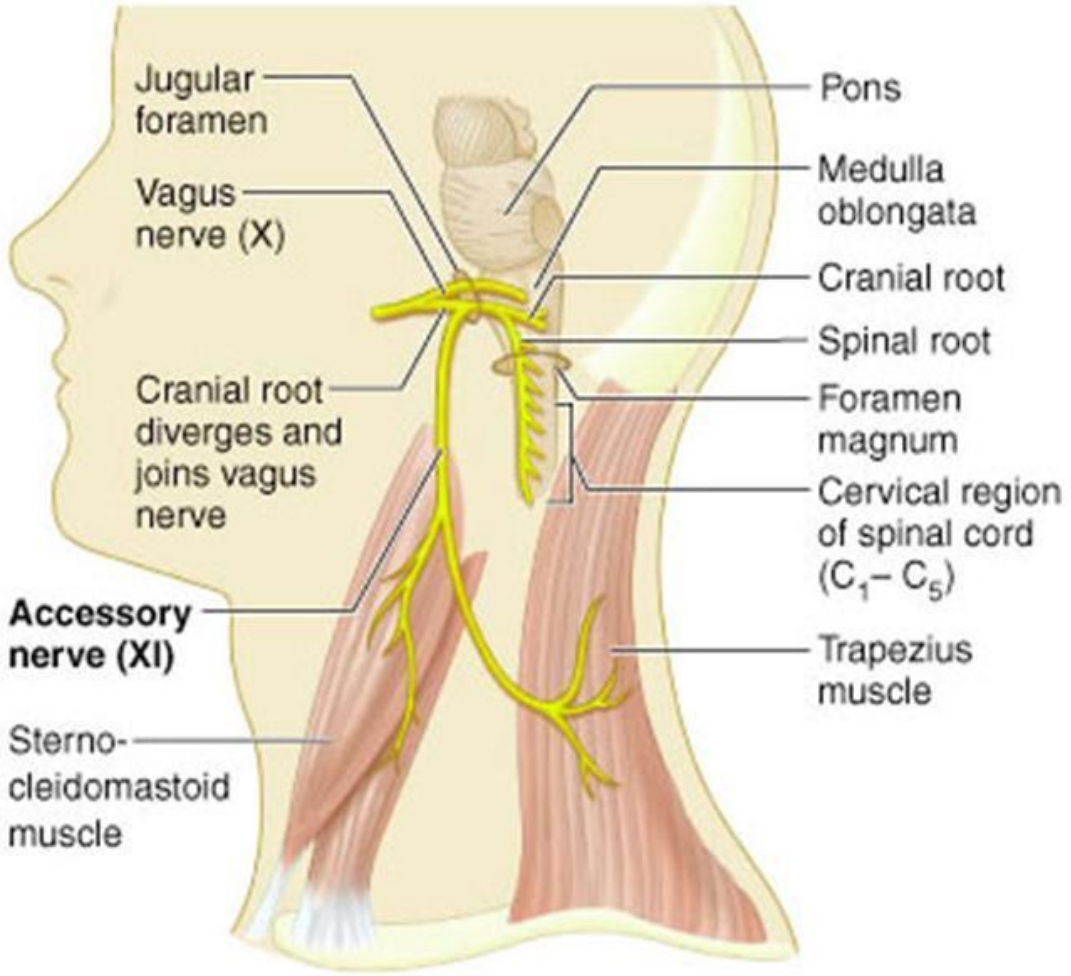


Accessory Nerve CN XI

Spinal Root

✓*Arises from nerve cells in the anterior gray column (horn) of the upper five segments of the cervical part of the spinal cord*

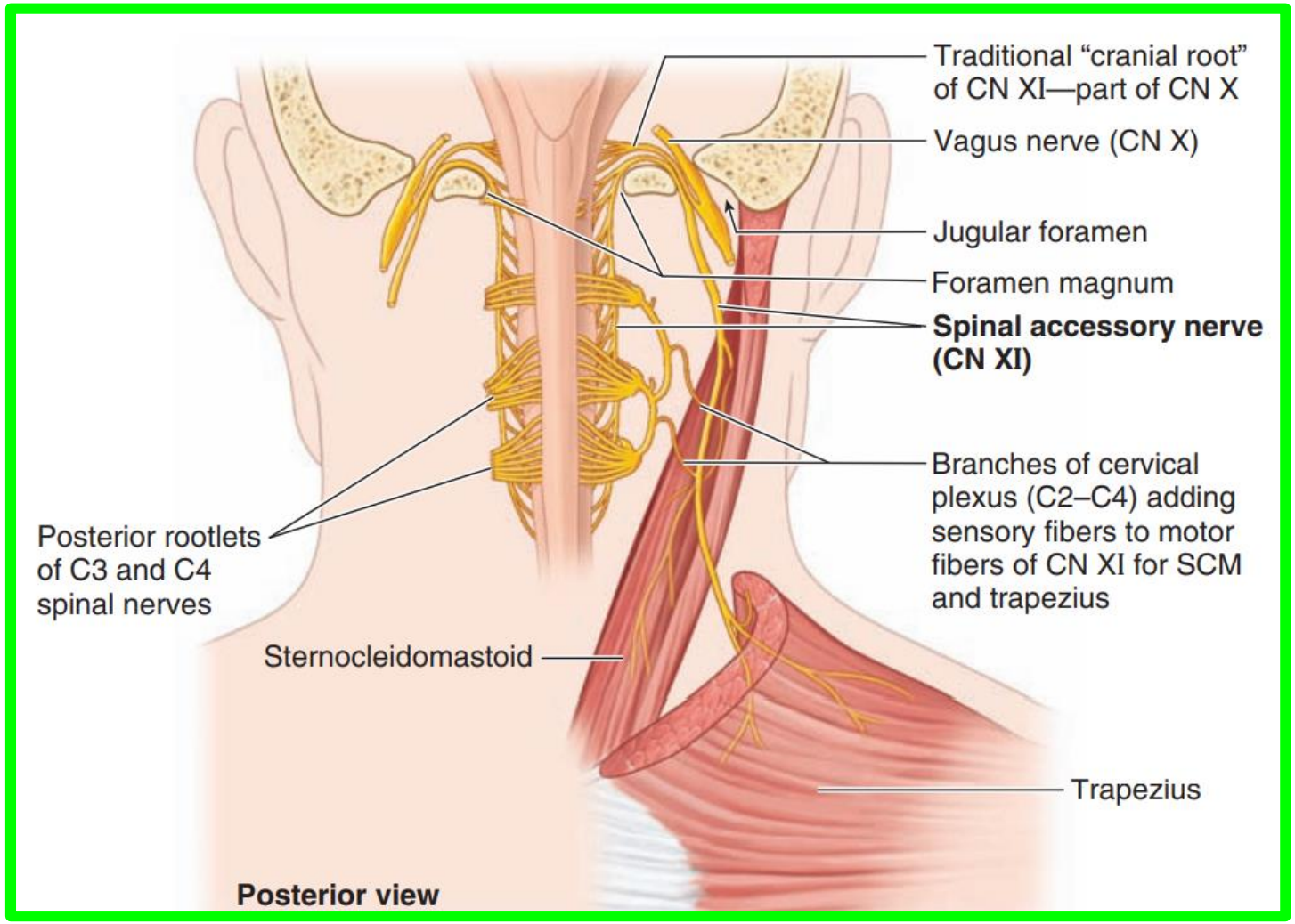
✓*The nerve ascends alongside the spinal cord and enters the skull through the foramen magnum. It then turns laterally to join the cranial root*



Accessory Nerve CN XI

❖*The two roots unite and leave the skull through the jugular foramen.*

The roots then separate:



❖*The cranial root joins the vagus nerves and is distributed in its branches to the muscles of the soft palate and pharynx (via the pharyngeal plexus) and to the muscles of the larynx (except the cricothyroid muscle).*

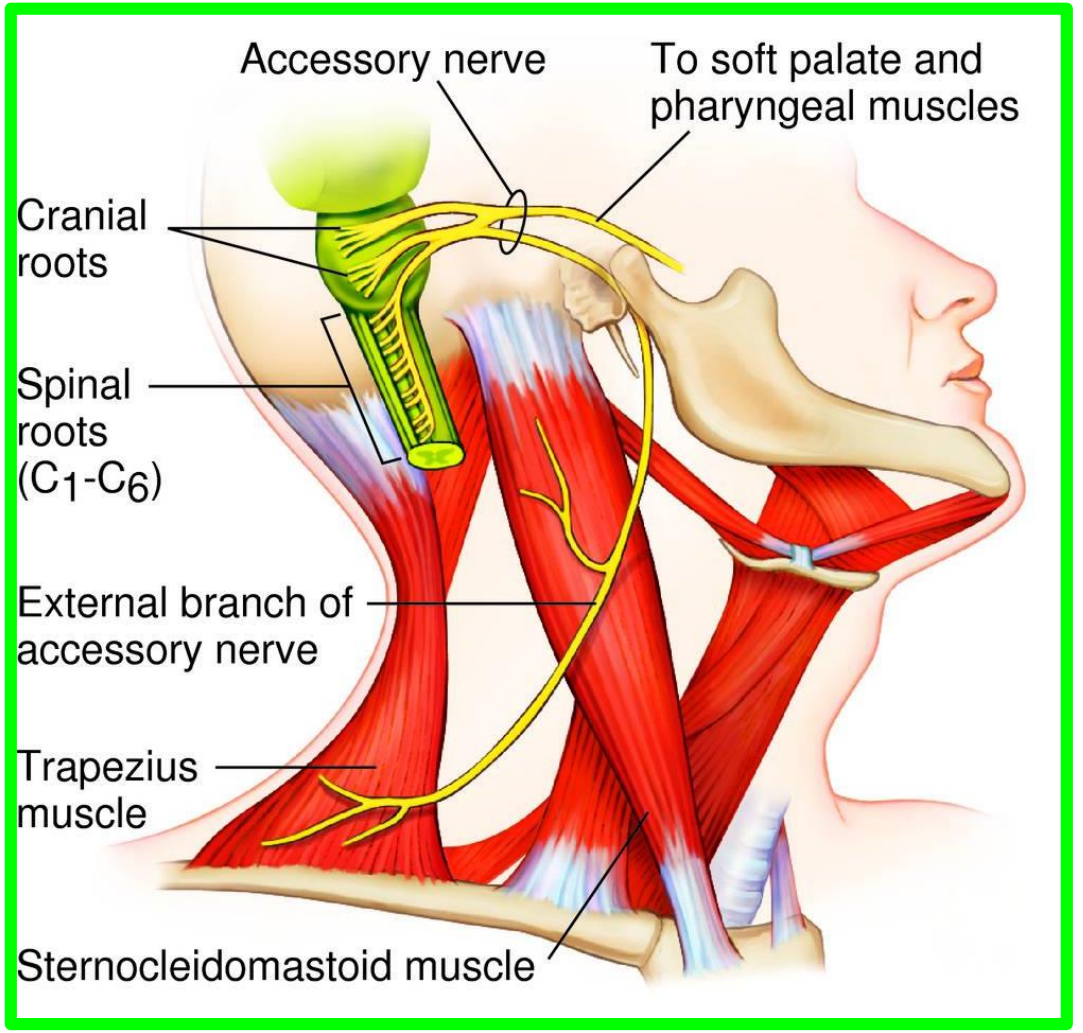
Accessory Nerve CN XI

❖*The spinal root* runs downward and laterally and enters the deep surface of *the sternocleidomastoid muscle*, which it supplies, and then crosses the posterior triangle of the neck to *supply the trapezius muscle*

The accessory nerve thus brings about:

✓*Movements of the soft palate, pharynx, and larynx*

✓*Controls the movements of the sternocleidomastoid and trapezius muscles,* two large muscles in the neck



Important Branches of the Hypoglossal Nerve

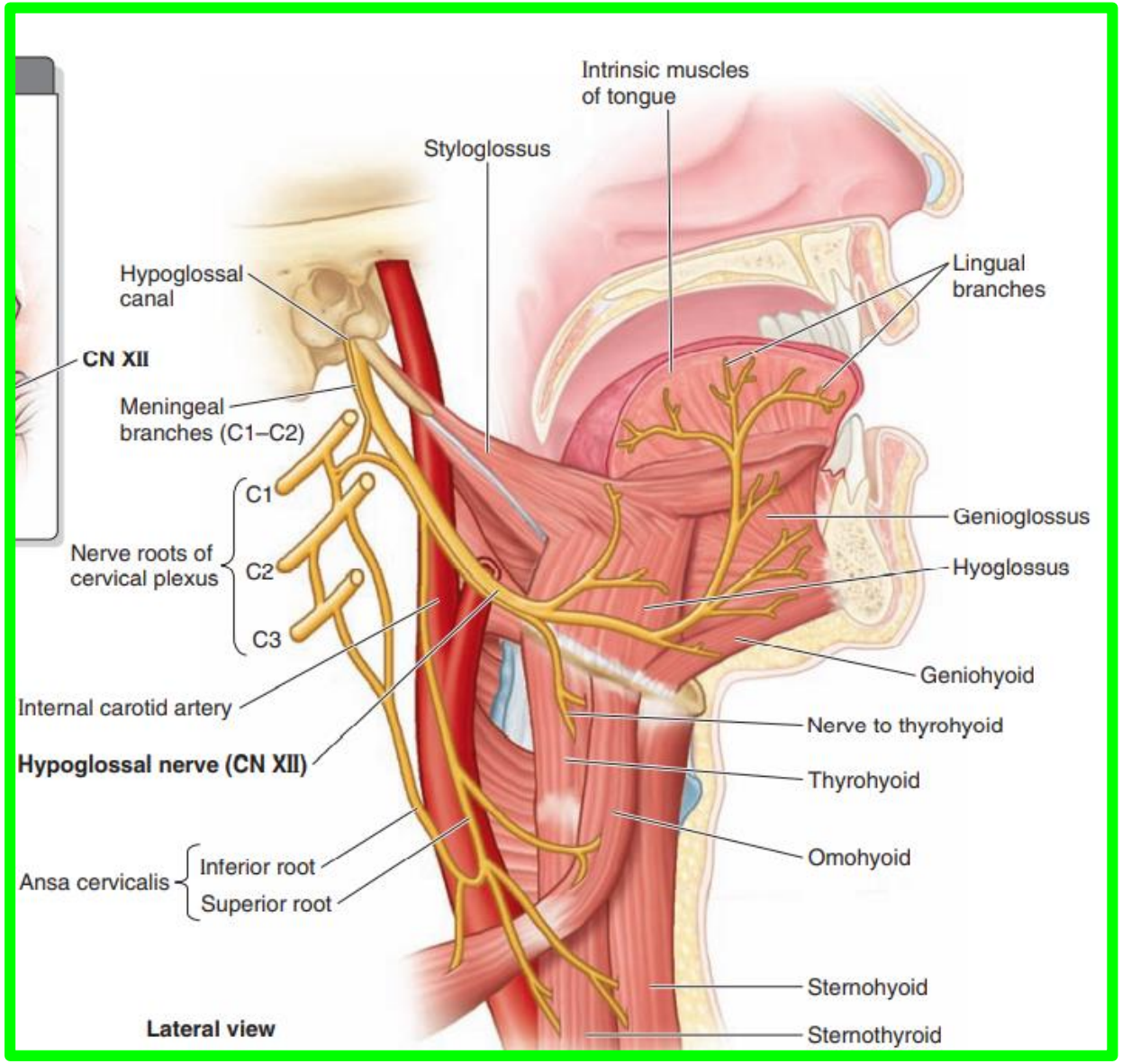
■■Meningeal branch

■■ Descending branch (C1 fibers)

passes downward and joins the descending cervical nerve (C2 and 3) to form the ansa cervicalis.

Branches from this loop supply the omohyoid, the sternohyoid, and the sternothyroid muscles.

■■ Nerve to the thyrohyoid muscle (C1)

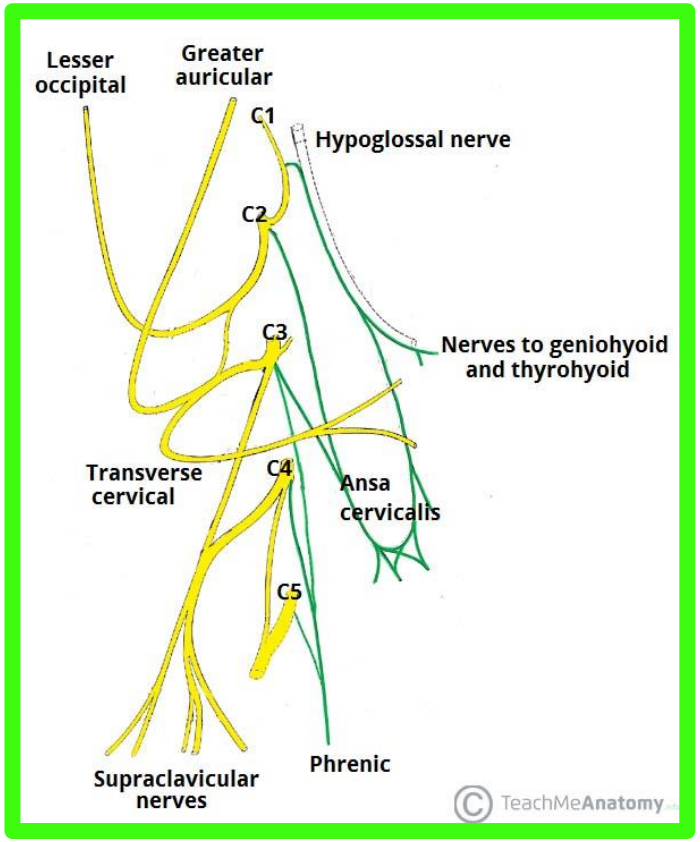


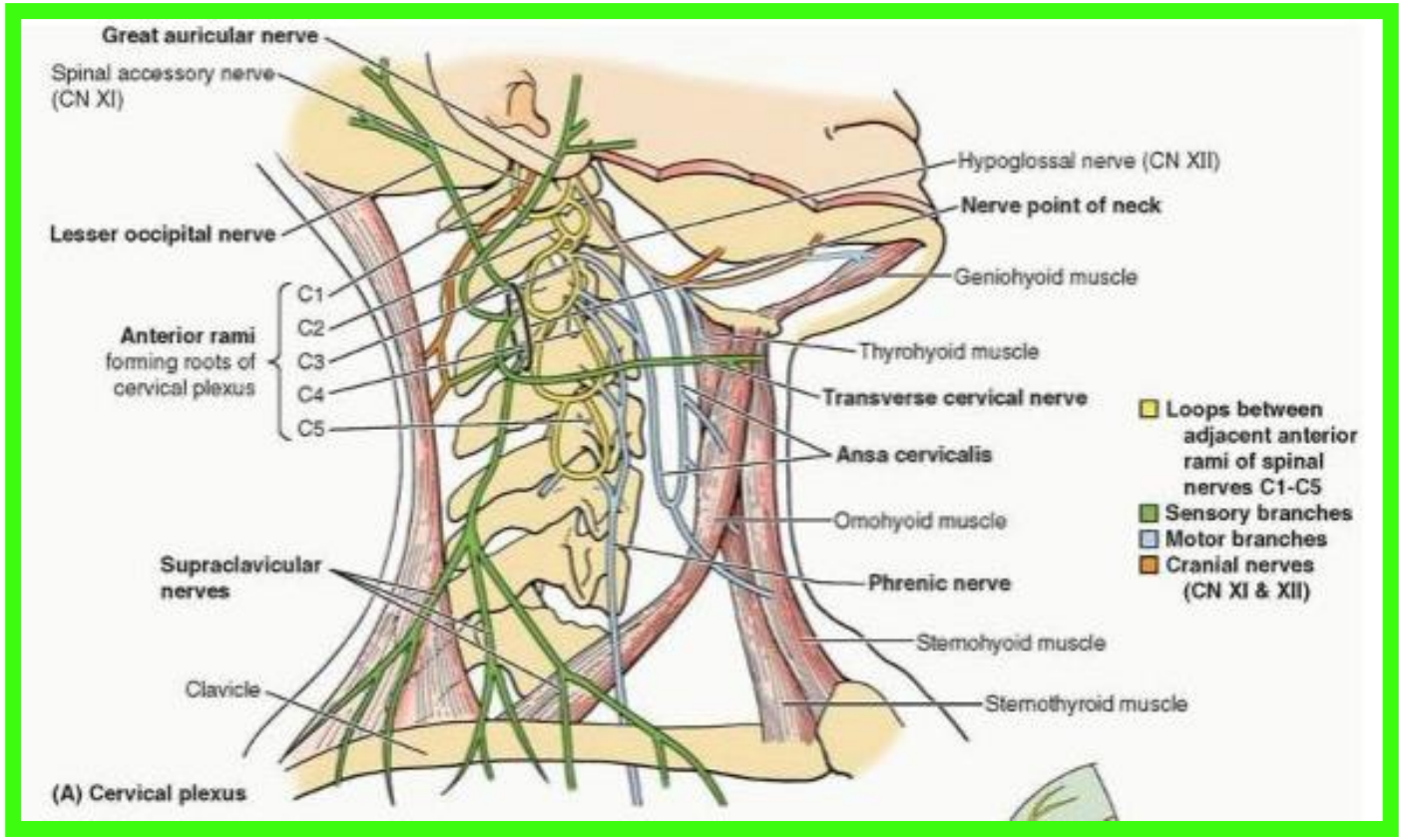
Cervical plexus

❖The anterior rami of C1-C4 make up the roots of the cervical plexus

❖The cervical plexus consists of an irregular series of (primary) nerve loops and the branches that arise from the loops.

❖ Each participating ramus, except the first, divides into ascending and descending branches that unite with the branches of the adjacent spinal nerve to form the loops.



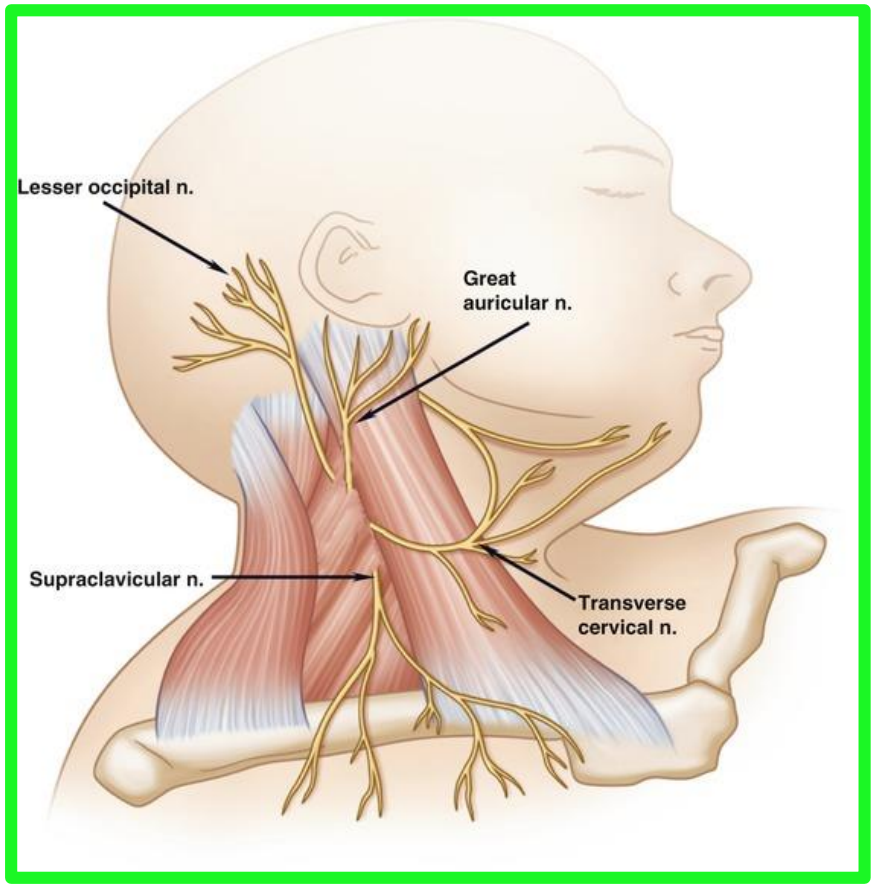


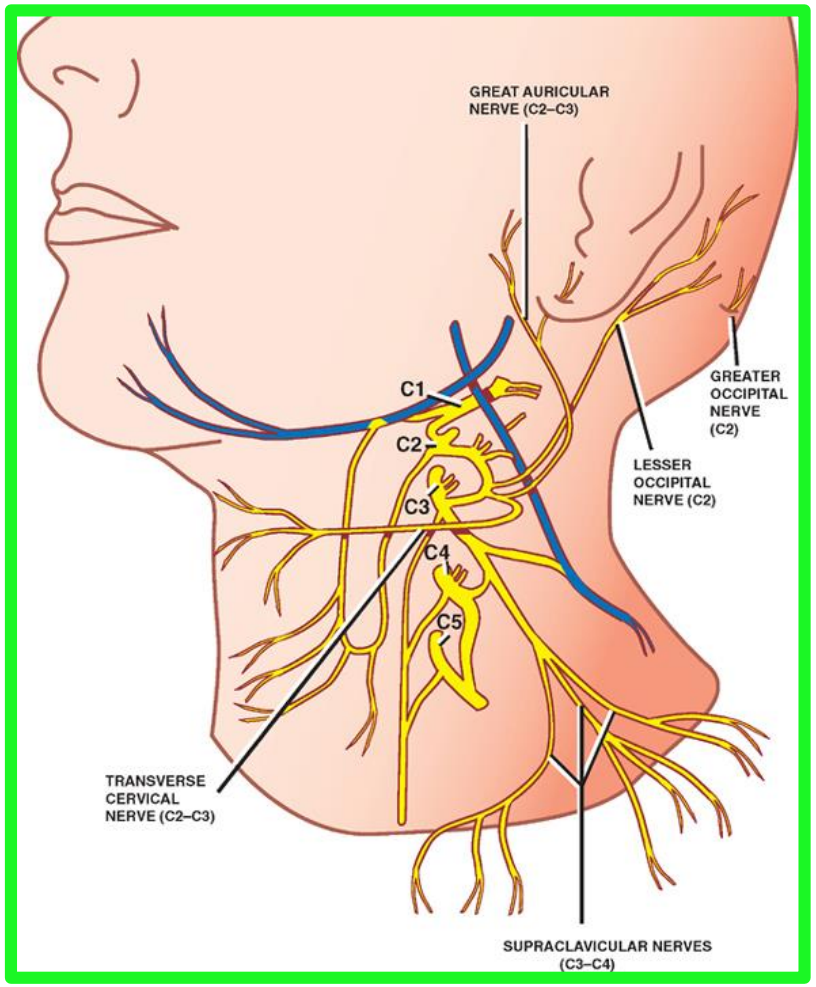
Dr. Aiman Qais Afar
15 March 2023

Cervical plexus

❖The cervical plexus lies Anteromedial to the levator scapulae and middle scalene muscles and deep to the SCM.

❖The superficial branches of the plexus that initially pass posteriorly are cutaneous (sensory) branches

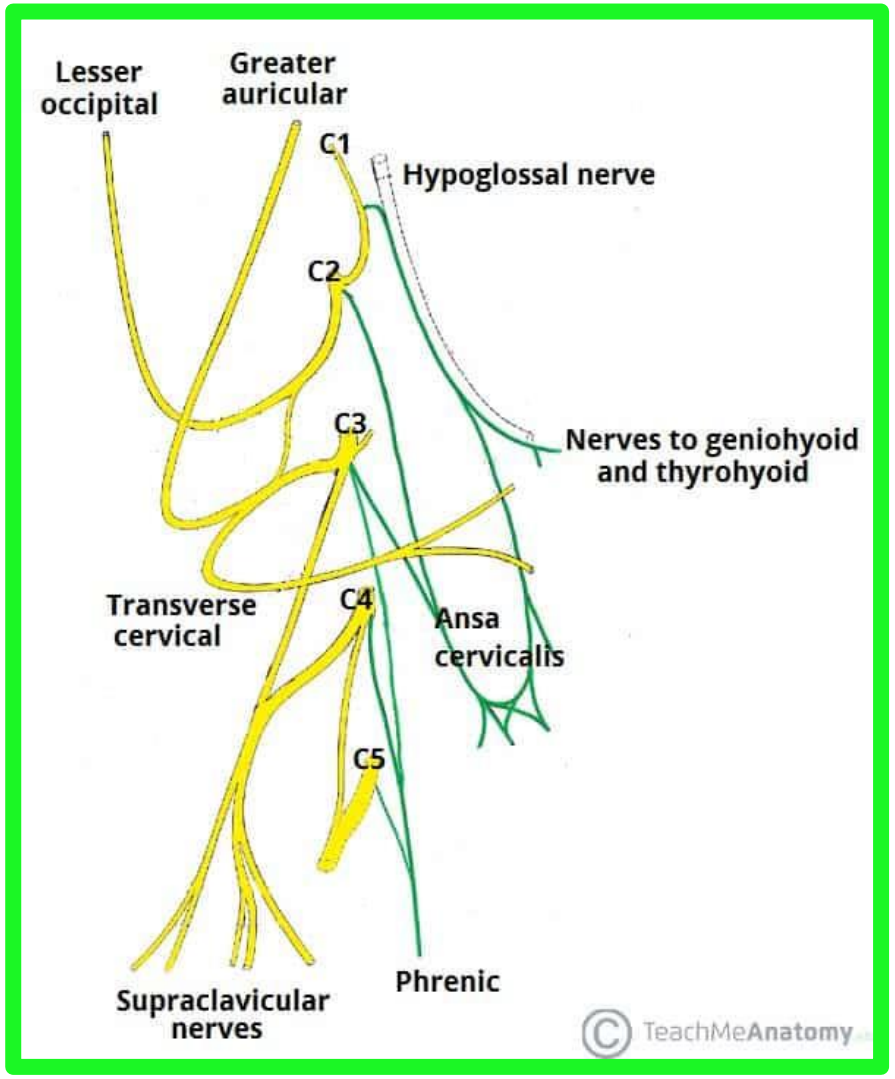


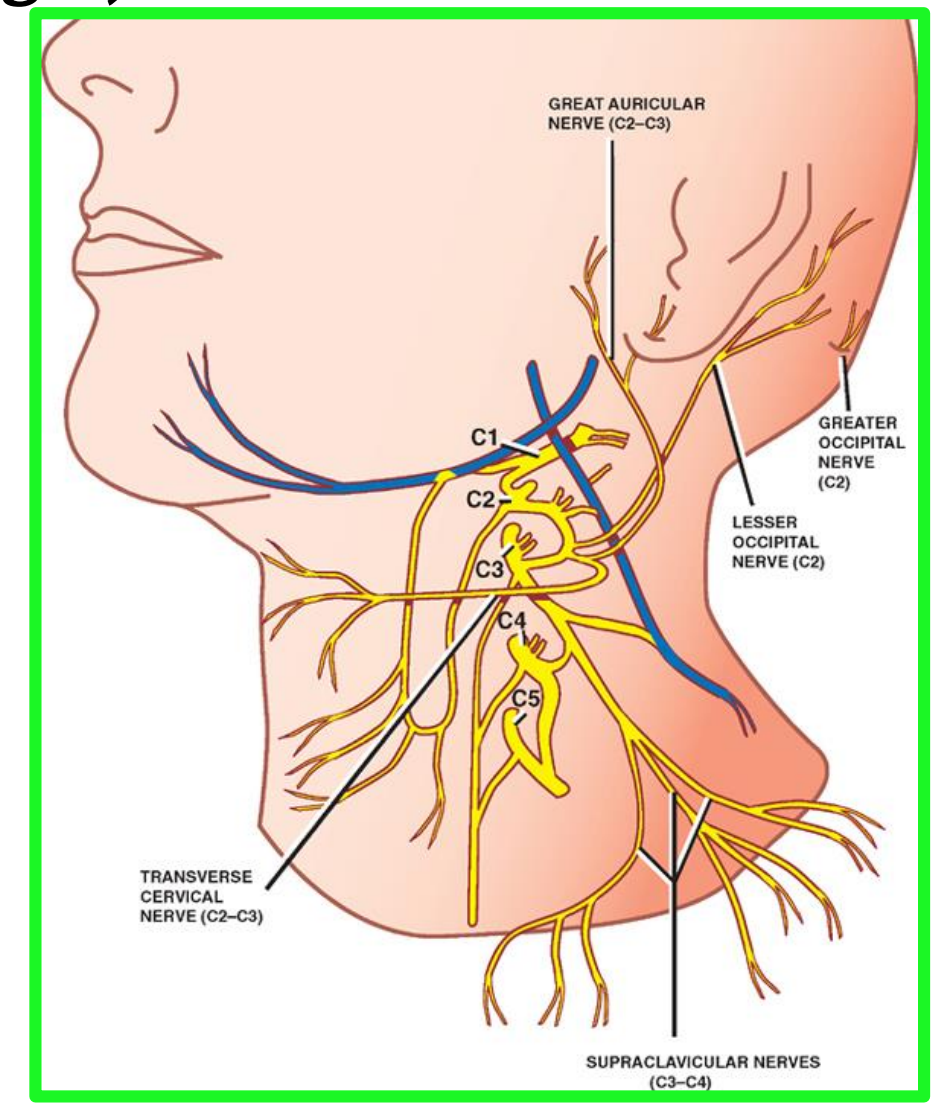


Cervical plexus

Dr. Aiman Qais Afar
15 March 2023

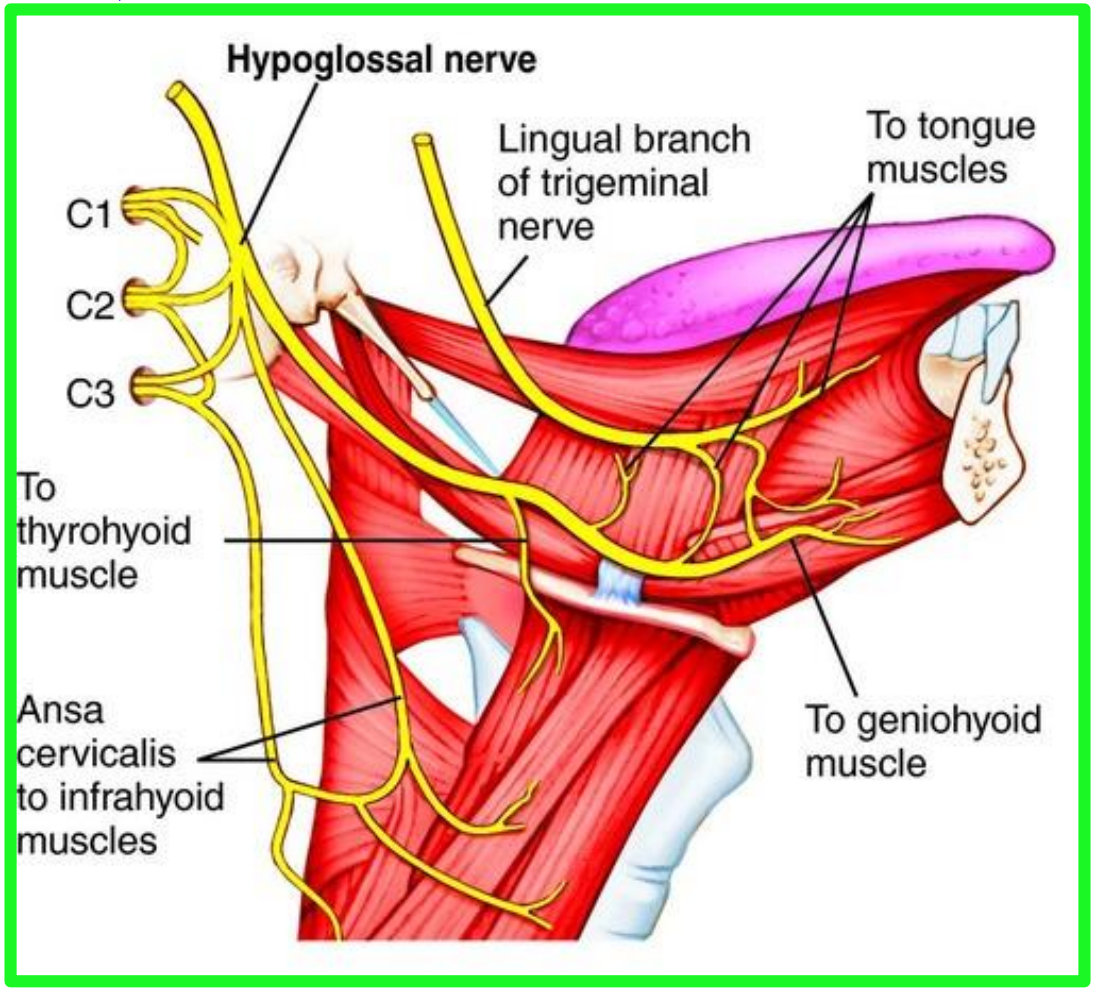
❖**The deep branches passing anteromedially** are **motor branches**, including the roots of **the phrenic nerve** (**to the diaphragm**) and **the ansa cervicalis**





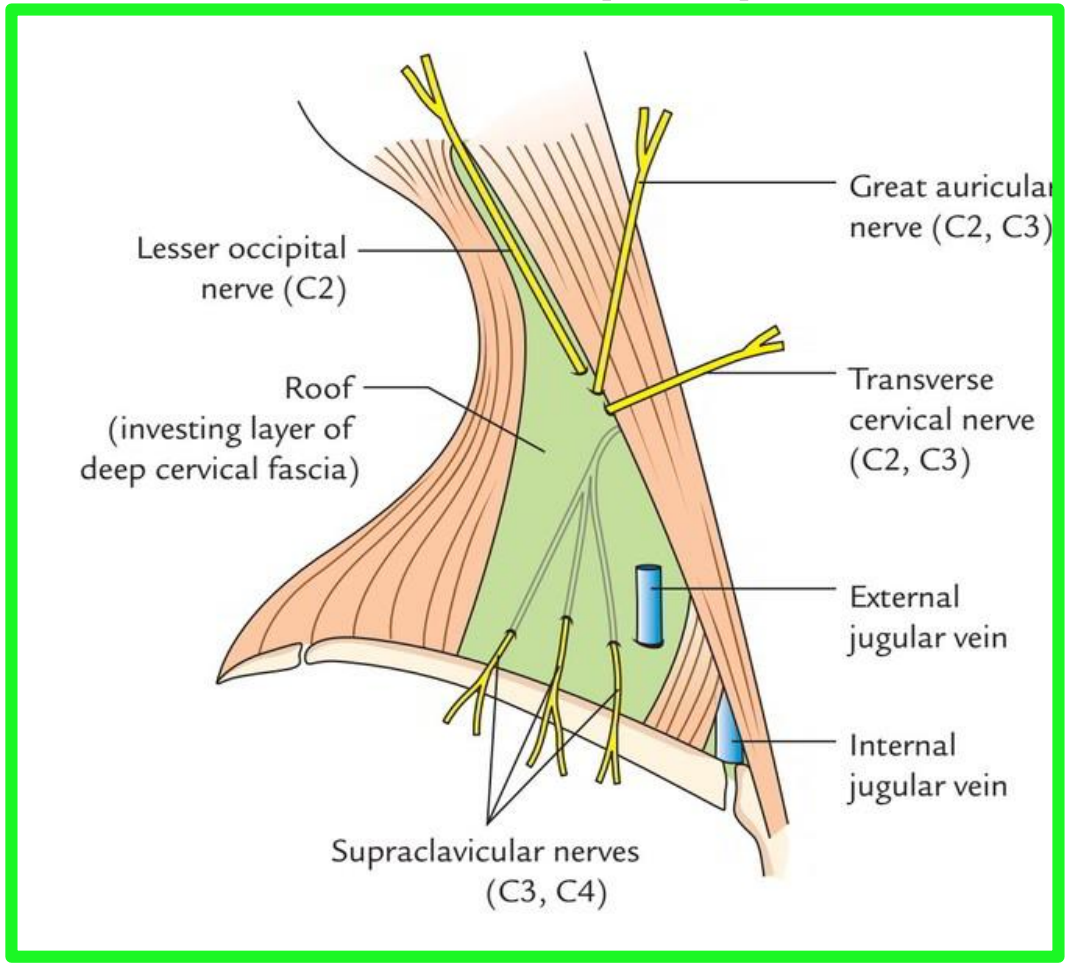
Cervical plexus

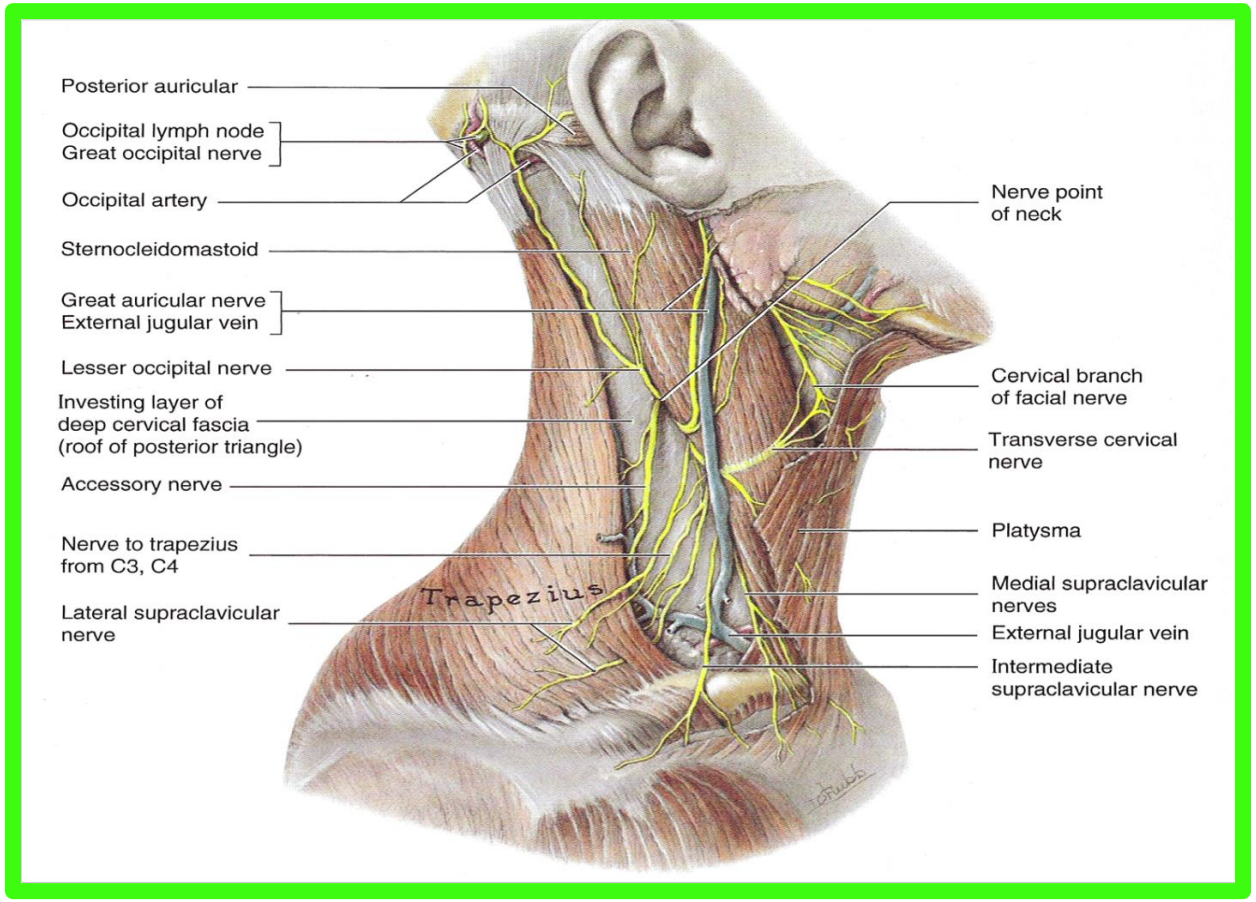
❑The fourth Infrahyoid muscle, the thyrohyoid, receives C1 fibers, which descend independently from the hypoglossal nerve, distal to the superior root of the ansa cervicalis (nerve to thyrohyoid)



Cervical plexus

❖**Cutaneous branches of the cervical plexus** emerge around the middle of the posterior border of the SCM, often called **the nerve point of the neck** and supply the skin of the neck, superolateral thoracic wall, and scalp between the auricle and the external occipital protuberance



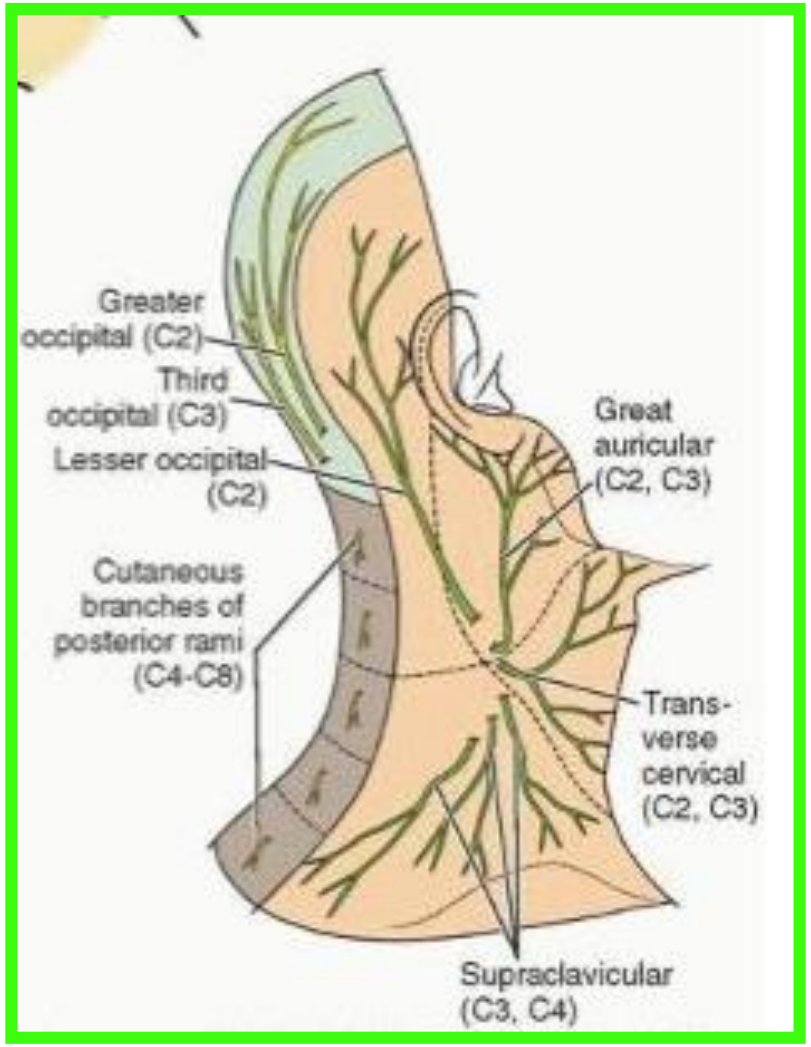


Cervical plexus

Branches of cervical plexus arising from the nerve loop between the anterior rami of C2 and C3 are the:

✓**Lesser occipital nerve (C2):** supplies the skin of the neck and scalp posterosuperior to the auricle.

✓**Great auricular nerve (C2 and C3):** ascends vertically across the oblique SCM to the inferior pole of the parotid gland, where it divides to supply the skin over—and the sheath surrounding—the gland, the mastoid process, and both surfaces of the auricle and an area of skin extending from the angle of the mandible to the mastoid process.

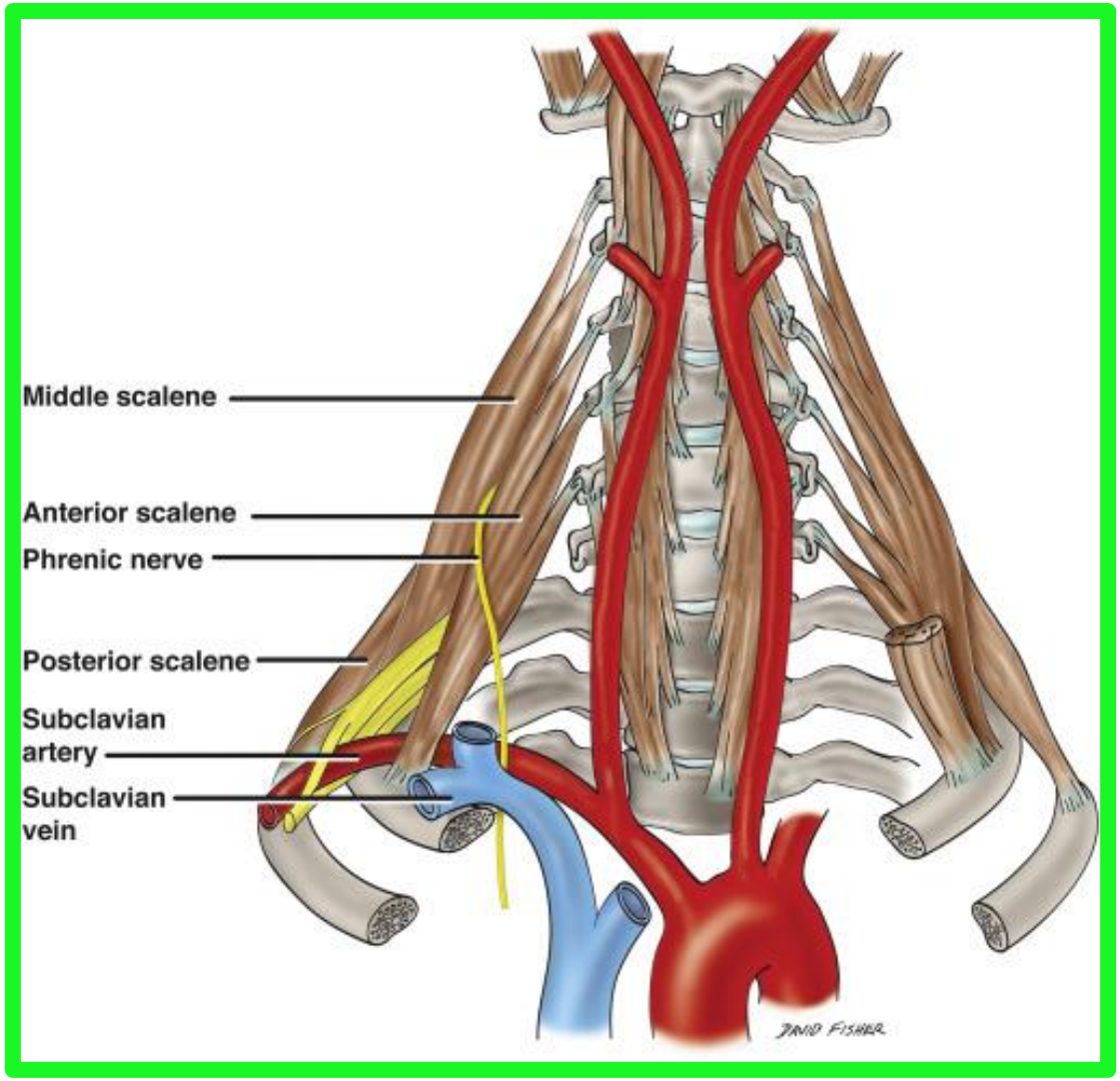


The phrenic nerves

- On the left, the phrenic nerve crosses anterior to the first part of the subclavian artery;

- On the right, it lies on the anterior scalene muscle and crosses anterior to the second part of the subclavian artery.

- On both sides, the phrenic nerve runs posterior to the subclavian vein and anterior to the internal thoracic artery as it enters the thorax.



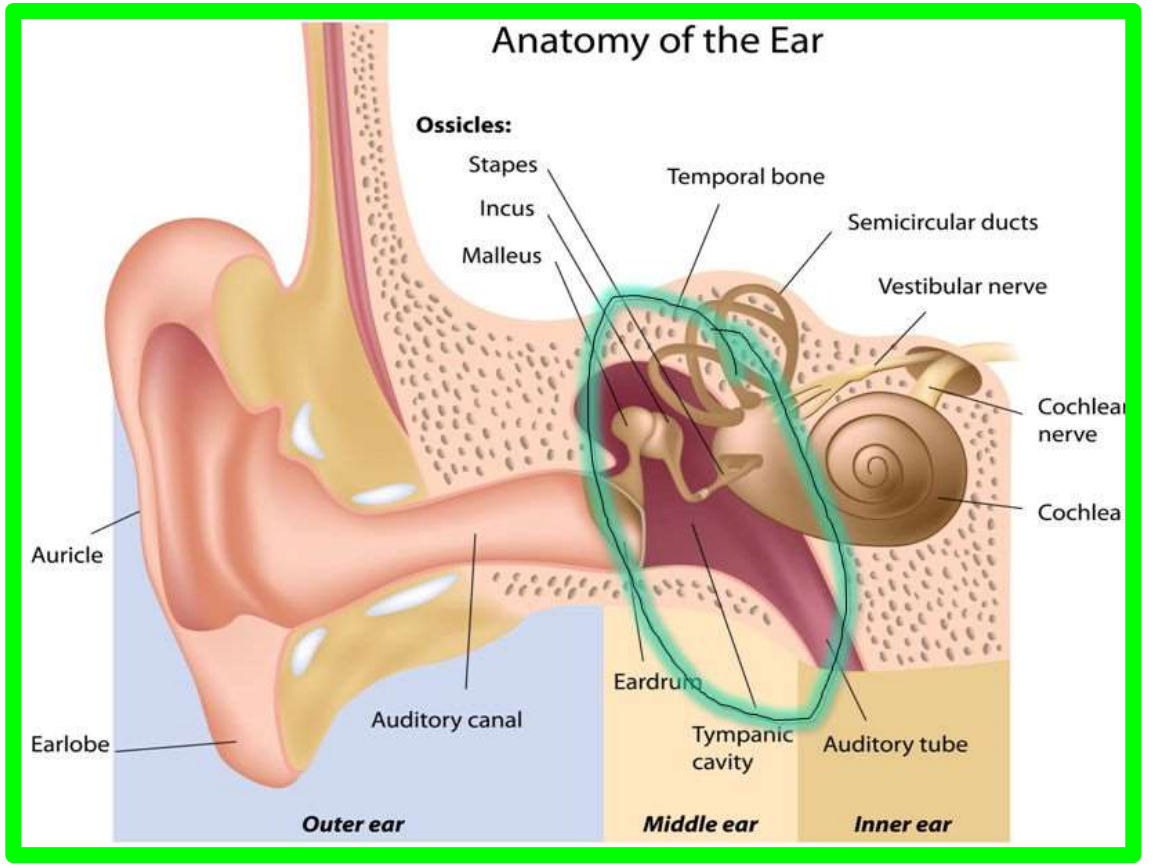
Middle Ear (Tympanic Cavity)

Dr. Aiman AL Maathidy

Tuesday 14 March 2023

✓ *Is an air-containing cavity in the petrous part of the temporal bone and is lined with mucous membrane.*

✓ *It contains the auditory ossicles, whose function is to transmit the vibrations of the tympanic membrane (eardrum) to the perilymph of the internal ear.*



✓ *It is a narrow, oblique, slitlike cavity whose long axis lies approximately parallel to the plane of the tympanic membrane.*

✓ *It communicates in front through the auditory tube with the nasopharynx and behind with the mastoid antrum.*

Middle Ear (Tympanic Cavity)

❑*The posterior wall* ***has in its upper part a large, irregular opening, the aditus to the mastoid antrum***

Below this is a small, hollow, conical projection, the pyramid, from whose apex emerges the tendon of the stapedius muscle

❑*The lateral wall* ***is largely formed by the tympanic membrane***

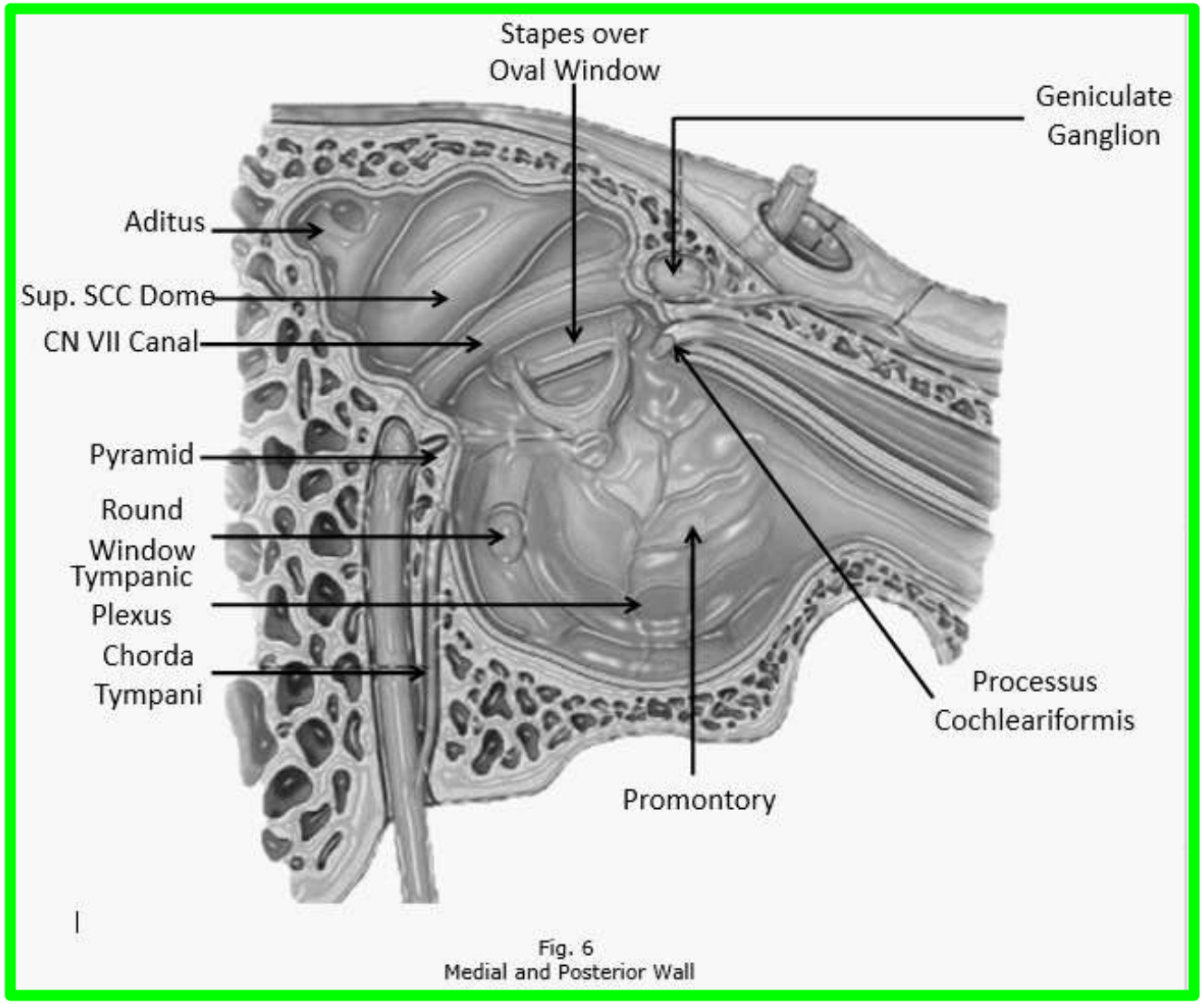
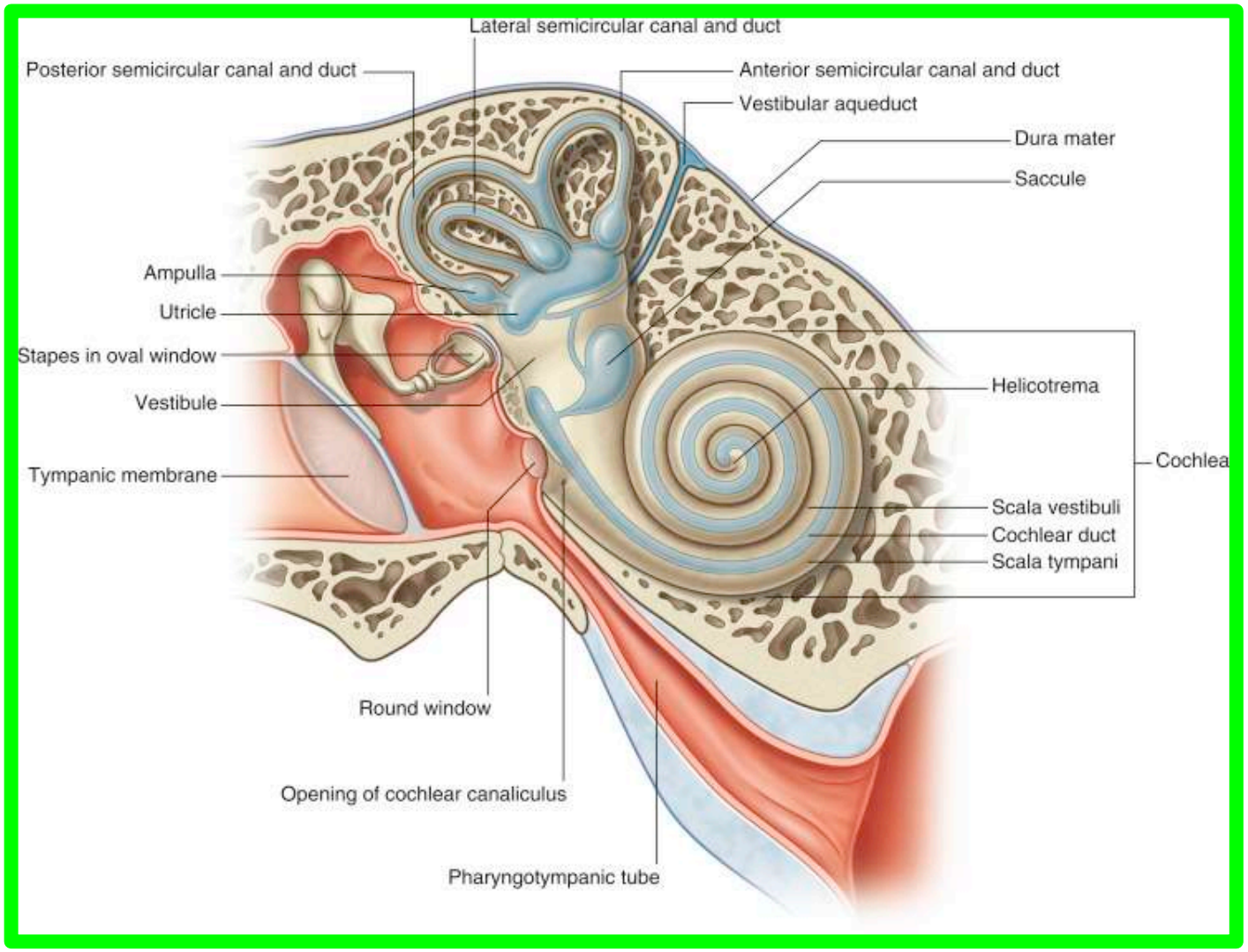


Fig. 6
Medial and Posterior Wall

Middle Ear (Tympanic Cavity)

✓*Below the posterior end of the promontory lies the fenestra cochleae, which is round and closed by the secondary tympanic membrane.*

✓*On the medial side of this window is the perilymph of the blind end of the scala tympani*

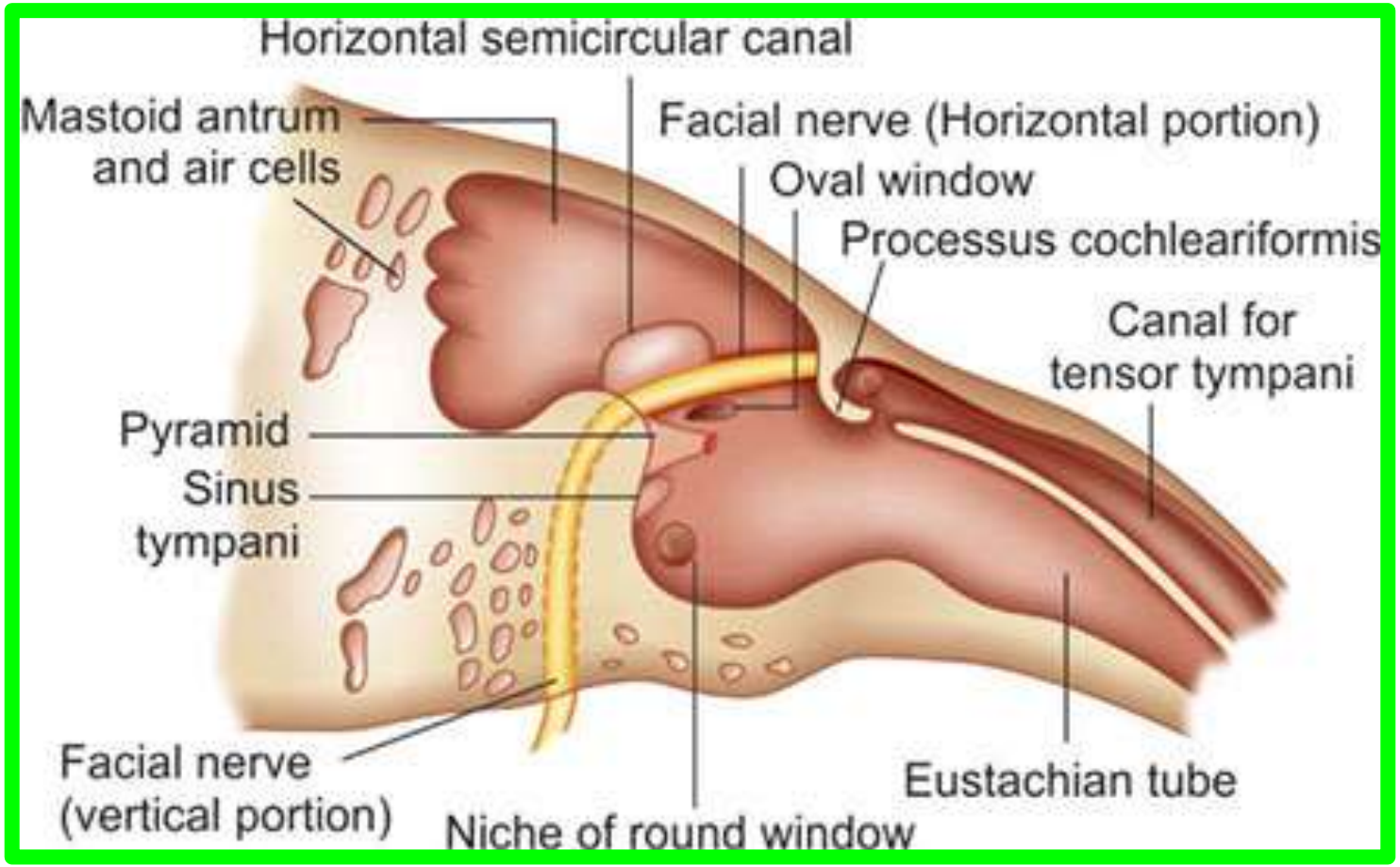


Middle Ear (Tympanic Cavity)

The bony shelf derived from the anterior wall extends backward on the medial wall above the promontory and above the fenestra vestibuli.

It supports the tensor tympani muscle.

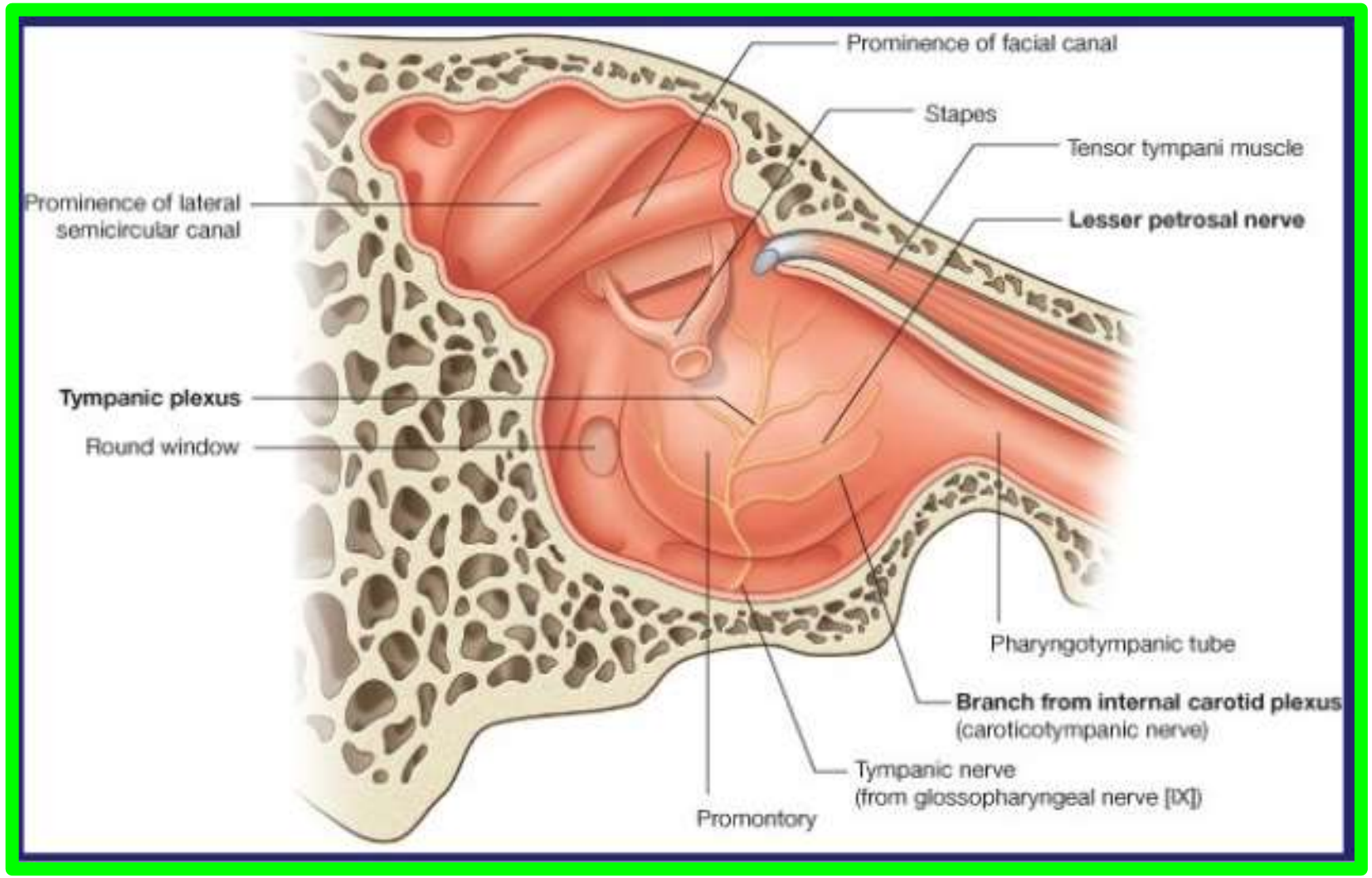
Its posterior end is curved upward and forms a pulley, the processus cochleariformis, around which the tendon of the tensor tympani bends laterally to reach its insertion on the handle of the malleus



Middle Ear (Tympanic Cavity)

A rounded ridge runs horizontally backward above the promontory and the fenestra vestibuli and is known as the prominence of the facial nerve canal.

On reaching the posterior wall, it curves downward behind the pyramid



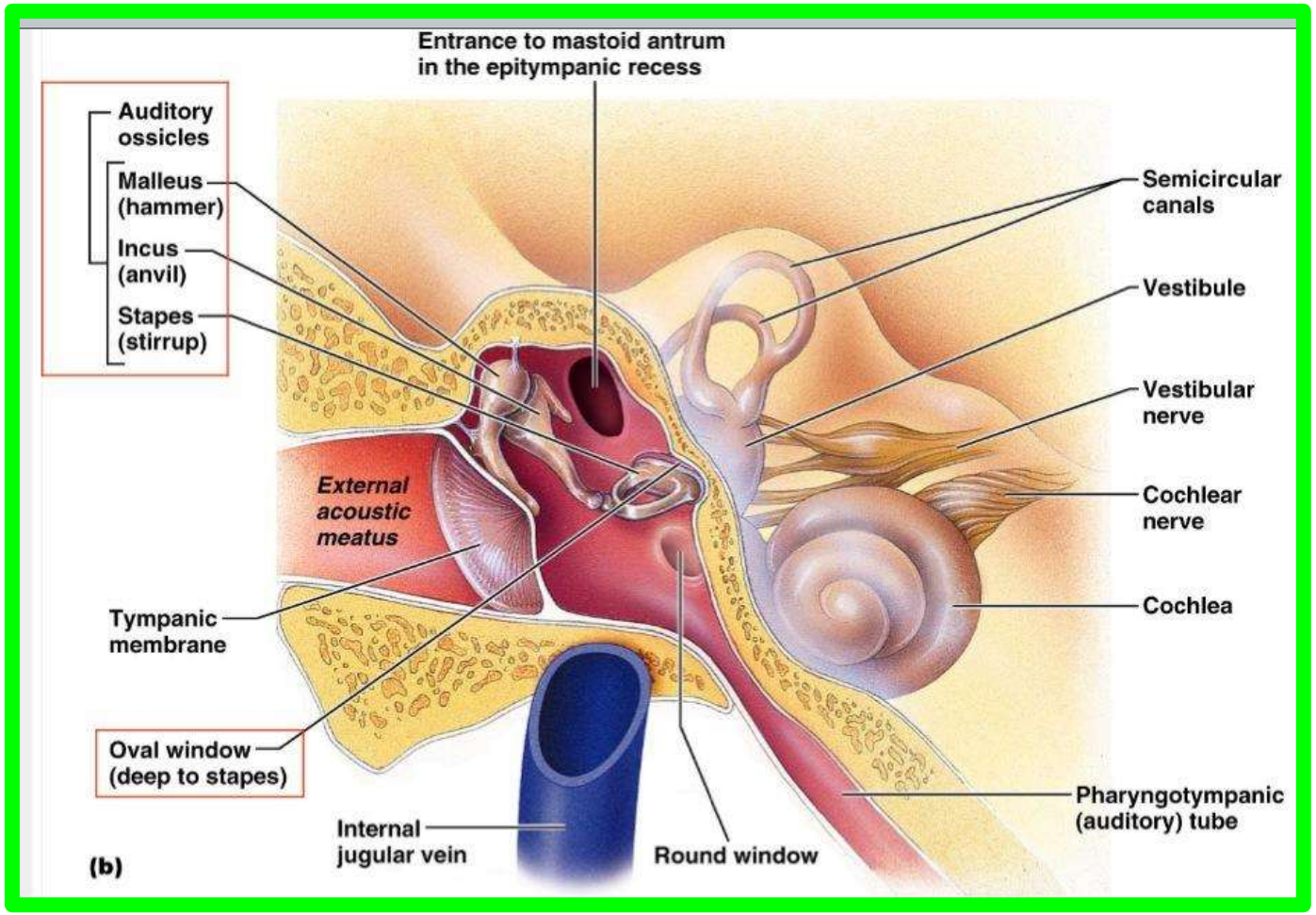
Middle Ear (Tympanic Cavity)

✓*The tympanic membrane is a thin, fibrous membrane that is pearly gray.*

✓ *The membrane is obliquely placed, facing downward, forward, and laterally.*

✓*It is concave laterally, and at the depth of the concavity is a small depression, the umbo, produced by the tip of the handle of the malleus.*

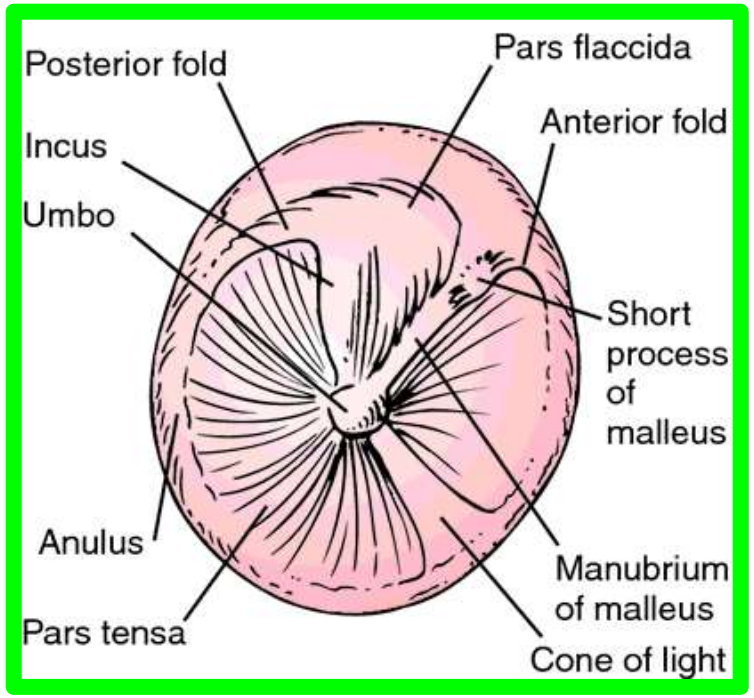
✓ *When the membrane is illuminated through an otoscope, the concavity produces a "cone of light," which radiates anteriorly and inferiorly from the umbo.*

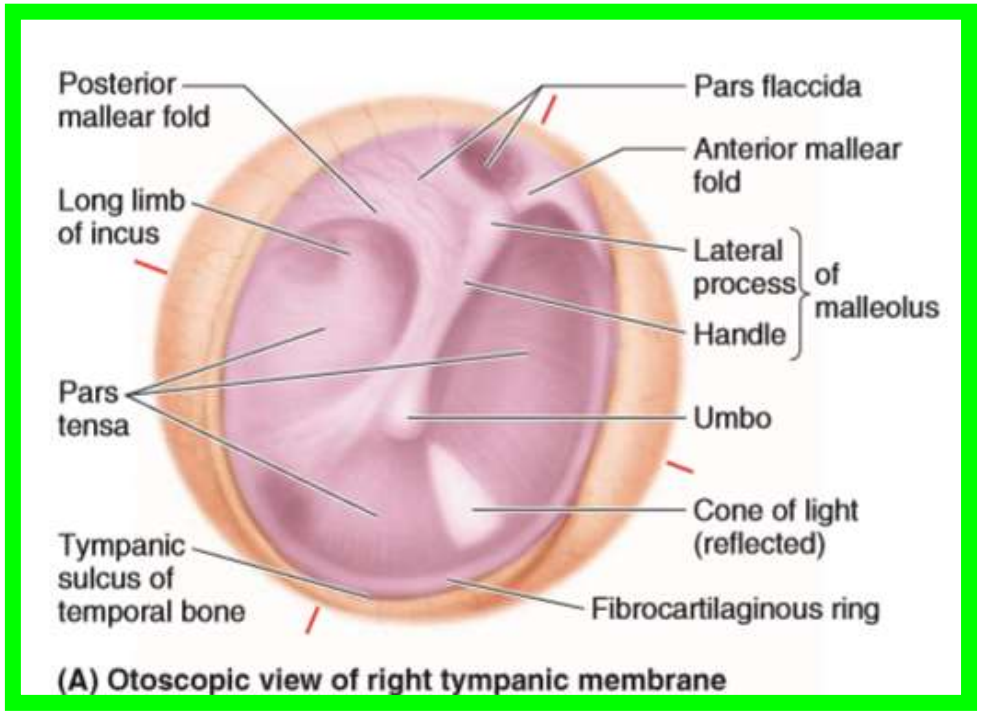


Middle Ear (Tympanic Cavity)

✓*The tympanic membrane is circular and measures about 1 cm in diameter. The circumference is thickened and is slotted into a groove in the bone.*

✓*The groove, or tympanic sulcus, is deficient superiorly, which forms a notch.*





✓*From the sides of the notch, two bands, termed the anterior and posterior malleolar folds, pass to the lateral process of the malleus.*

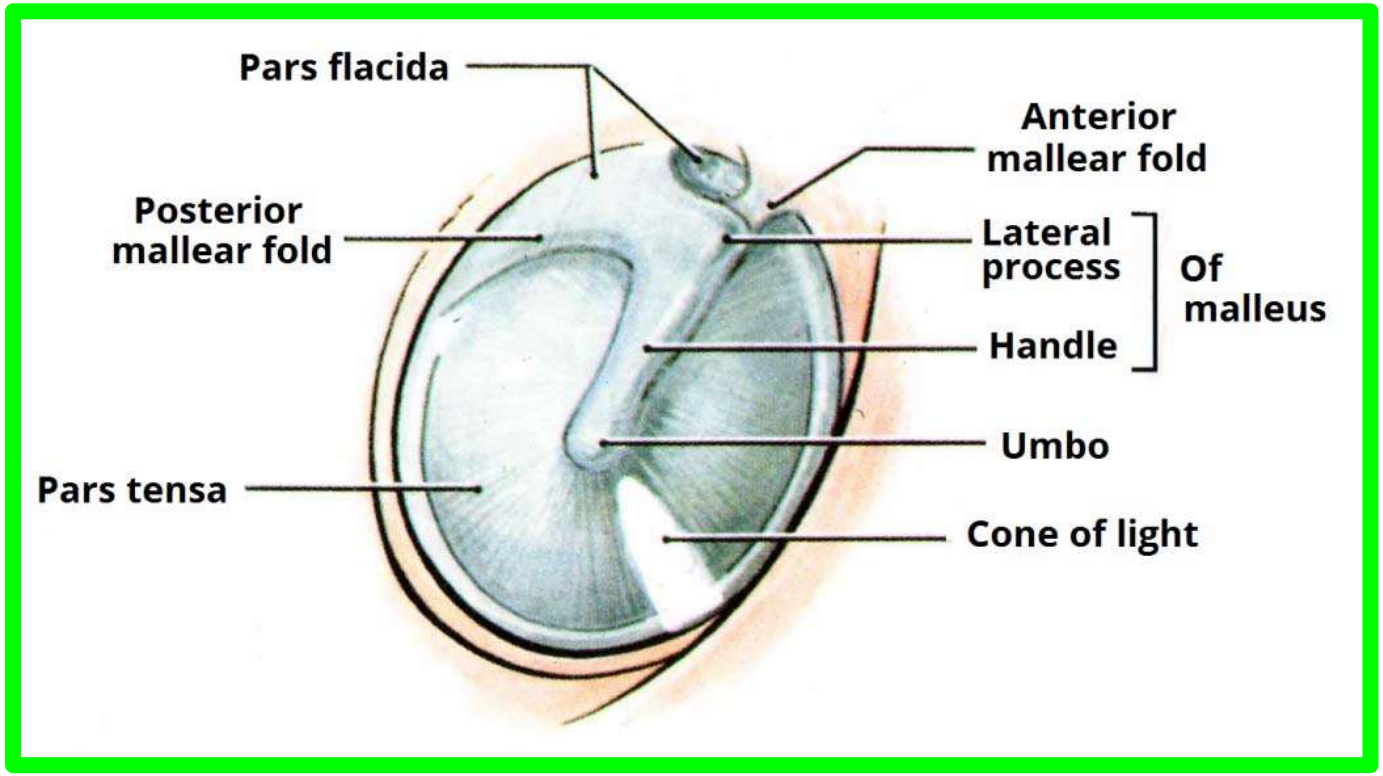
✓*The small triangular area on the tympanic membrane that is bounded by the folds is slack and is called the pars flaccida*

Middle Ear (Tympanic Cavity)

✓ *The remainder of the membrane is tense and is called the pars tensa.*

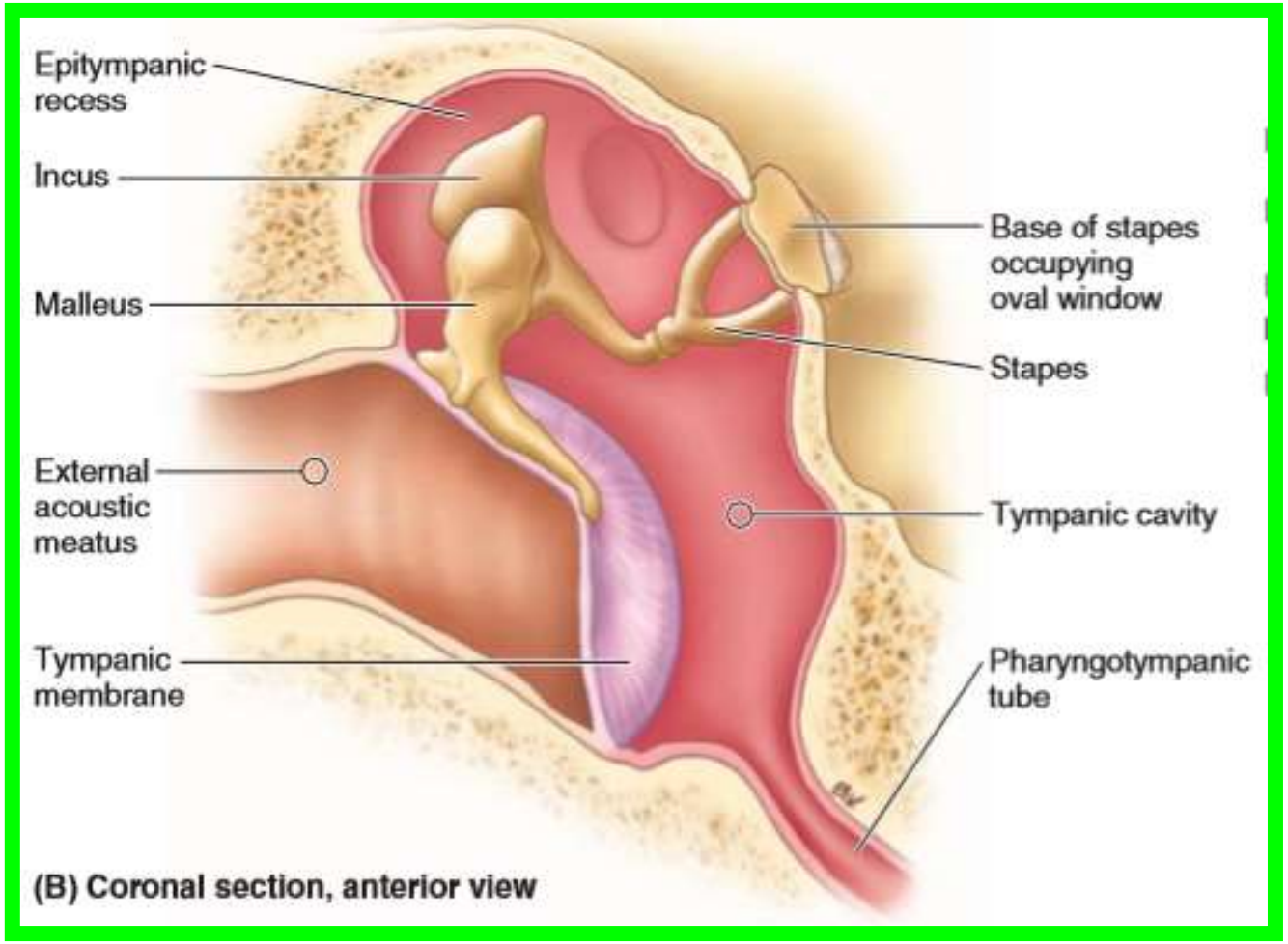
✓*The handle of the malleus is bound down to the inner surface of the tympanic membrane by the mucous membrane.*

✓*The tympanic membrane is extremely sensitive to pain and is innervated on its outer surface by the auriculotemporal nerve and the auricular branch of the vagus.*



Auditory Ossicles

The auditory ossicles (malleus, incus, and stapes) form a mobile chain of small bones across the tympanic cavity from the tympanic membrane to the oval window (L. fenestra vestibuli), an oval opening on the labyrinthine wall of the tympanic cavity leading to the vestibule of the bony labyrinth



The ossicles are covered with the mucous membrane lining the tympanic cavity, but unlike other bones of the body, they are not directly covered with a layer of periosteum.

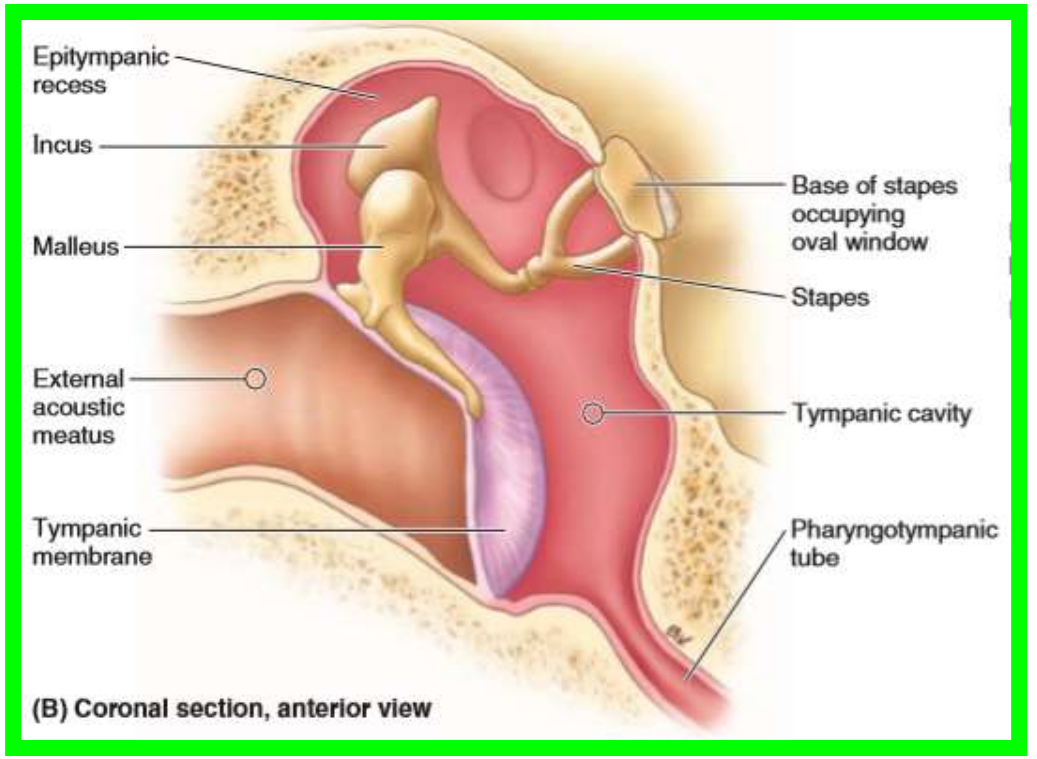
Auditory Ossicles

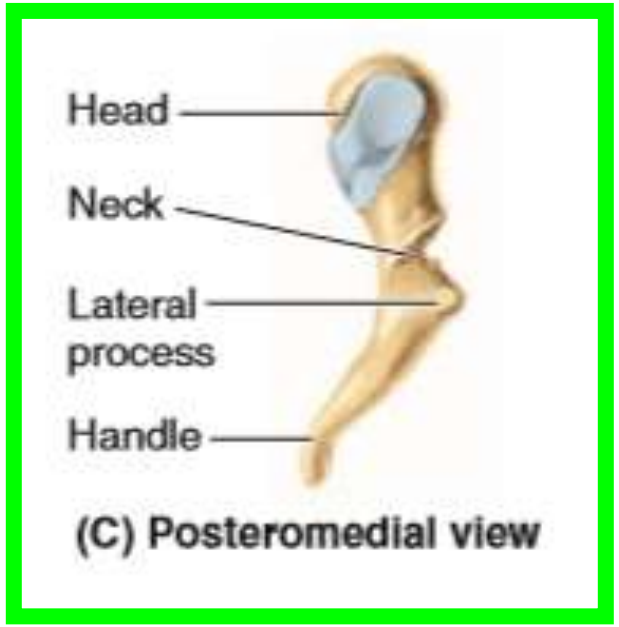
The malleus (L. hammer) is attached to the tympanic membrane

Its rounded head lies superiorly in the epitympanic recess.

The neck lies against the flaccid part of the tympanic membrane, and the handle is embedded in the tense part of the tympanic membrane with its tip at the umbo.

The head of the malleus articulates with the incus; the tendon of the tensor tympani inserts into the handle of the malleus.





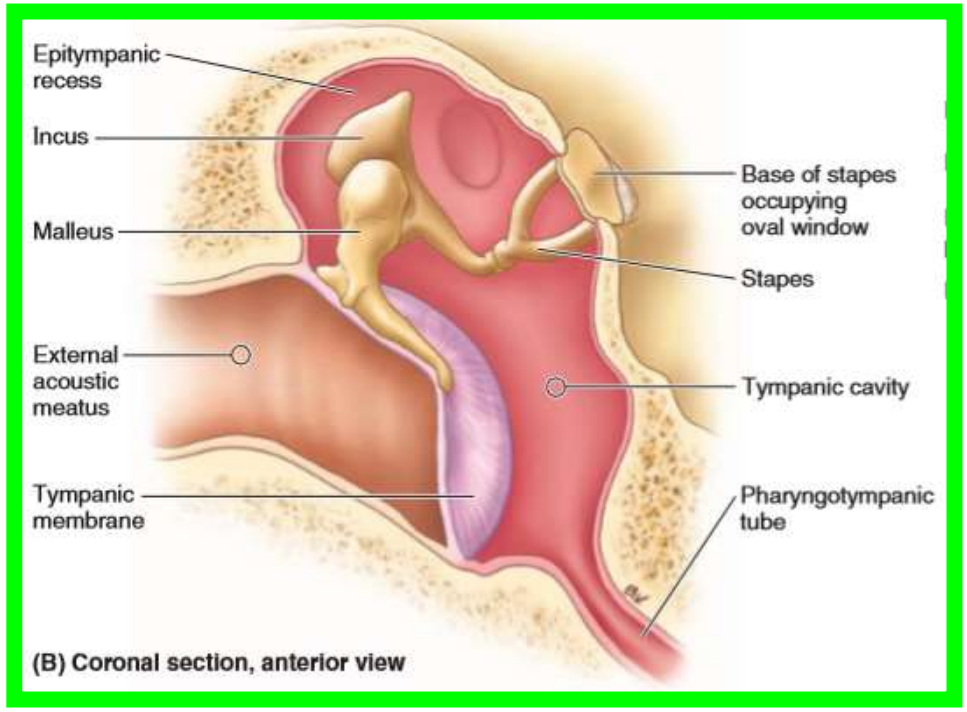
Auditory Ossicles

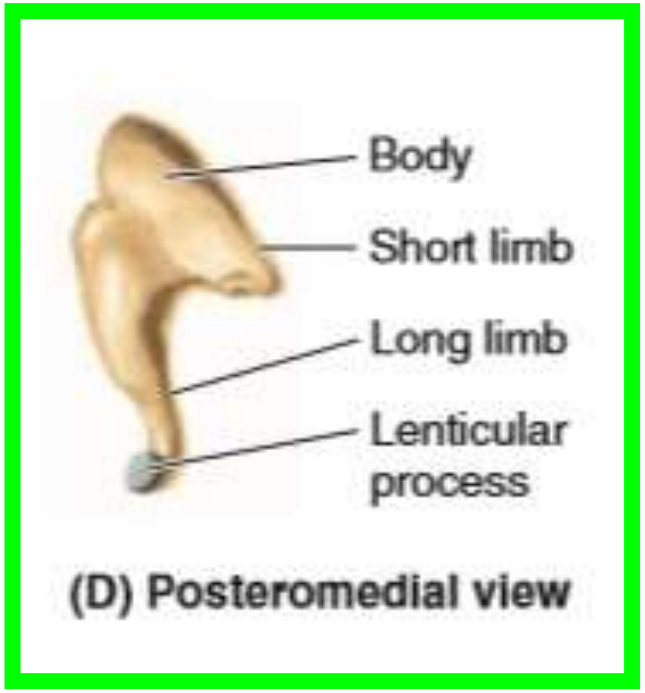
✓The incus (L. anvil) links (articulates with) the malleus and the stapes

✓The body of the incus lies in the epitympanic recess where it articulates with the head of the malleus.

✓The long limb lies parallel to the handle of the malleus, and its inferior end articulates with the stapes by way of the lenticular process.

✓The short limb is connected by a ligament to the posterior wall of the tympanic cavity





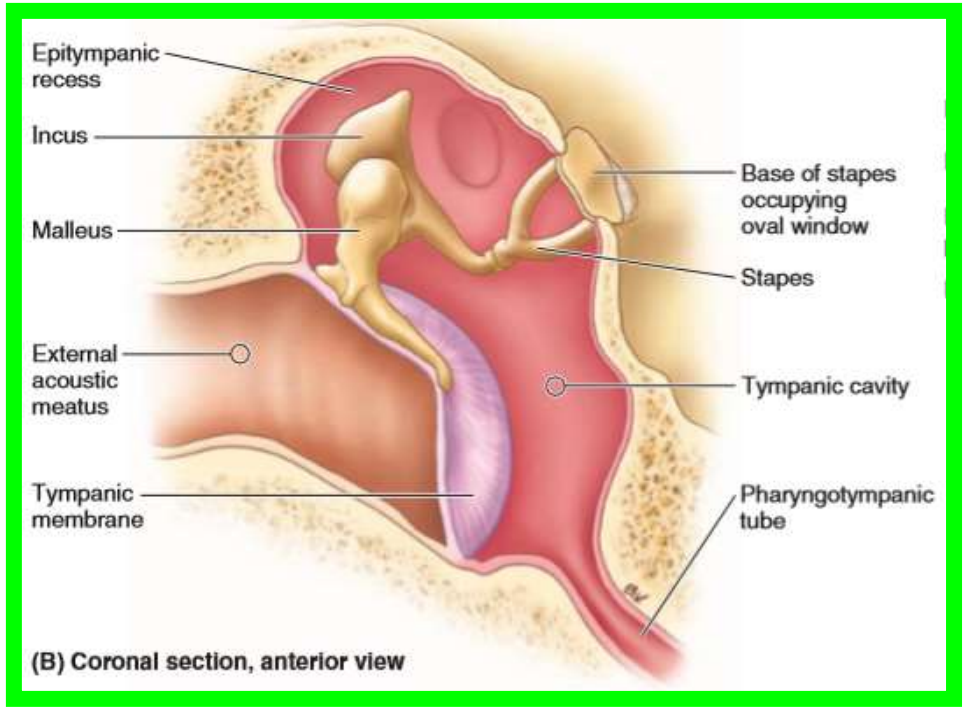
Auditory Ossicles

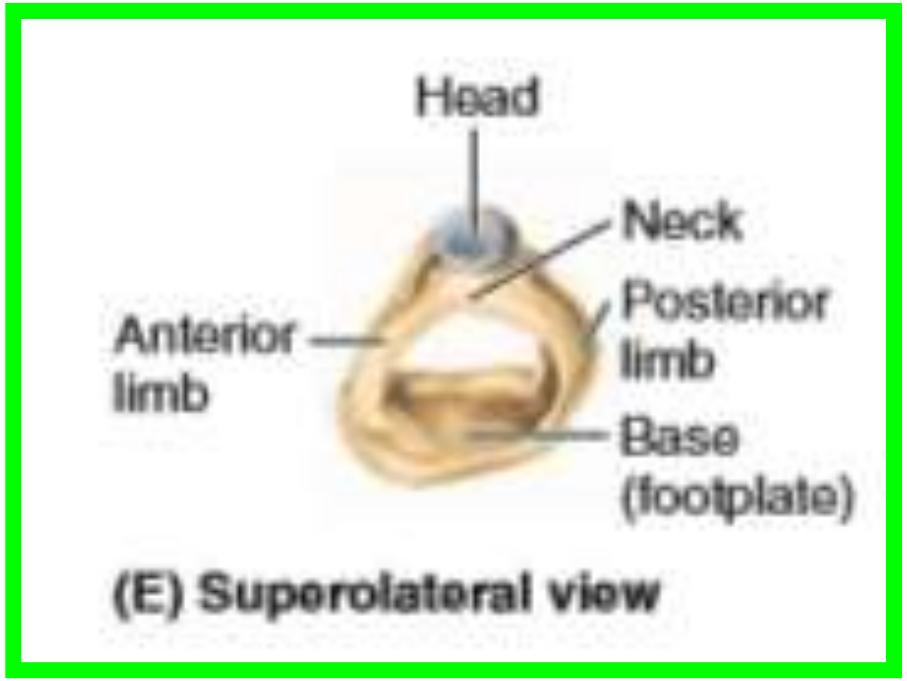
The stapes (L. stirrup) is the smallest ossicle

The base (footplate) of the stapes is attached to the margins of the oval window on the labyrinthine wall.

The base is considerably smaller than the tympanic membrane; as a result, the vibratory force of the stapes is increased approximately 10 times over that of the tympanic membrane.

Consequently, the auditory ossicles increase the force but decrease the amplitude of the vibrations transmitted from the tympanic membrane.





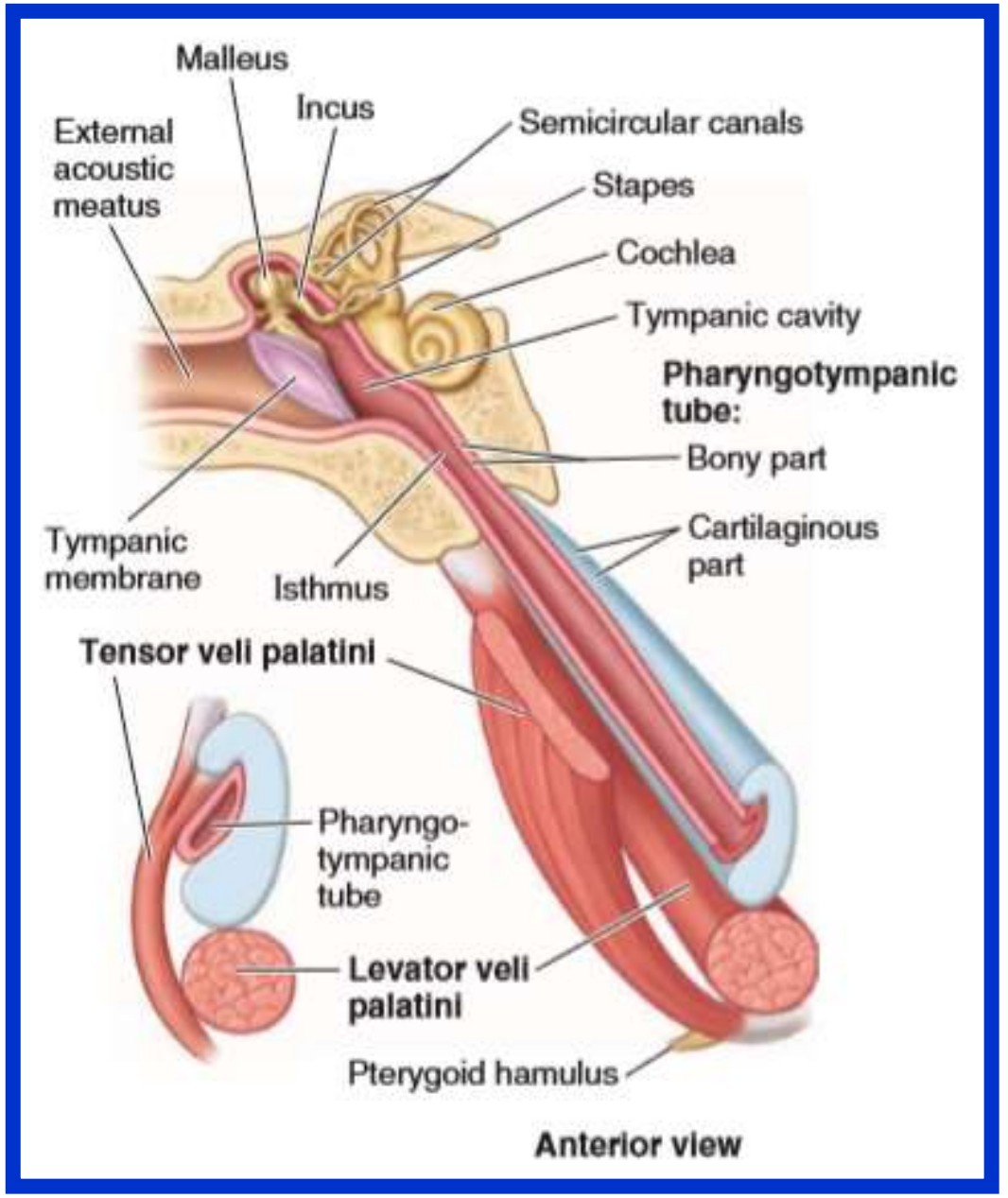
PHARYNGOTYMPANIC TUBE

❖**The auditory tube** connects the anterior wall of the tympanic cavity to the nasal pharynx

❖Its **posterior third is bony**, and its **anterior two thirds is cartilaginous**.

❖As the tube descends, it passes over the upper border of the superior constrictor muscle

❖**It serves to equalize air pressures in the tympanic cavity and the nasal pharynx**.



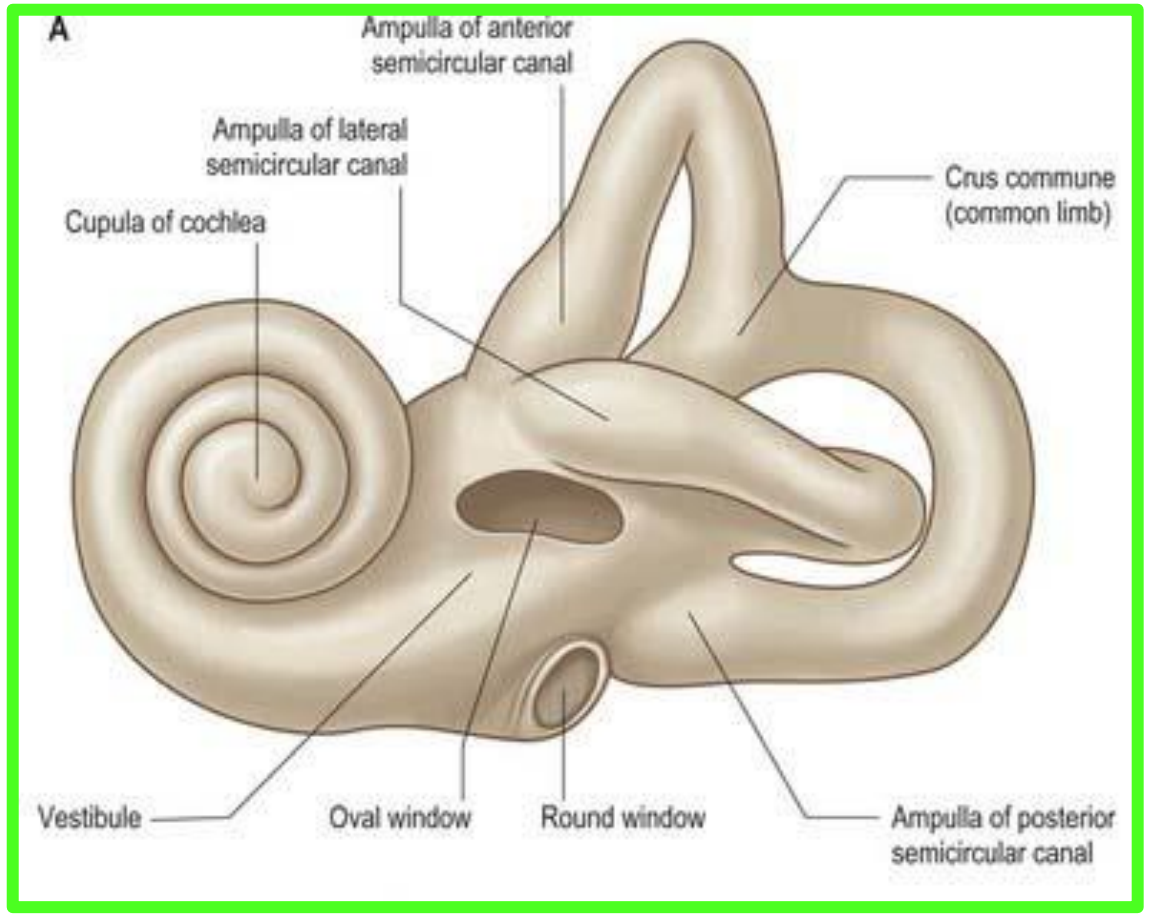
INTERNAL EAR (LABYRINTH)

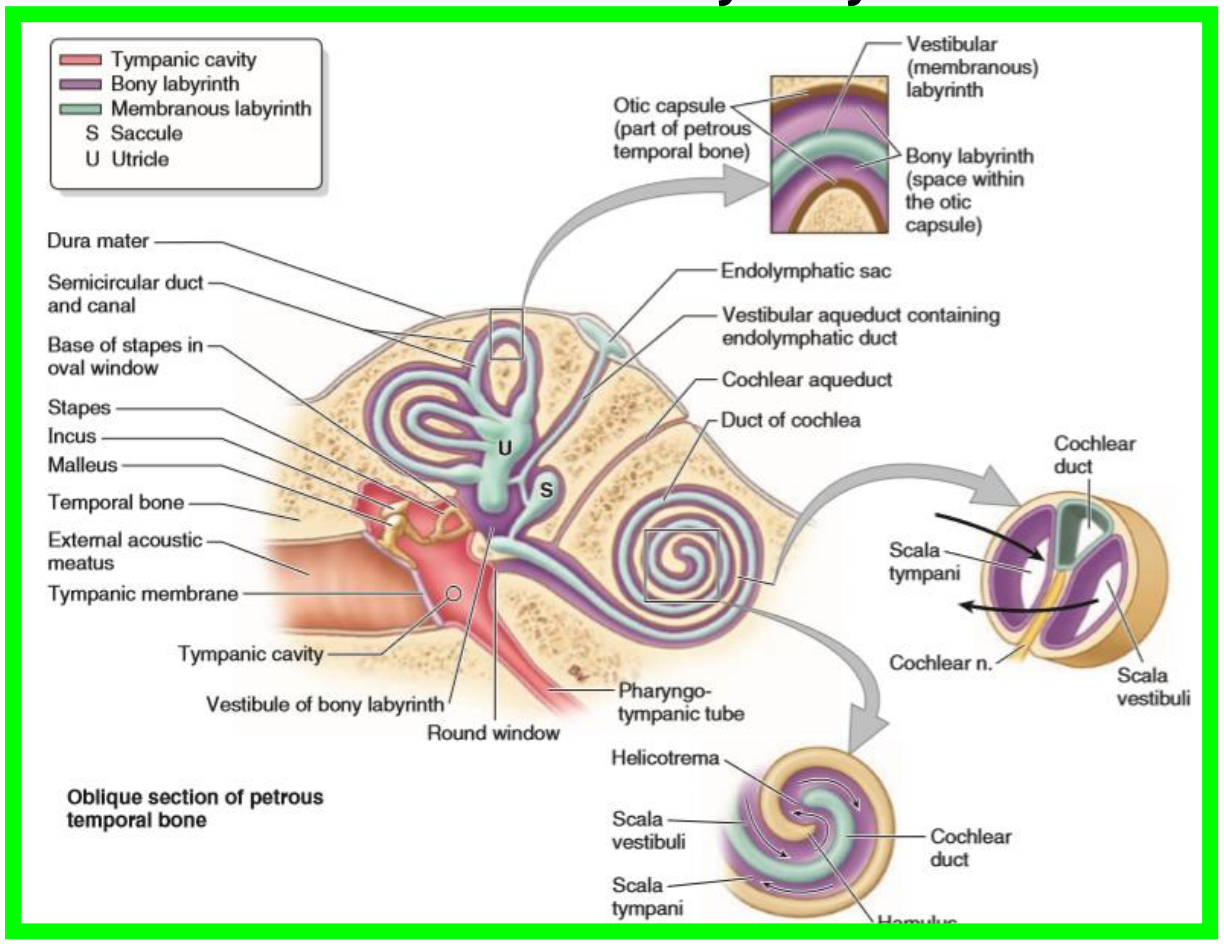
Dr. Aiman AL Maathidy
Thursday 16 March 2023

- **SITE:** inside the petrous part of temporal bone.
- **Structure:** it consists of 2 parts:

(1) **Bony labyrinth:** boney cavities inside the petrous temporal bone.

(2) **Membranous labyrinth:** interconnected sacs and ducts inside the bony labyrinth.



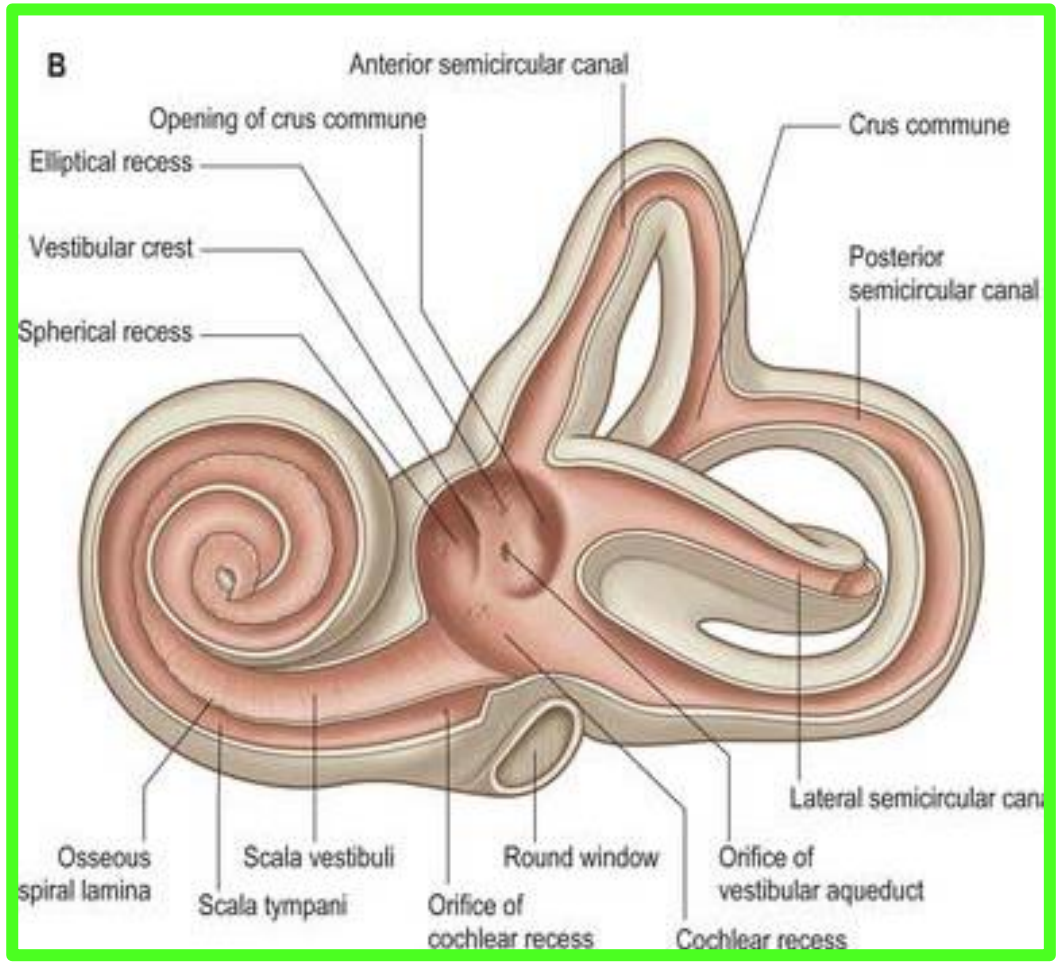


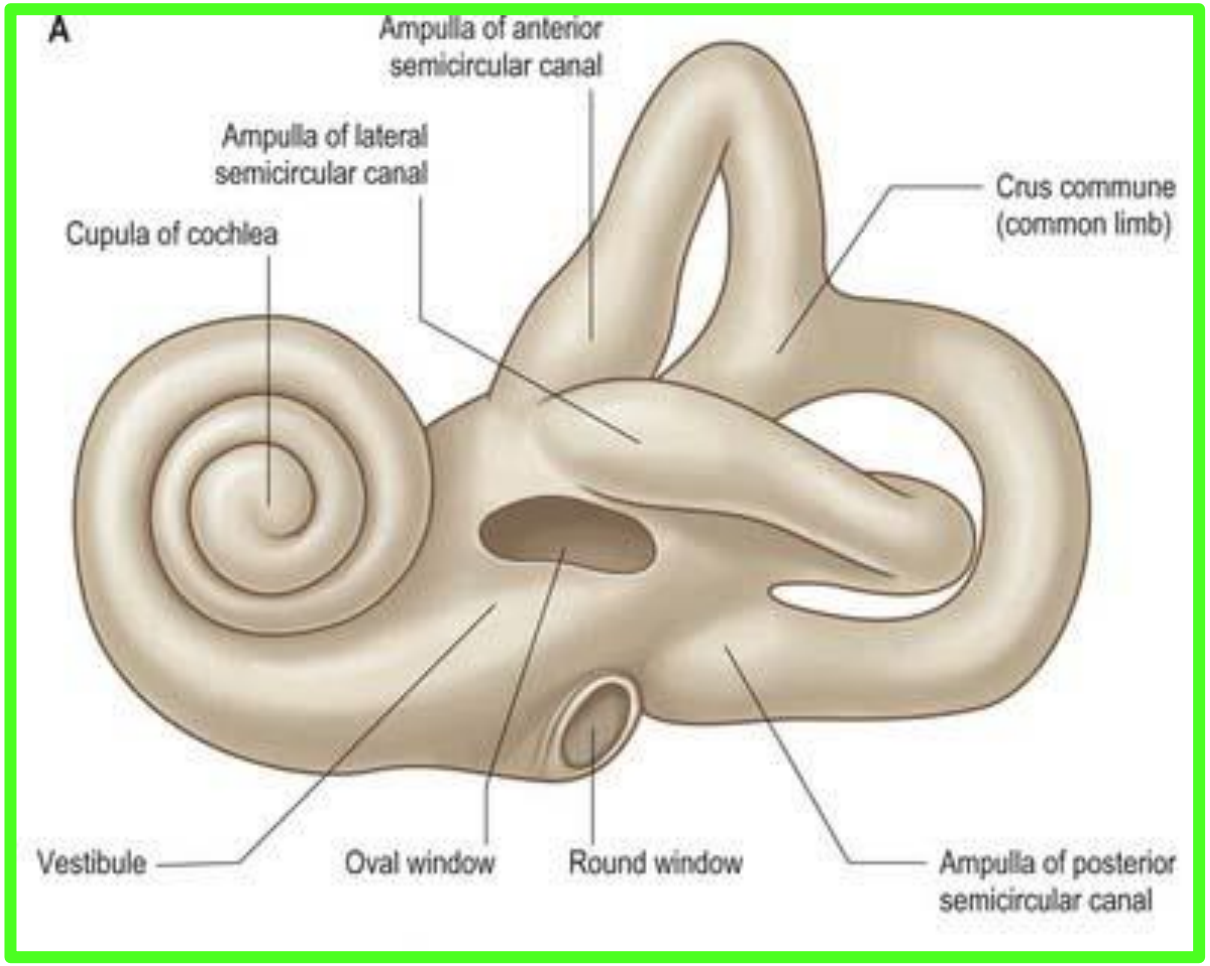
BONY LABYRINTH

II- The vestibule: is the central part of bony labyrinth.

a- Its anterior wall shows the opening of the scala vestibuli of the cochlea.

b- Its posterior wall receives the 5 openings of the 3 semicircular canals.



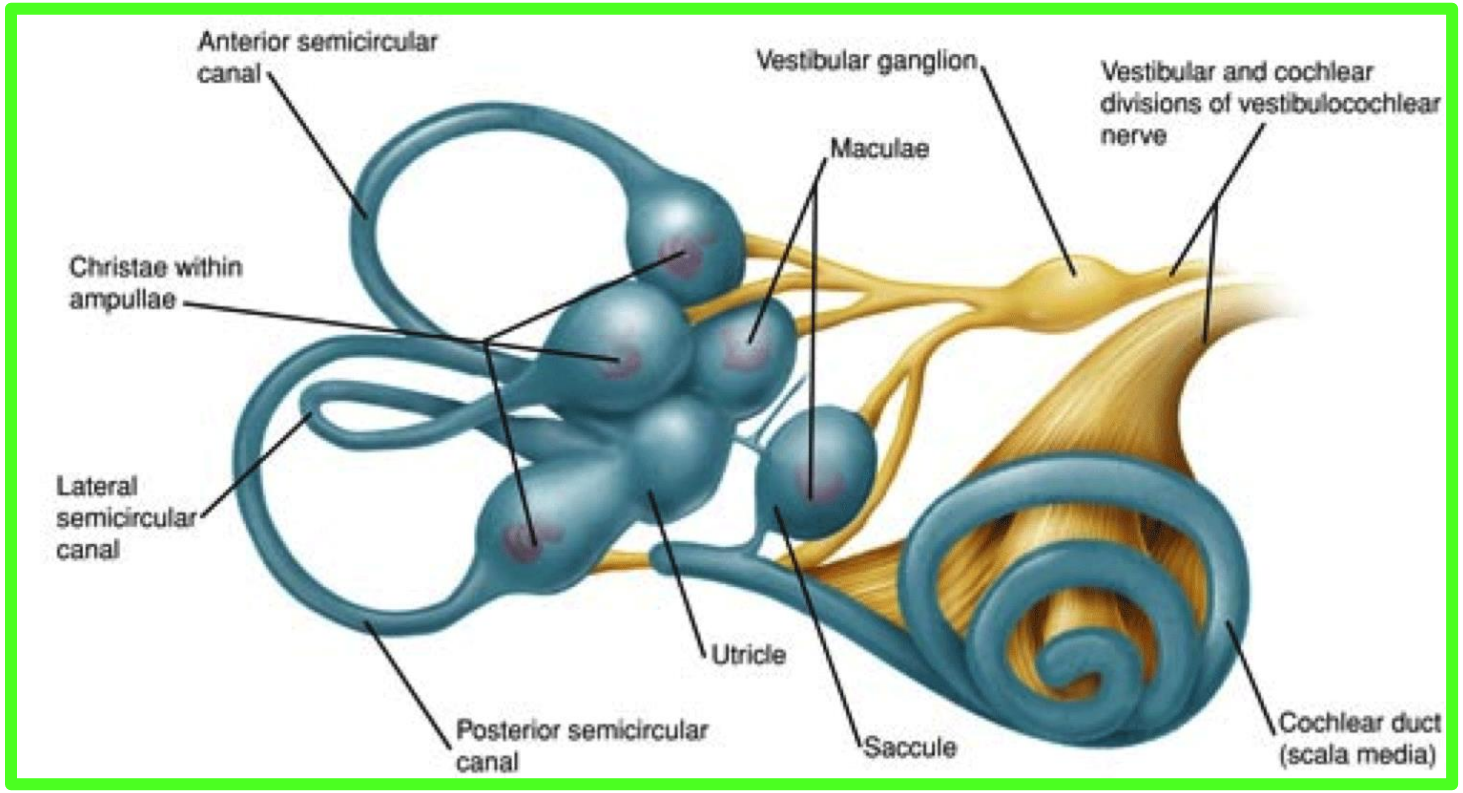


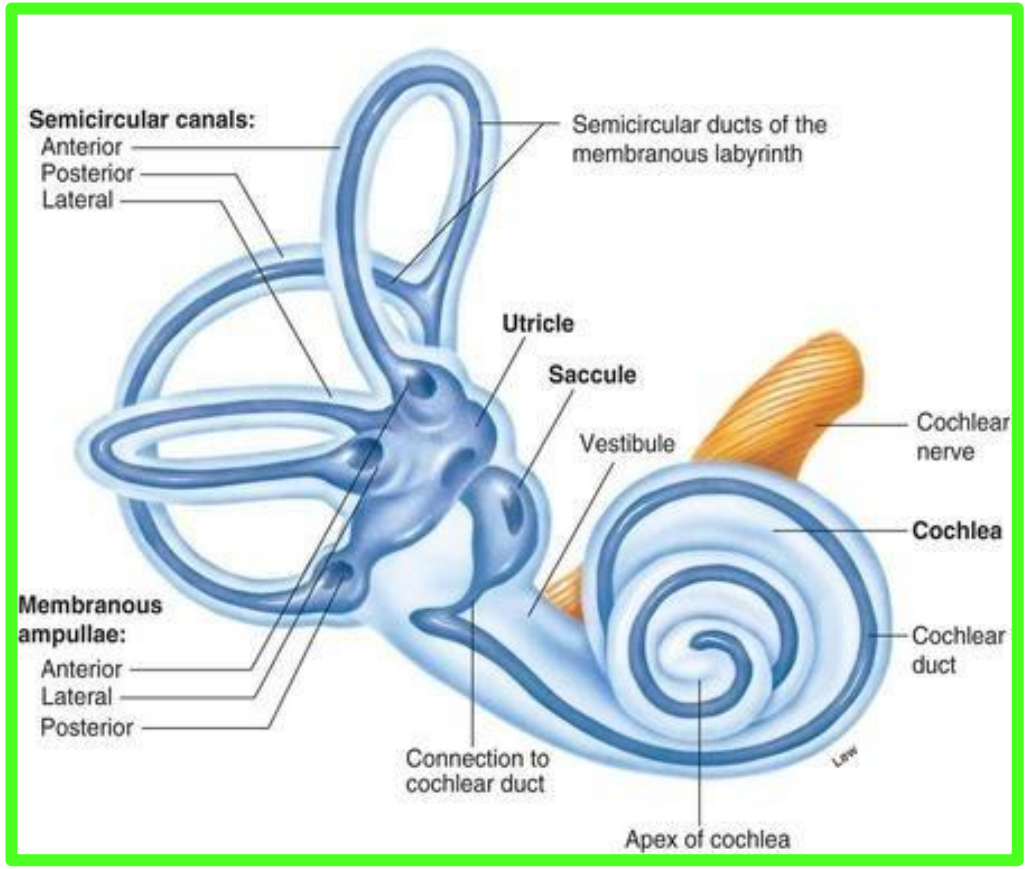
MEMBRANOUS LABYRINTH

- **Parts:**

(1) The 3 semicircular ducts :

- They lie within the corresponding bony canals.
- They open in the utricle.
- Each duct has a dilatation at one of its ends called ampulla.



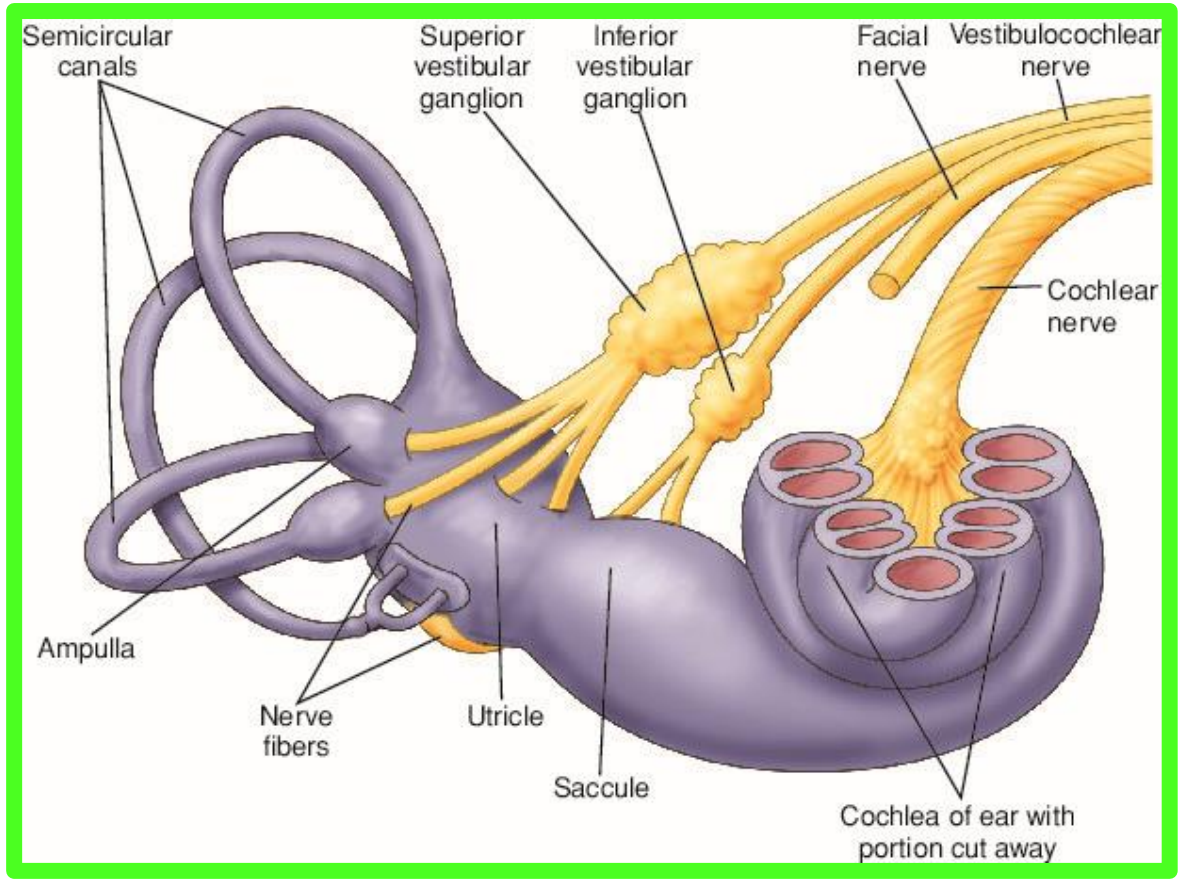


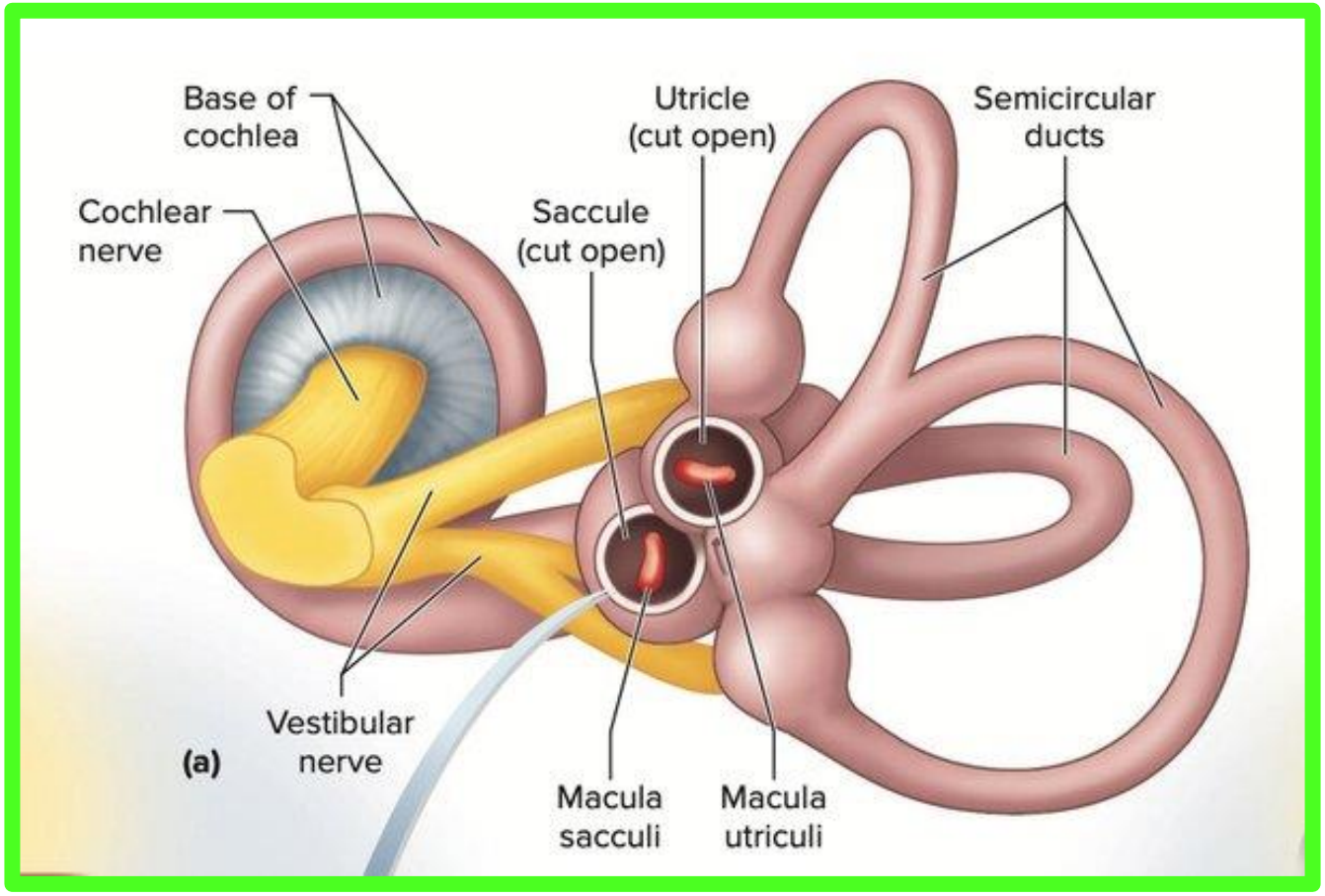
MEMBRANOUS LABYRINTH

(2) The utricle and saccule: they are 2 small sacs which lie **in the vestibule**.

A. Utricle: receives the **3 semicircular ducts**.

- Its lateral wall in thickened to form **a macula.**

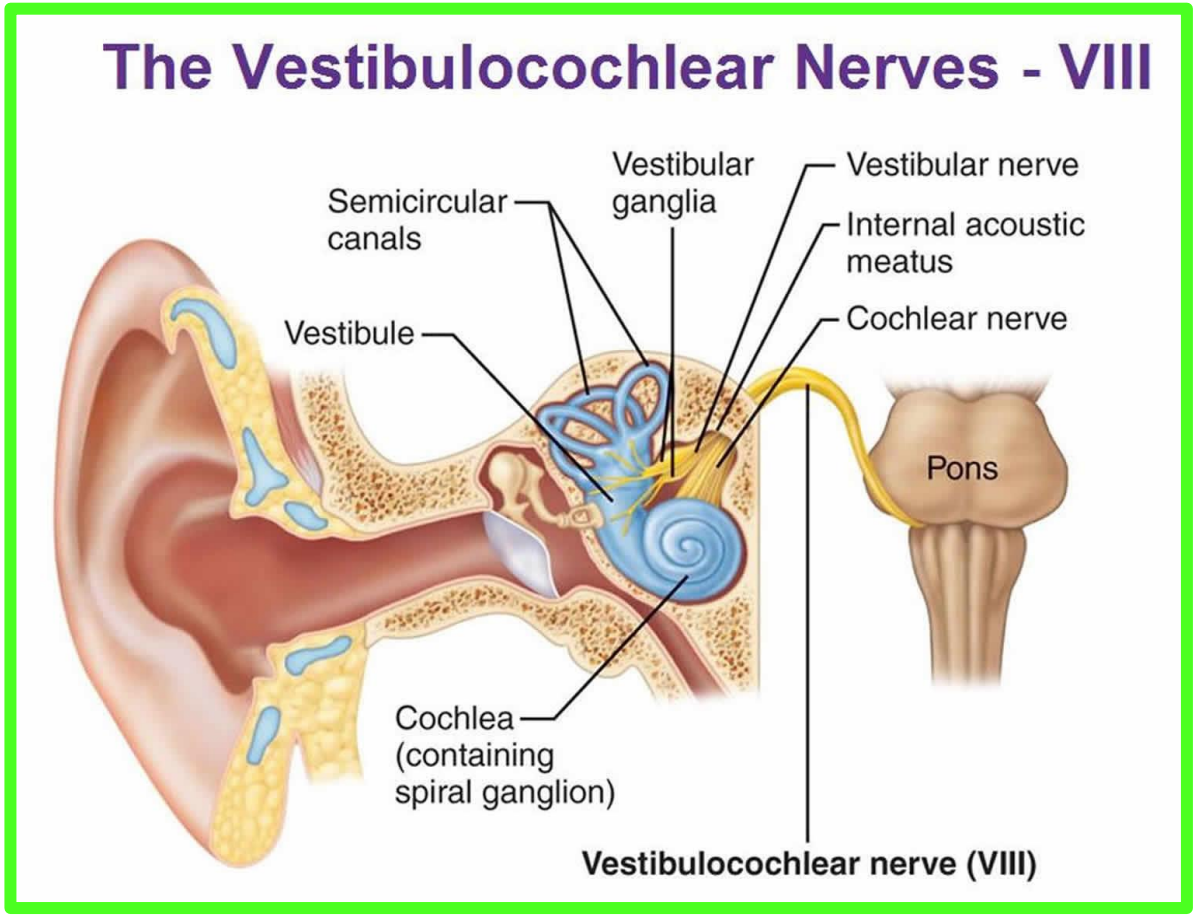


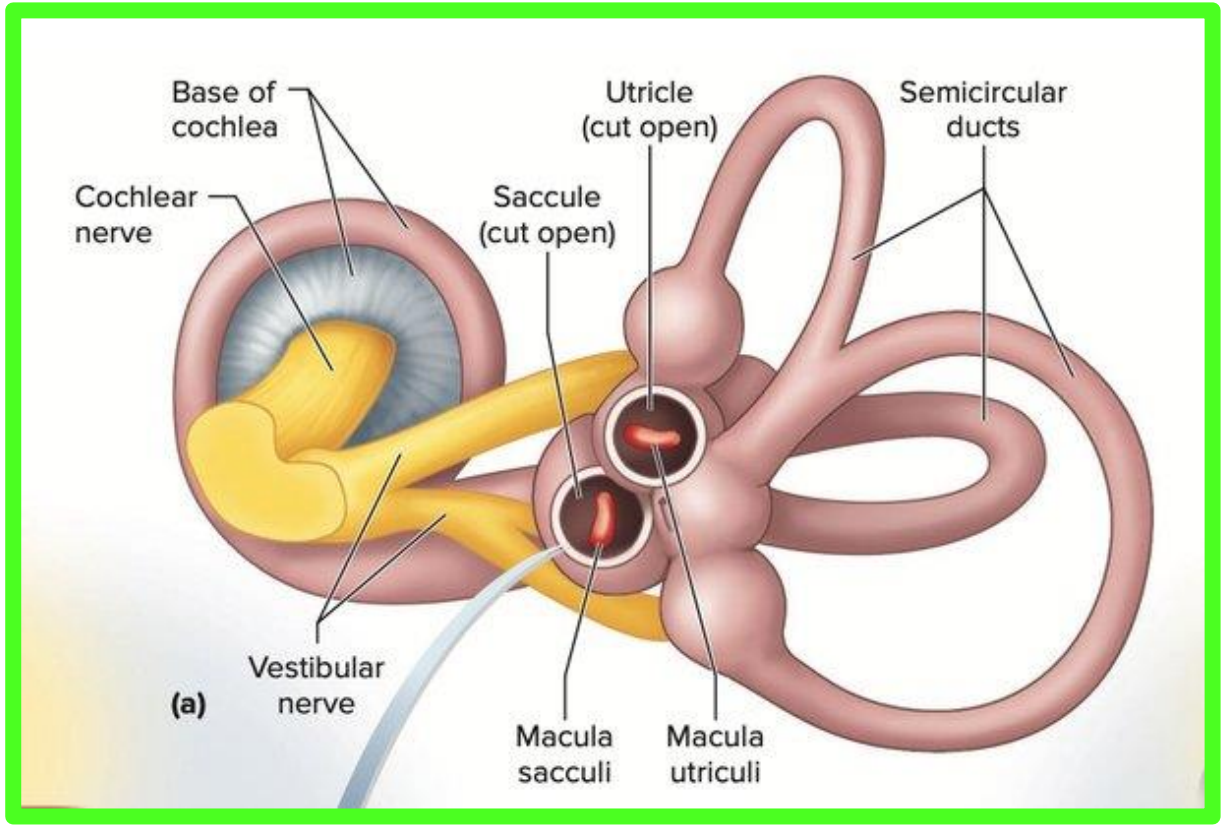


MEMBRANOUS LABYRINTH

B. Saccule: lies close to the base of the cochlea.

- It is connected to the basal turn of cochlea by ductus reunines.
- Its anterior wall in thickened to form a macula.
- The macula receives the fibres of the vestibular nerve.





MEMBRANOUS LABYRINTH

(3) The cochlear duct (inside the cochlear canal)

- It contains endolymph and organ of corti (sensory end organ of hearing).

- It extends between scala vestibuli above and scala tympani below.

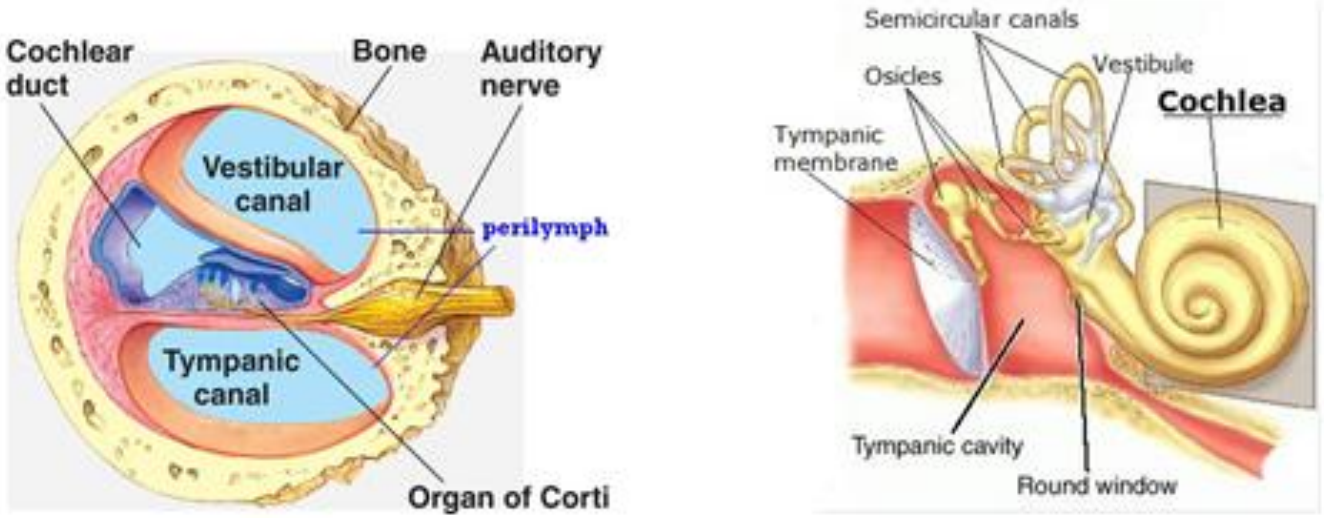
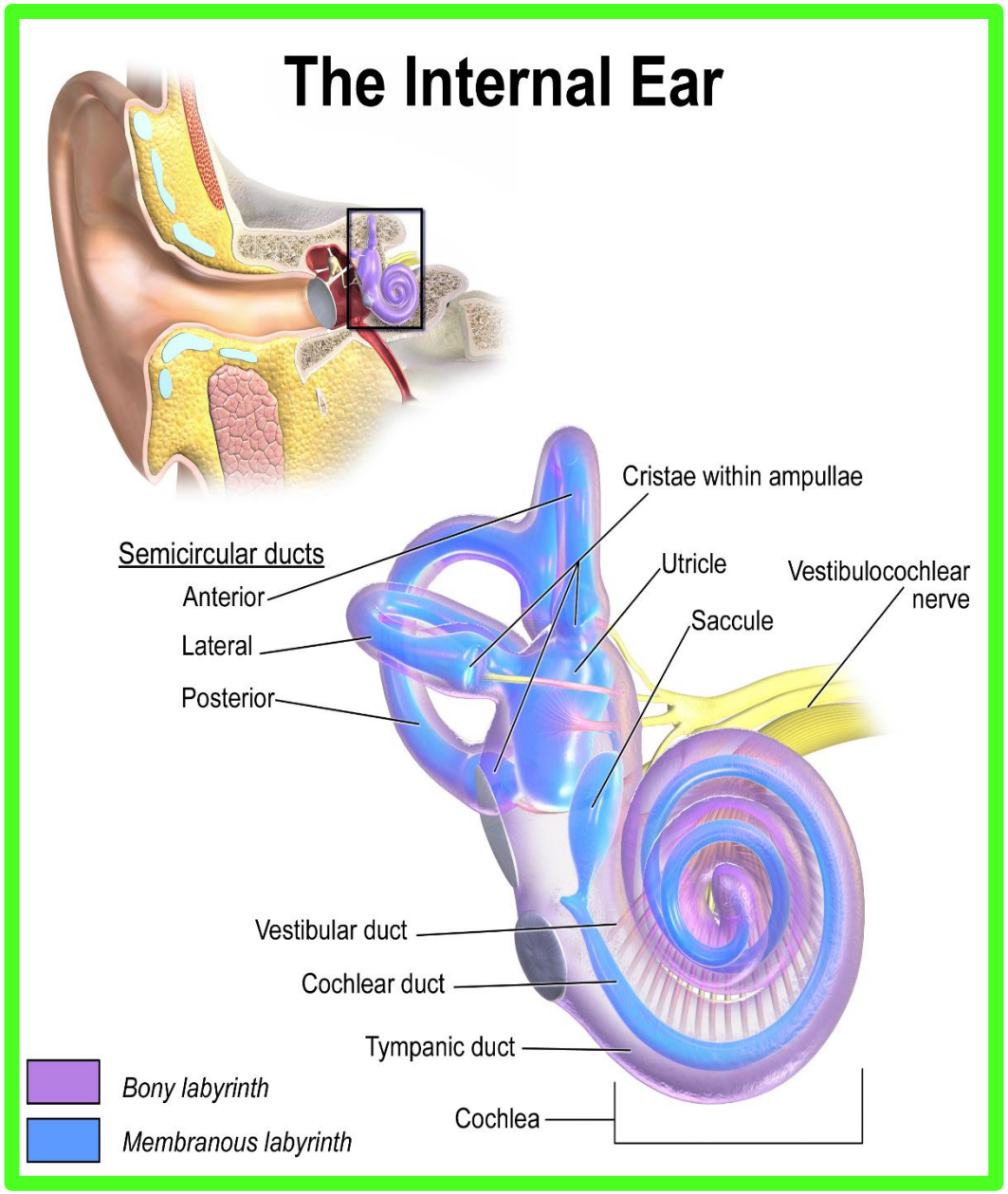
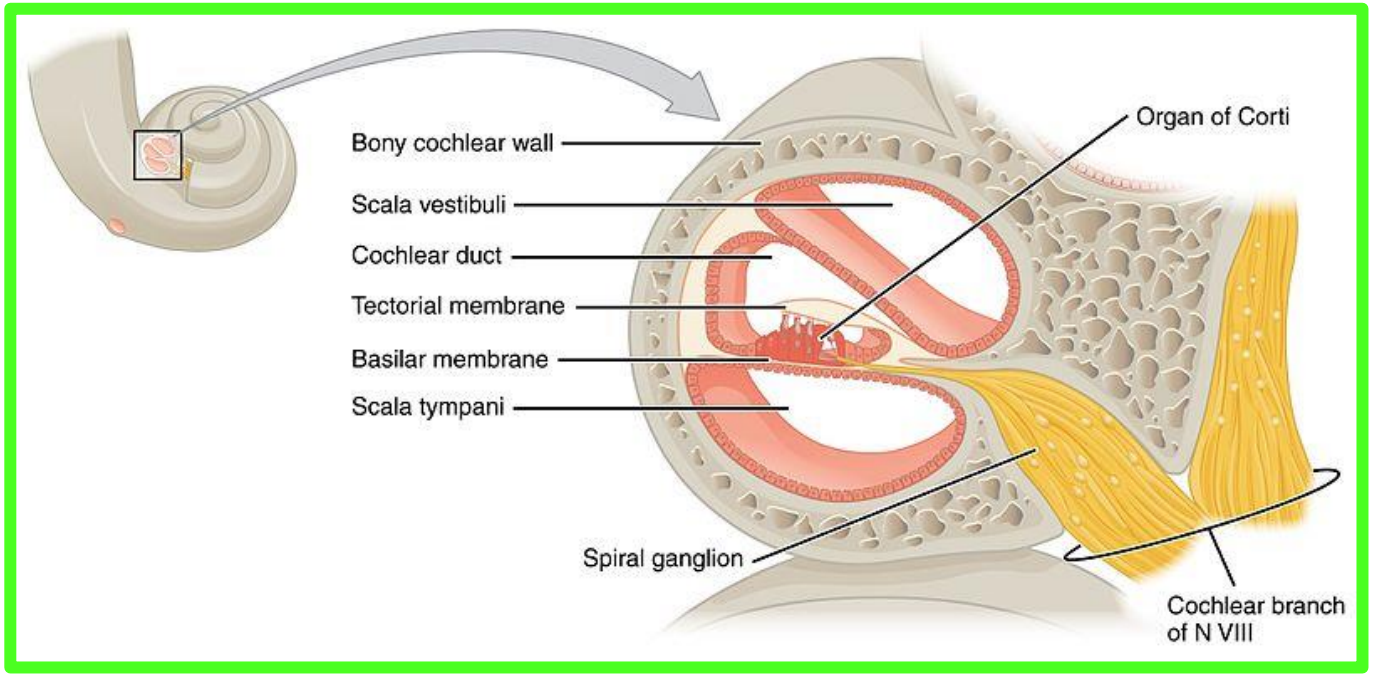


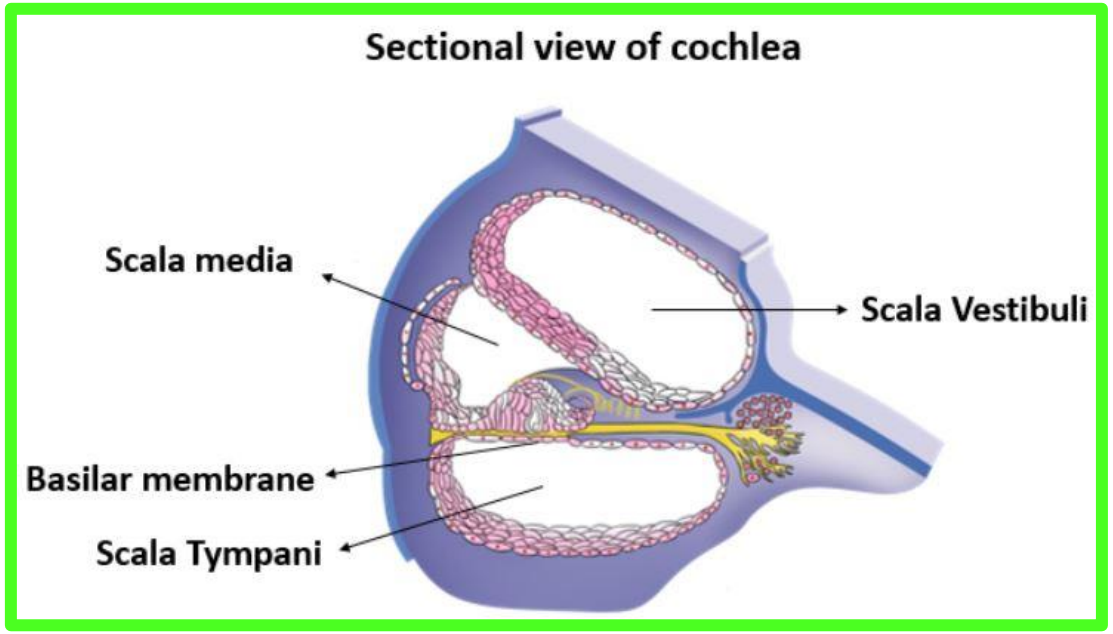
Fig. Structure of internal ear



MEMBRANOUS LABYRINTH

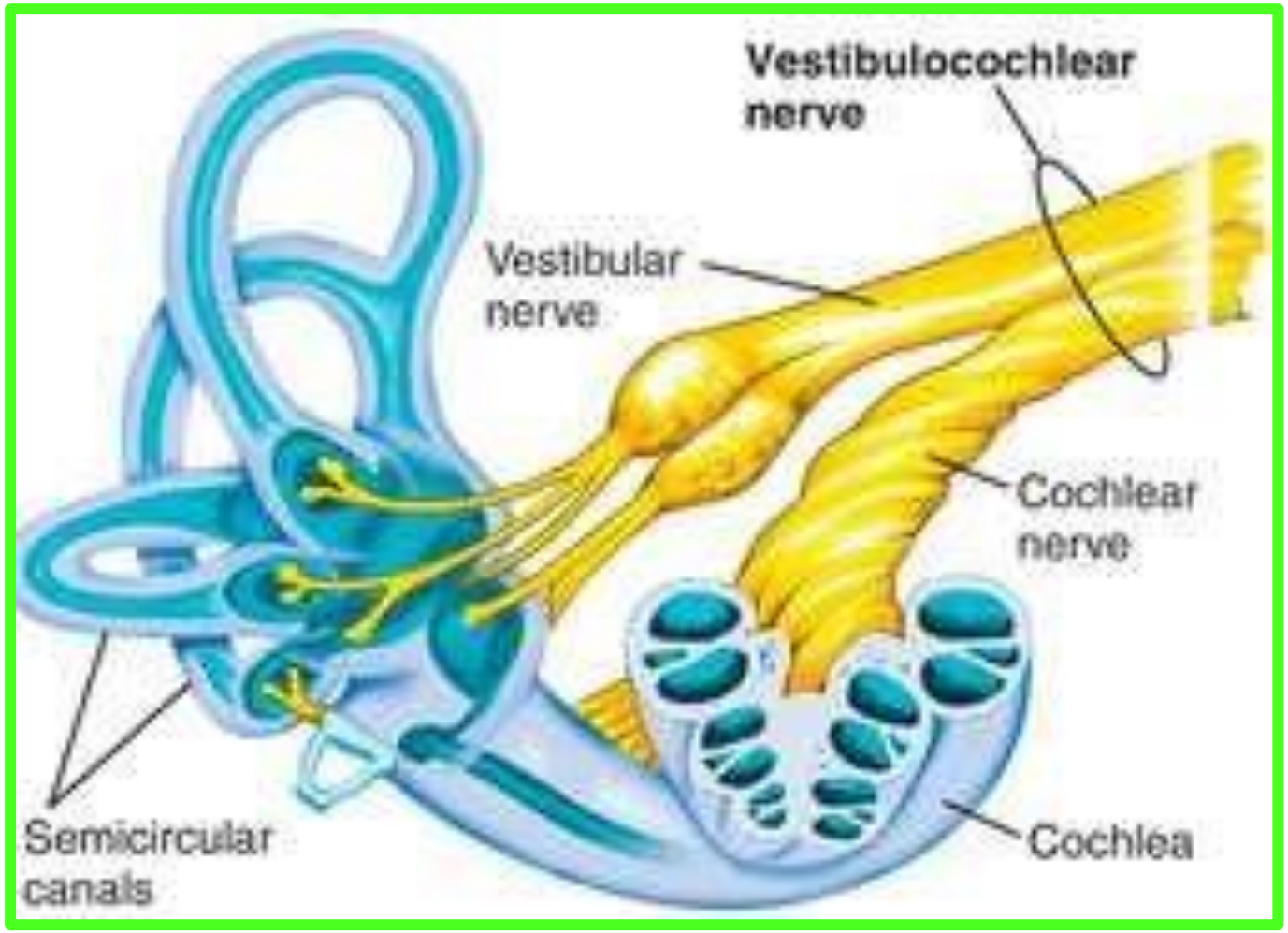
- It is separated from the scala vestbuli by the vestibular membrane.
- It is separated from the scala tympani by the basilar membrane.
- Spiral ganglion, the peripheral processes pass to the organ of corti and the central from the cochlear nerve.





- **Nerve supply of the labyrinth**

- It is supplied by the vestibule-cochlear nerve as following:
  - Its cochlear division for the hearing.
  - Its vestibular division for the equilibrium.



VESTIBULO – COCUHLEAR NERVE

- **Type: special sensory nerve** (purely sensory) formed of 2 parts .
  - **i. Cochlear part:** carrying hearing impulses.
  - **ii.Vestibular part:** carrying equilibrium impulses .
- **Exit from the brain stem**: from the **anterior aspect at the ponto-meduallary junction**.