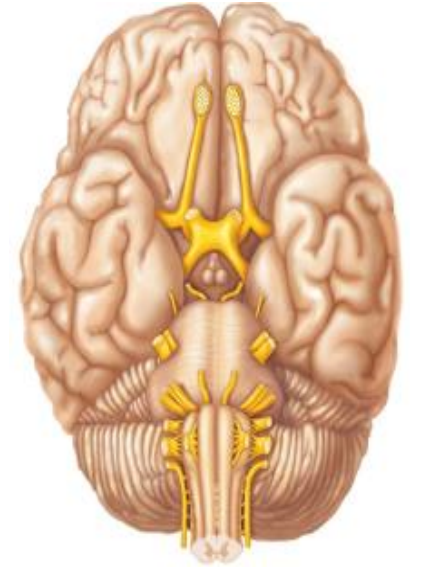


**Cranial nerves originating from Pons
(5,7)
Course-Distribution and Branches**



Dr. Rasha Abdelaziz Abdellatif

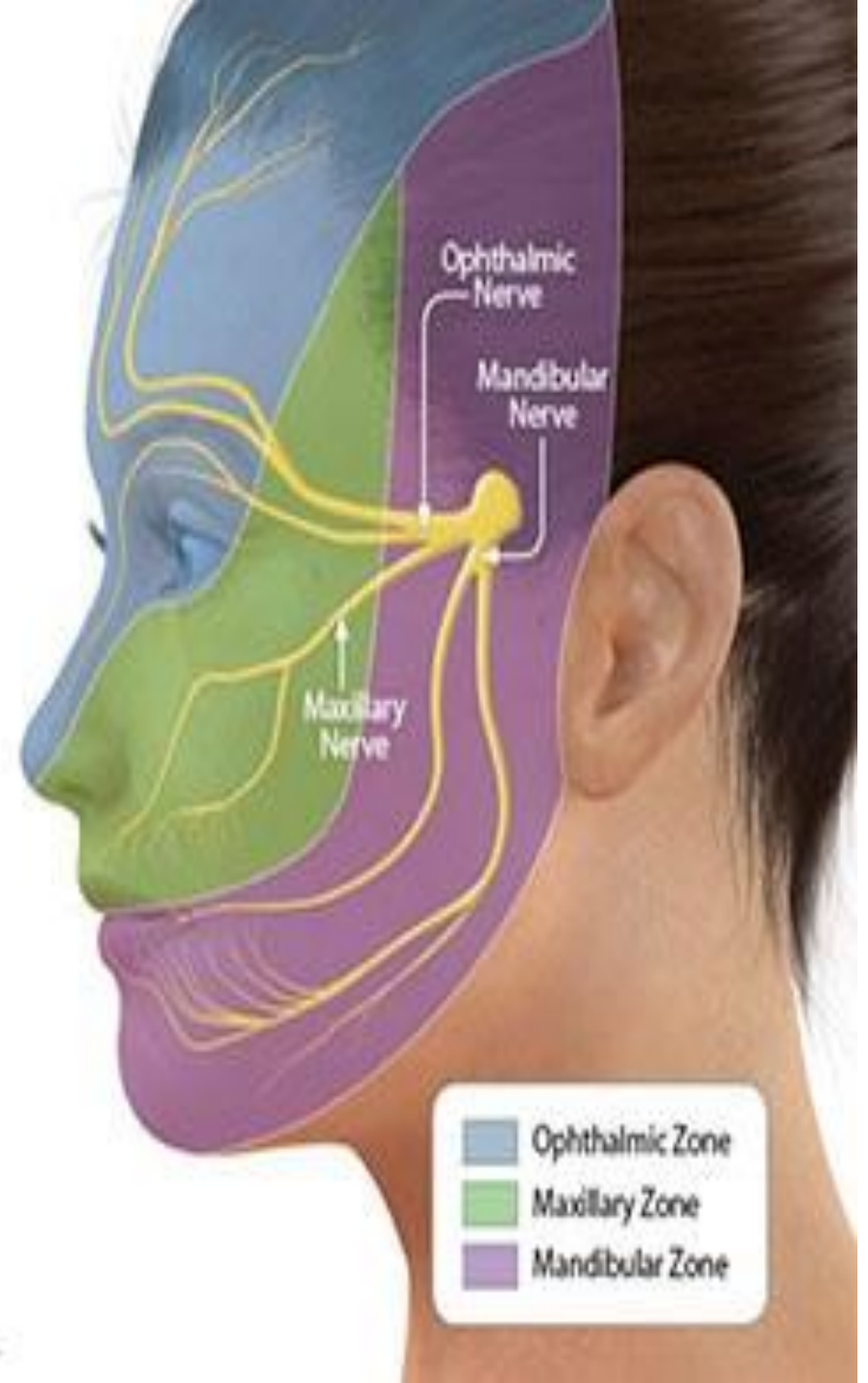
**Associate professor of human anatomy and
Embryology – Mutah university**

Session ILOs

By the end of this lecture, the student should be able to:

- 1. describe the origin of V, VII cranial nerves**
- 2. describe the functions of V, VII cranial nerves**
- 3. describe the course of V, VII cranial nerves**
- 4. describe the branches of V, VII cranial nerves**

Trigeminal nerve (V) cranial nerve



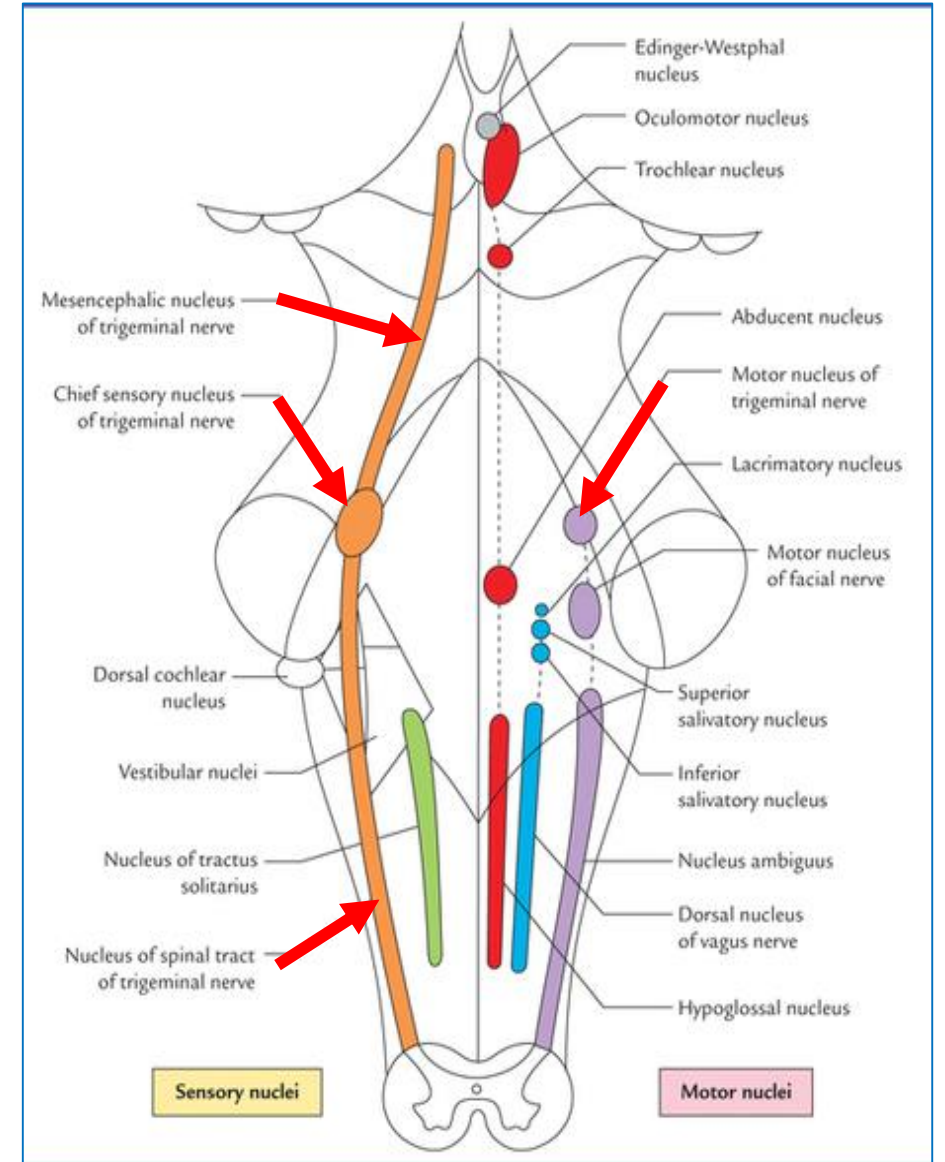
Cranial nerves originating from Pons

Trigeminal Nerve(V)

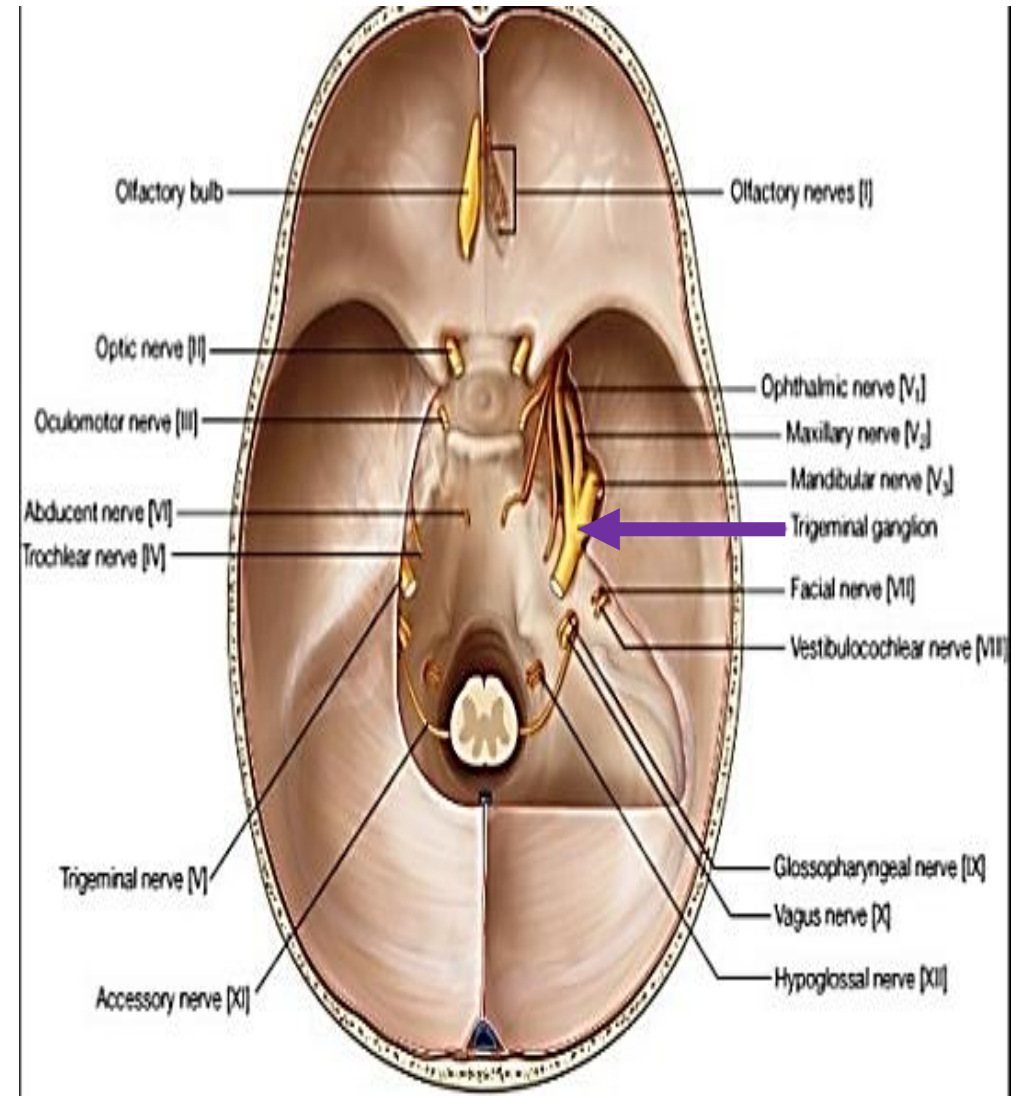
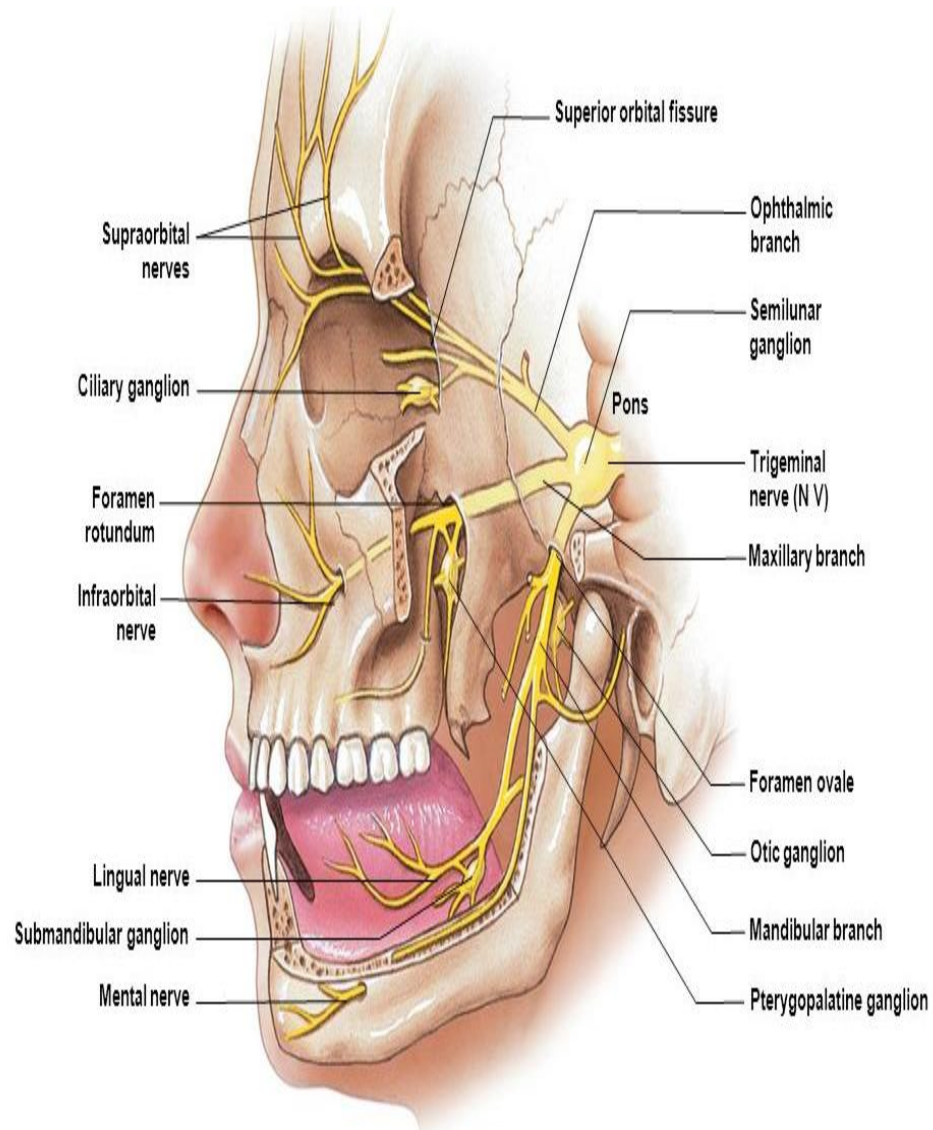
It is a mixed nerve and it arises from the following cranial nuclei :

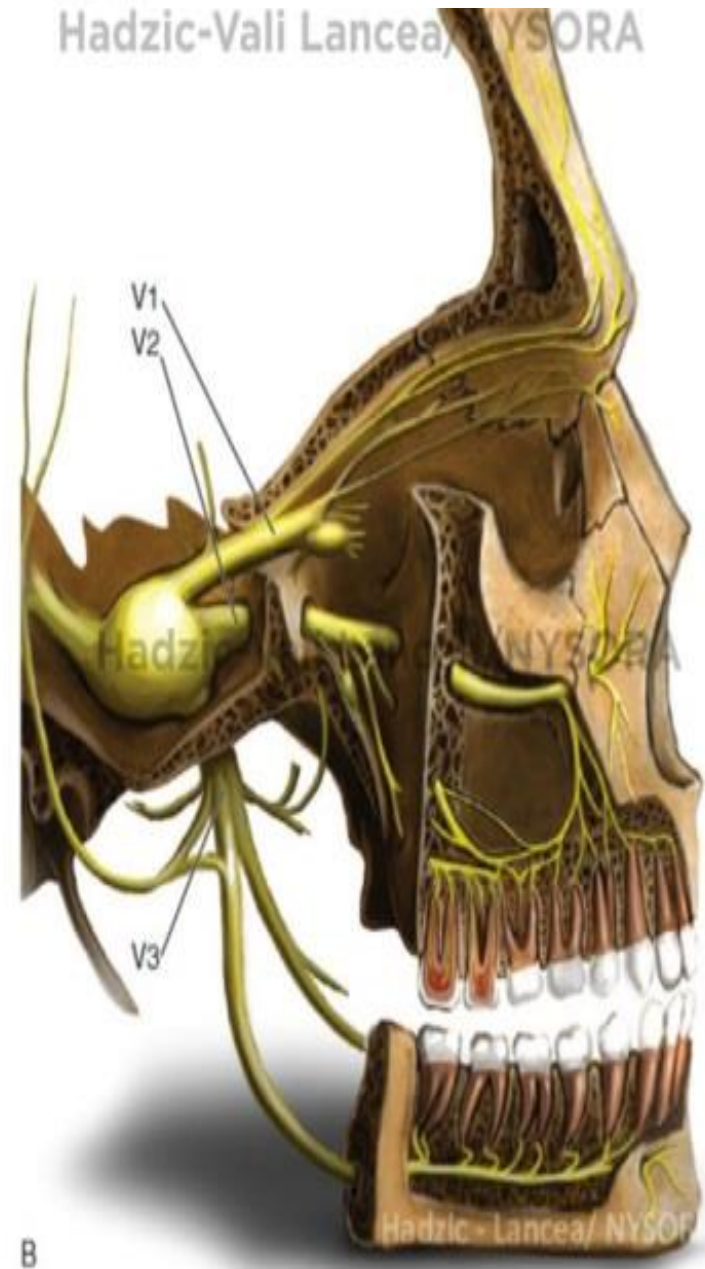
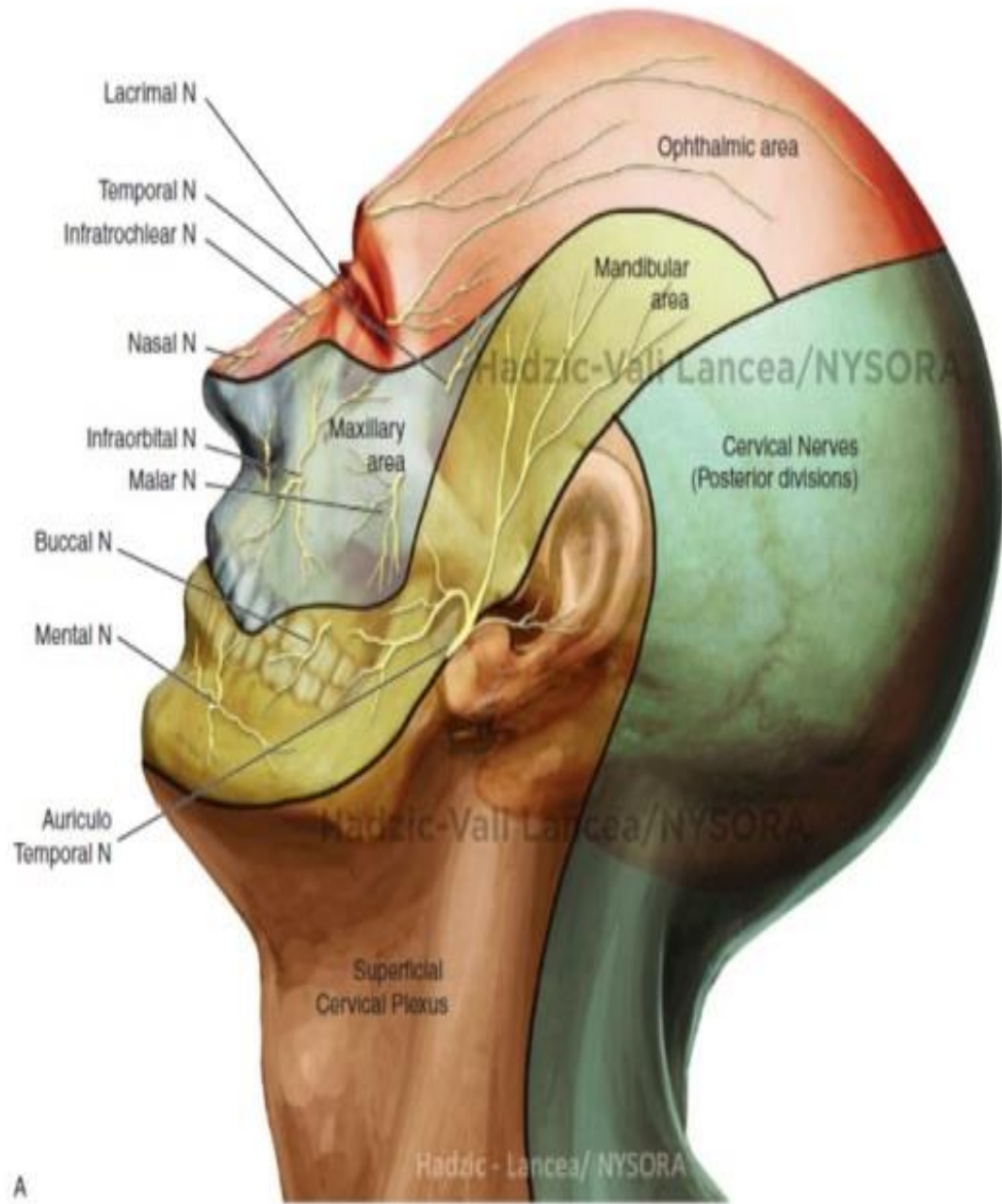
1. *Trigeminal motor nucleus*
2. *Sensory nuclei:*
 - A- *spinal trigeminal nucleus*
 - B- *Main sensory nucleus:*
 - C- *Mesencephalic nucleus*

- Is the largest cranial nerve .
- Leaves the pons about half way between the lower and upper borders of the pons on its ventro-lateral aspect .
- It is formed of two bundles, a small motor root and a larger sensory root.
- About 1 cm from the pons , the sensory root swells and forms the trigeminal (Gasserian or semilunar ganglion).



Course of trigeminal nerve

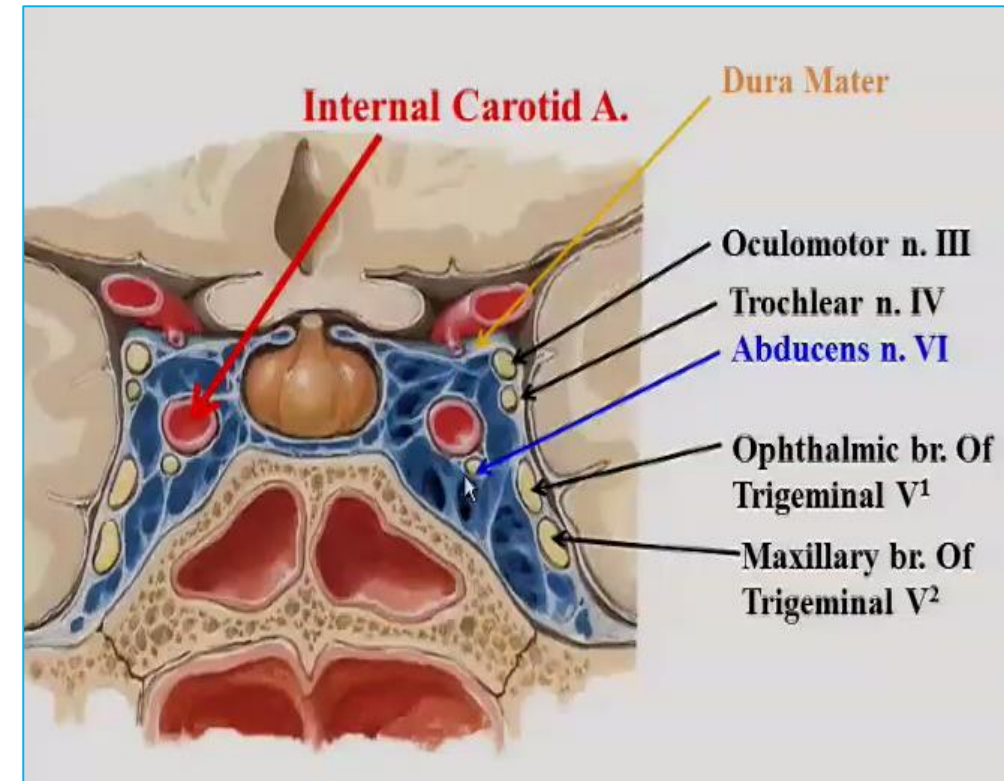
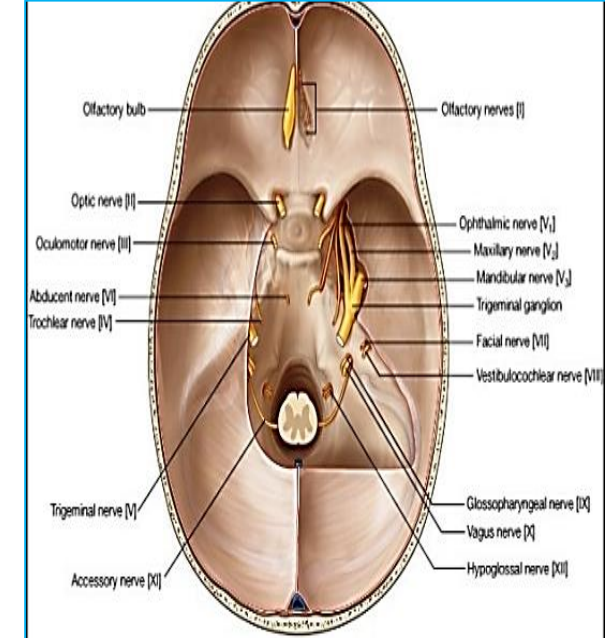
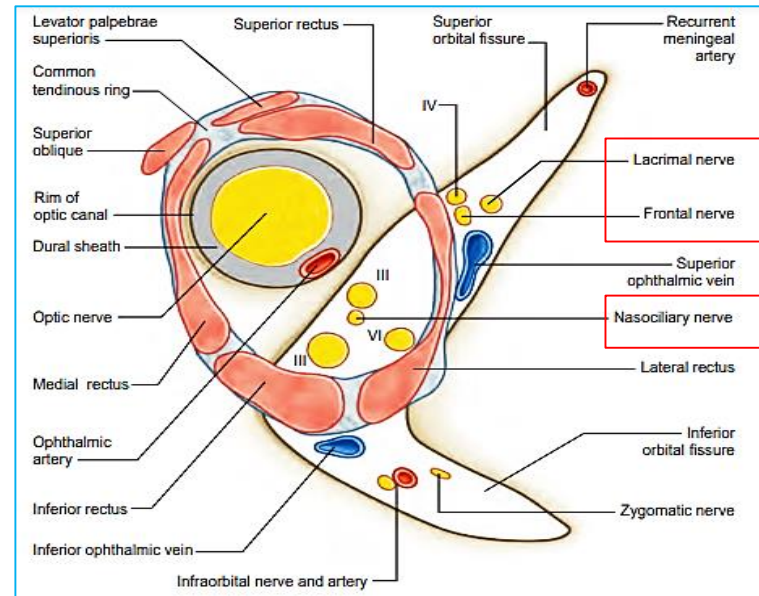




1. Ophthalmic nerve

Ophthalmic nerve:

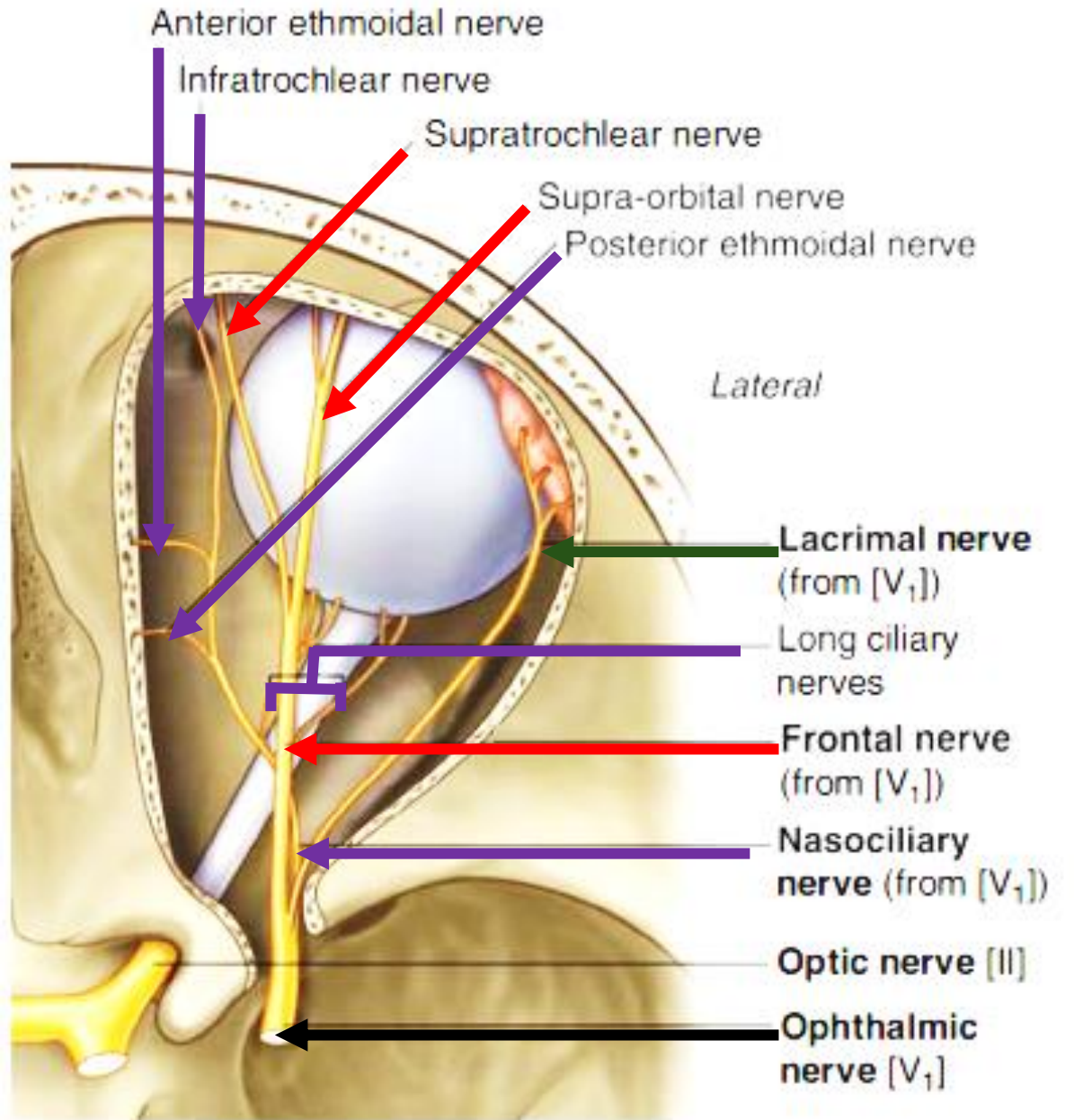
- It is one of 3 divisions of trigeminal nerve.
- pass through the middle cranial fossa in the lateral wall of cavernous sinus.
- It divides into 3 branches **lacrimal**, **frontal** and **nasocilliary** that enter the orbit through superior orbital fissure:



Branches:

Ophthalmic nerve:

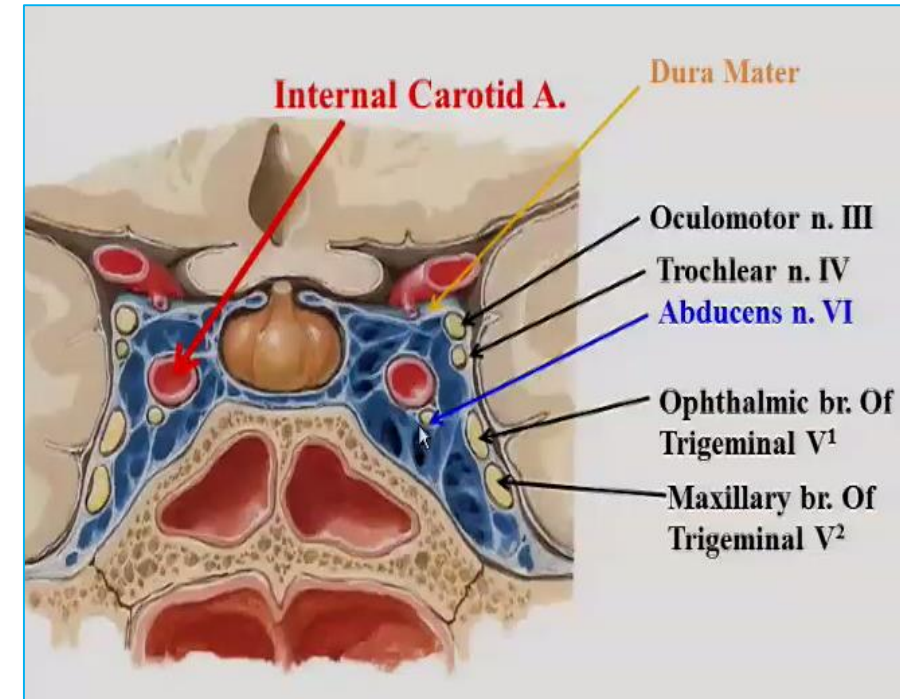
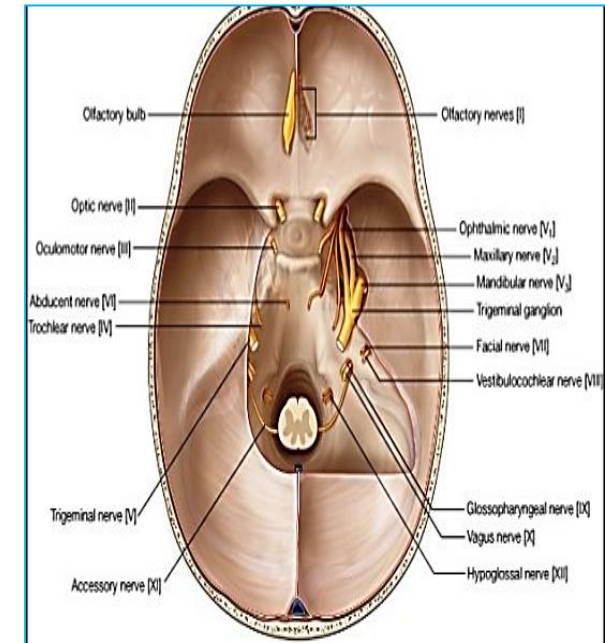
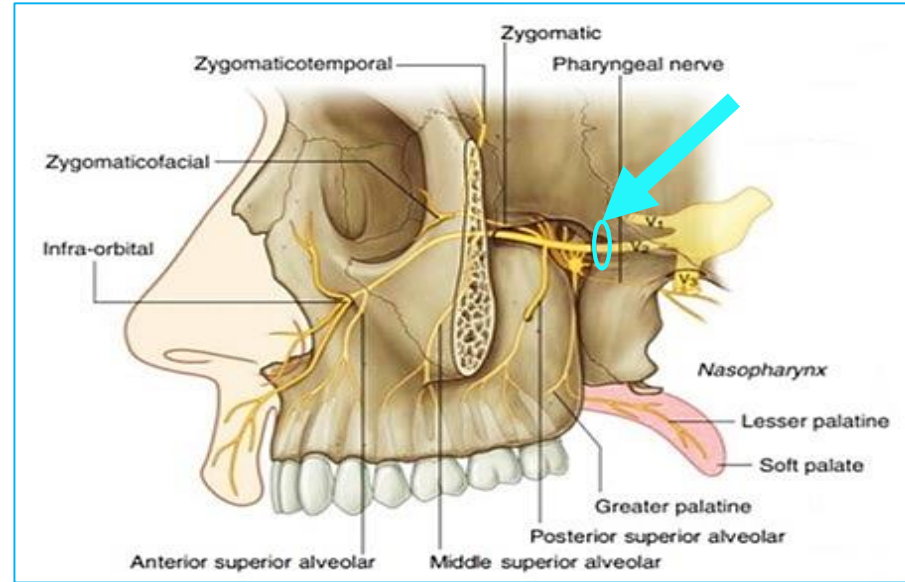
- It divides into 3 branches
1. Lacrimal nerve to lacrimal gland
 2. Frontal nerve which divides into supraorbital and supratrochlear nerve
 3. Nasociliary nerve which gives:
 - 2-3 long ciliary nerves
 - Posterior ethmoidal nerve
 - Infratrochlear nerve
 - Anterior ethmoidal nerve



2. maxillary nerve

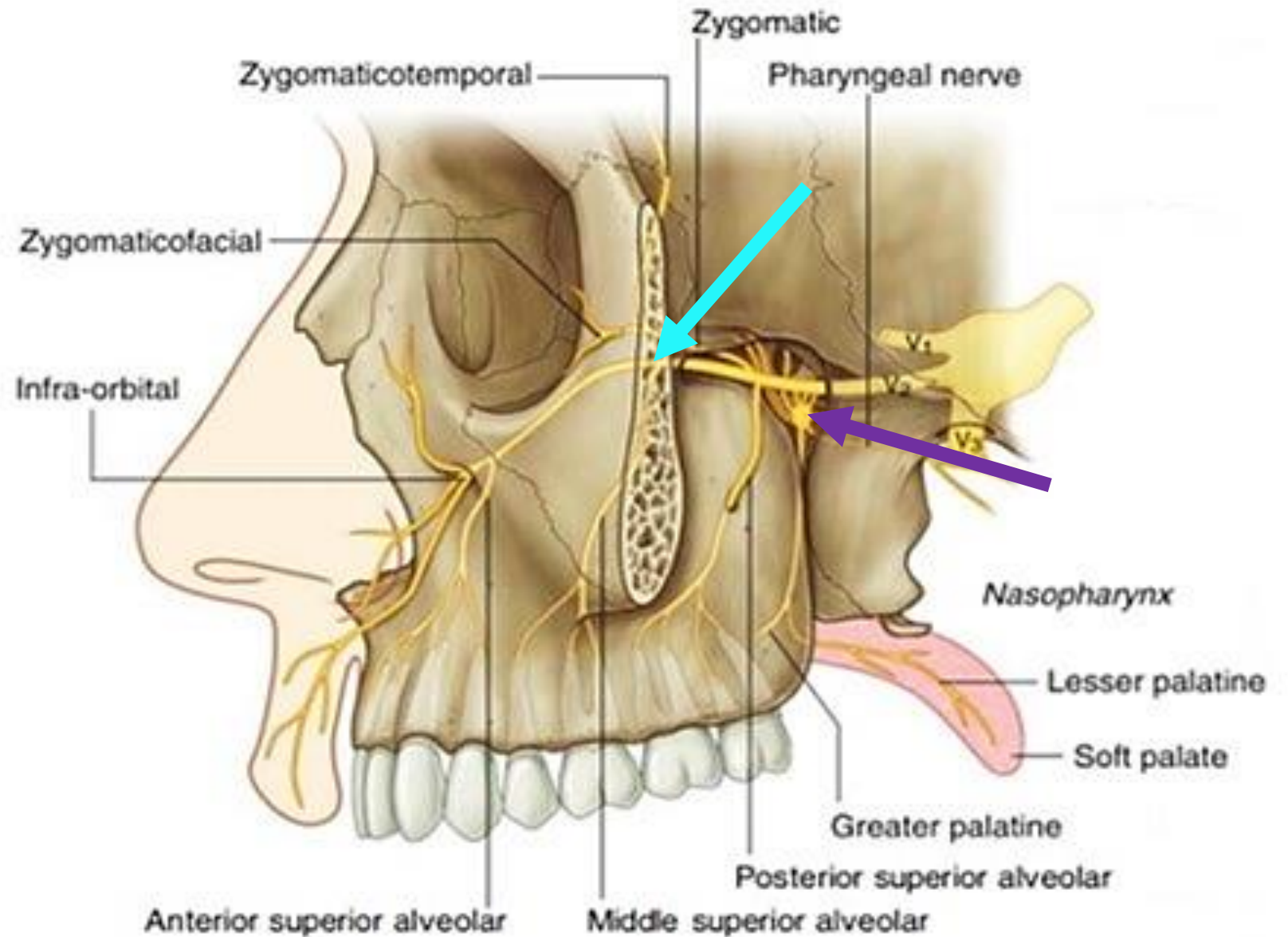
Maxillary nerve

- **Course and relations:**
- It arises from the convex anterior border of the trigeminal ganglion
- It passes in the lateral wall of cavernous sinus
- It leaves the middle cranial fossa through the foramen rotundum.



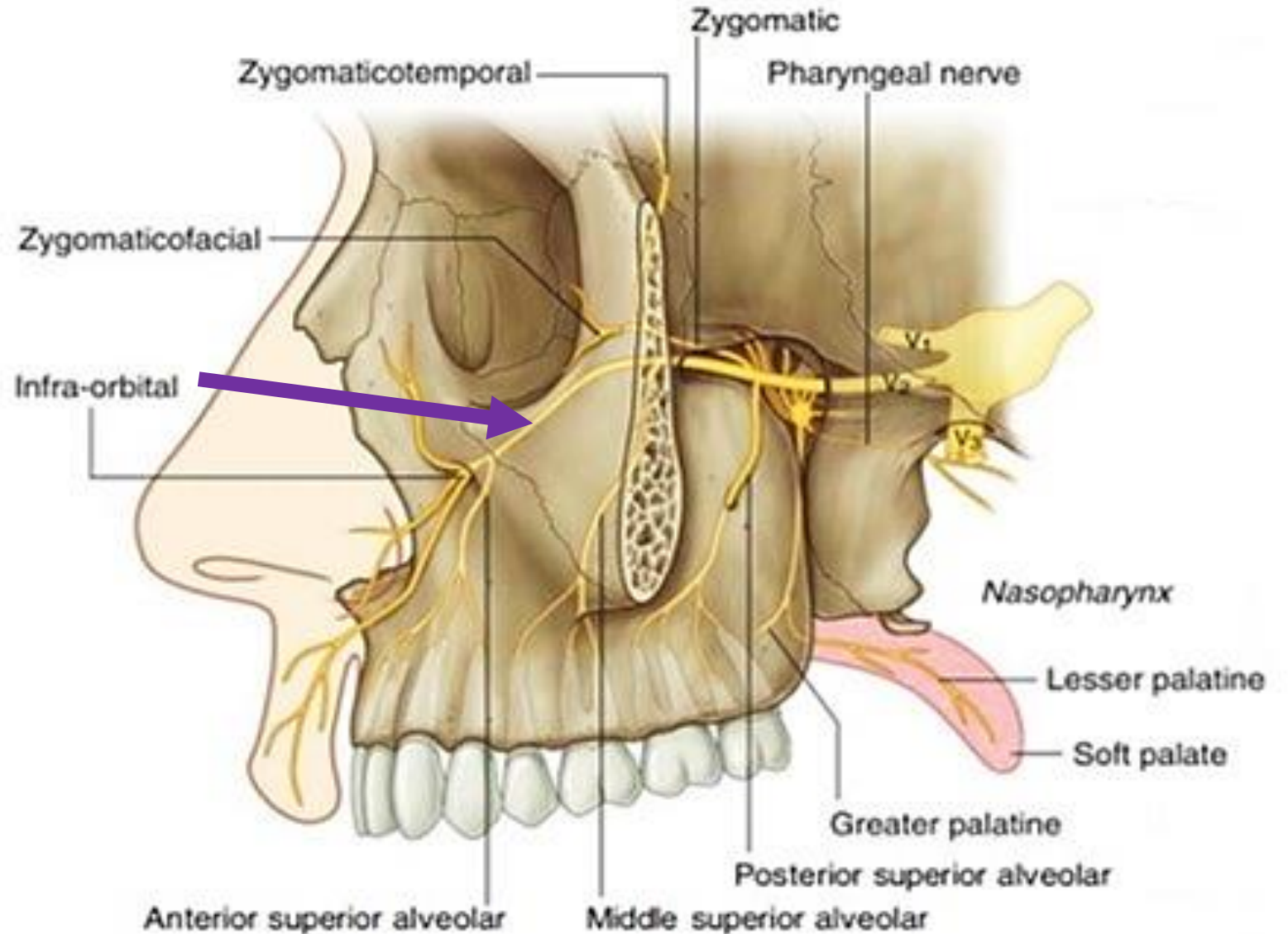
Maxillary nerve

- It enters the pterygopalatine fossa where the pterygo- palatine ganglion is suspended from the nerve.
- It crosses the infratemporal fossa to enter the orbit through the inferior orbital fissure



Maxillary nerve

- Its continuation in the orbit is called the inferior orbital nerve, which runs in the infraorbital groove and canal in the floor of the orbit
- It emerges on the face through the infraorbital foramen.



Maxillary nerve

Branches

In the middle cranial fossa:

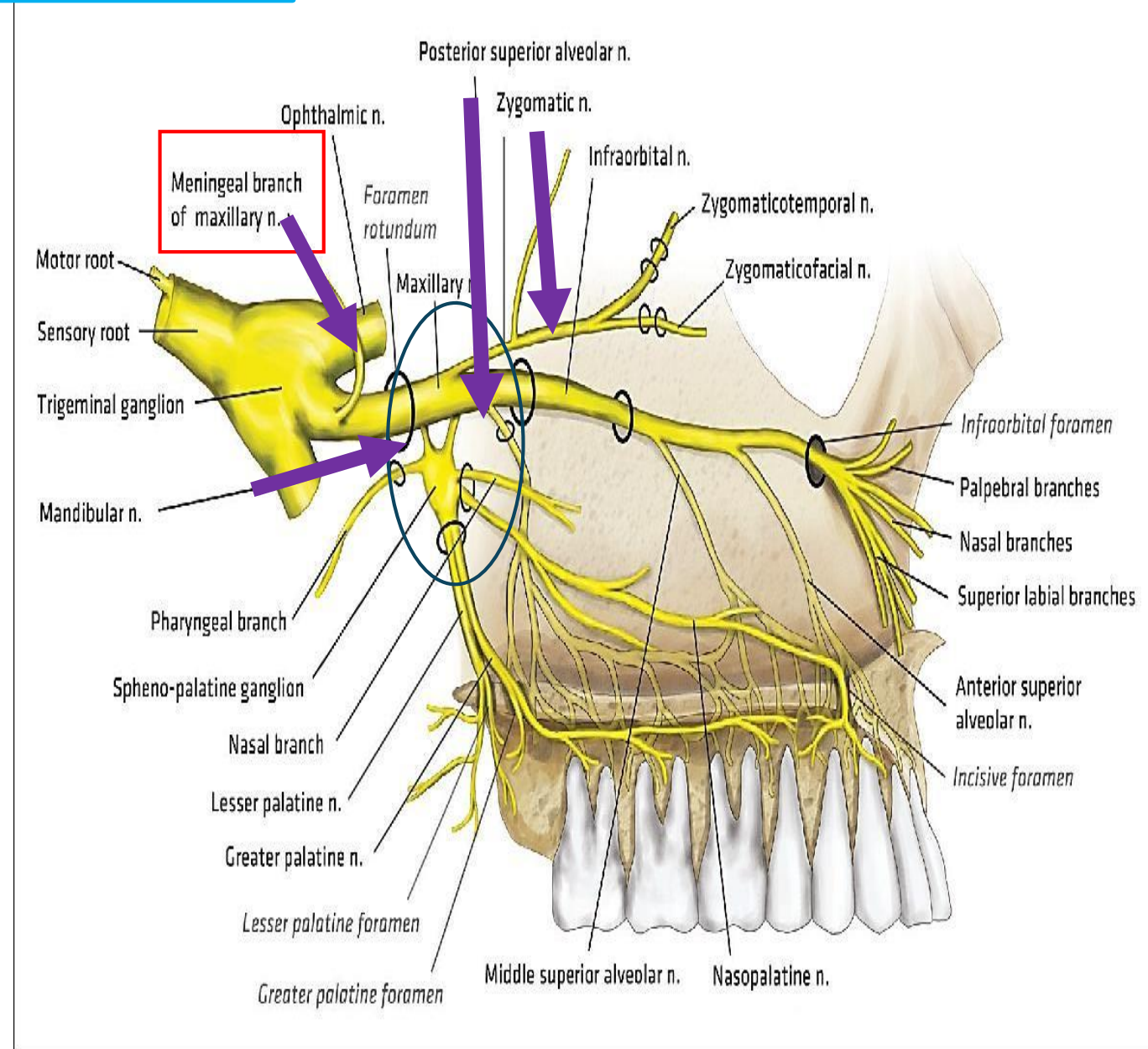
Meningeal branch: to the dura mater of the fossa

In the pterygopalatine fossa:

1. Ganglionic branches: Pre & post-ganglionic branches by which the sphenopalatine ganglion is suspended.

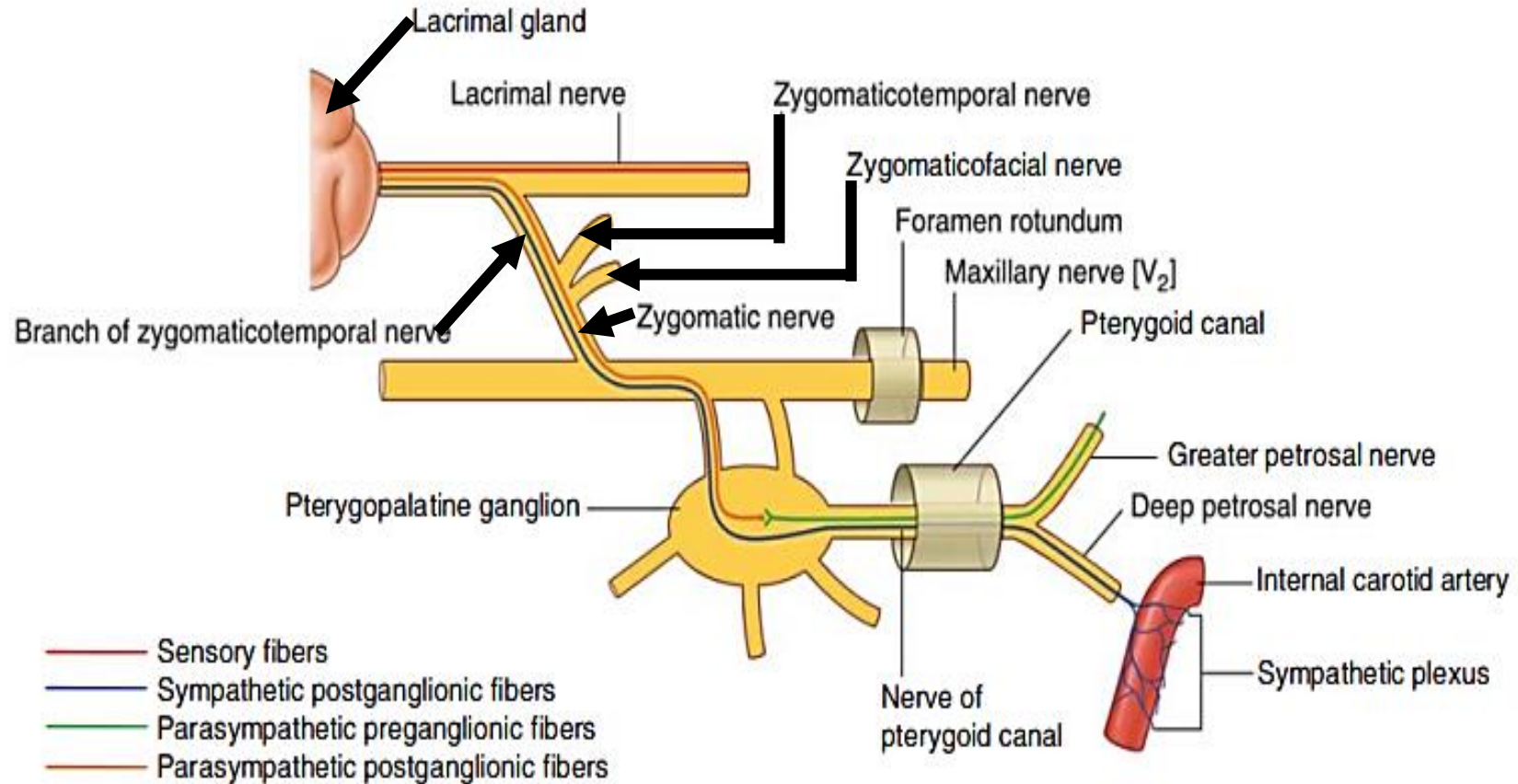
2. Zygomatic

3. posterior superior alveolar



2. Zygomatic Nerve

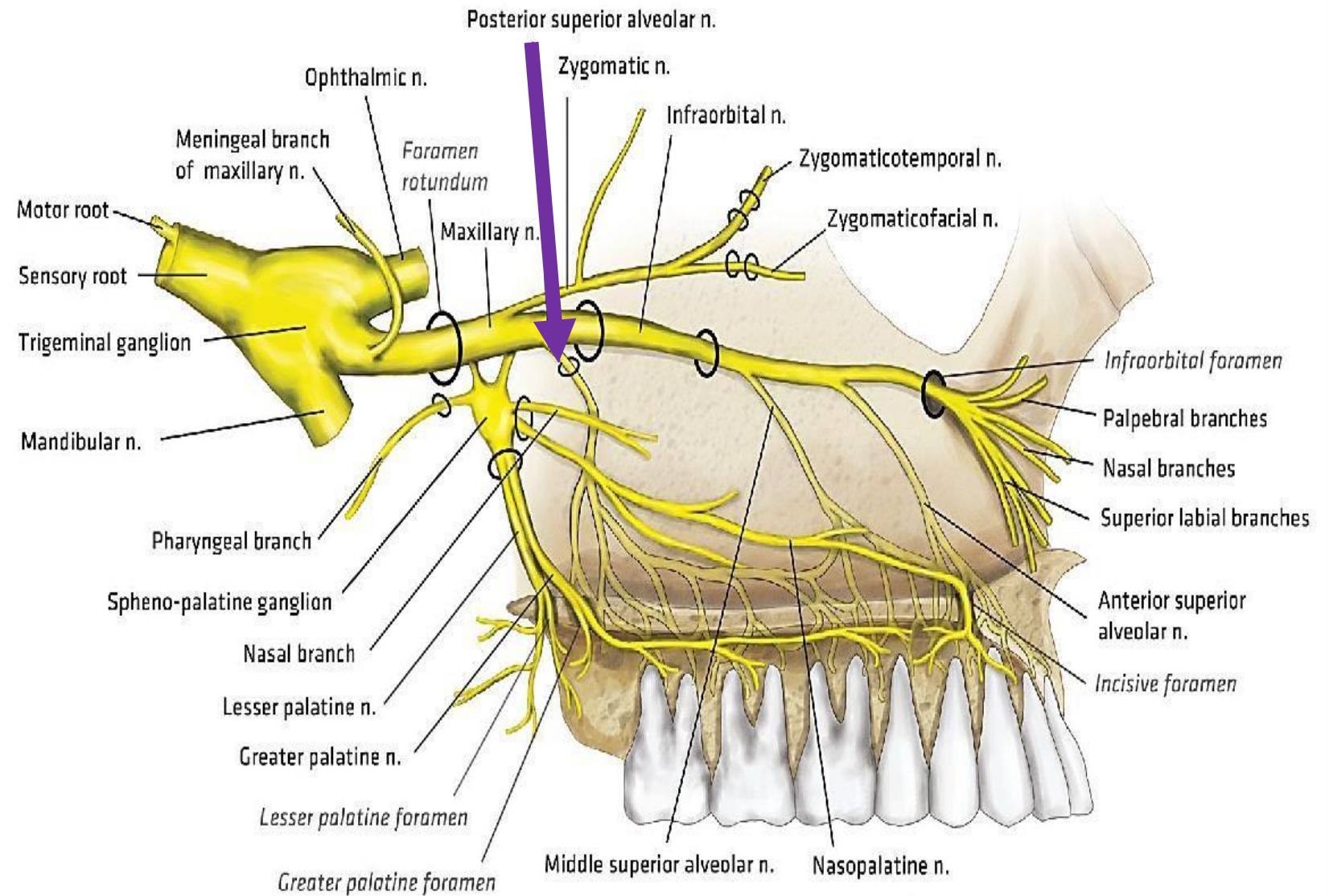
- It enters the orbit through the inferior orbital fissure.
- It divides into 2 nerves:
 - **Zygomatiko-facial**
 - **Zygomatiko-temporal**
- It carries postganglionic secretory fibers from the sphenopalatine ganglion to the lacrimal gland by communicating with the lacrimal branch of ophthalmic nerve.



Maxillary nerve

3. Posterior superior alveolar nerve:

- Enters the posterior surface of the maxilla to supply the upper molar teeth, the mucosa of the upper gum and the maxillary sinus.



In the infraorbital canal

- Here it is called the infraorbital nerve. *It gives:*

1. Middle superior alveolar nerve

- Supplies the upper premolar teeth, mucosa of maxillary sinus and upper gum

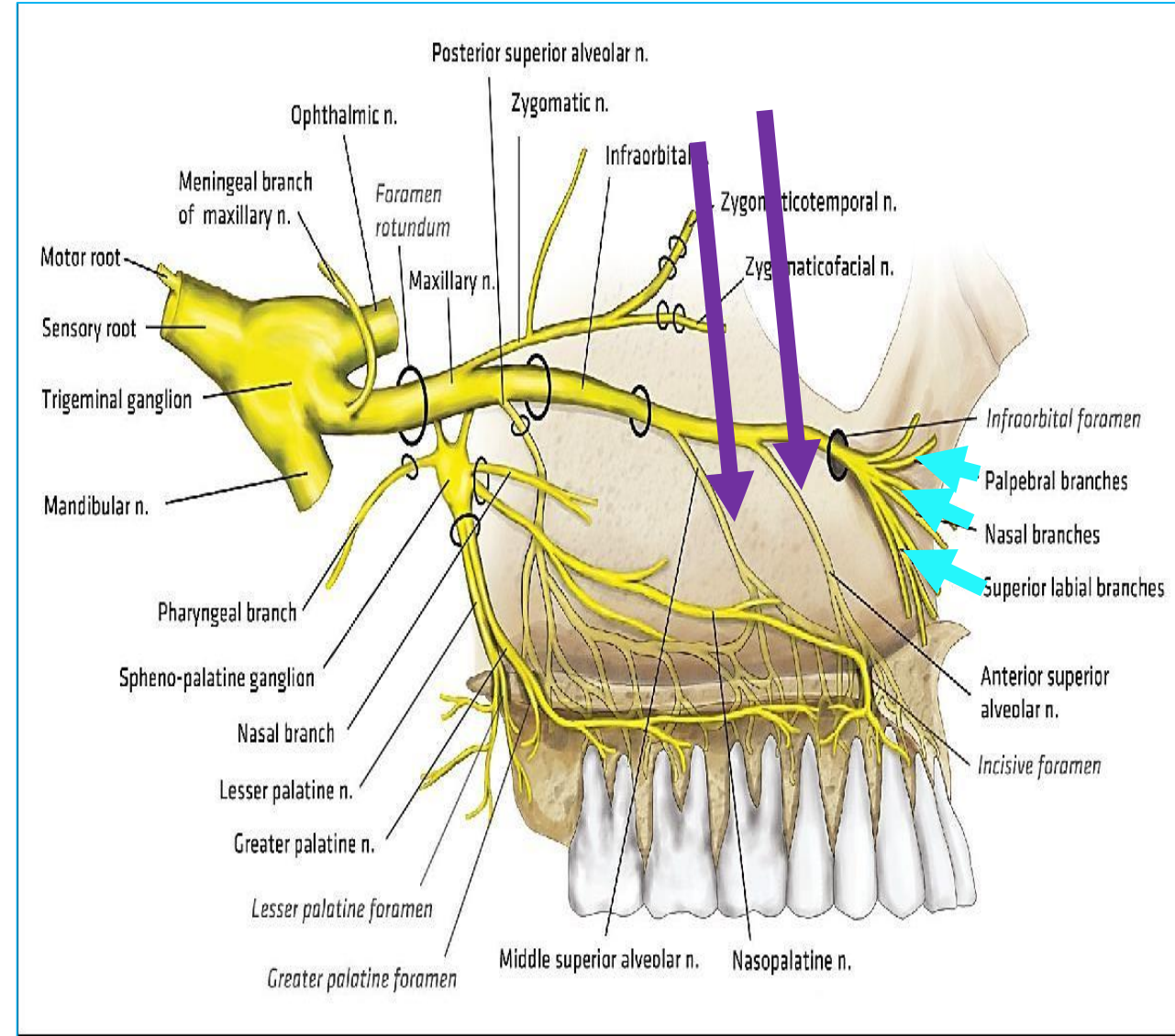
2. Anterior superior alveolar nerve

- *Supplies the upper incisors and canine teeth and the upper gum.*

In the face:

- It gives 3 terminal branches
- Nasal branches To the side of the nose
- Labial branches To the skin and mucosa of the upper lip.
- Palpebral branches To the lower eyelid

Maxillary nerve

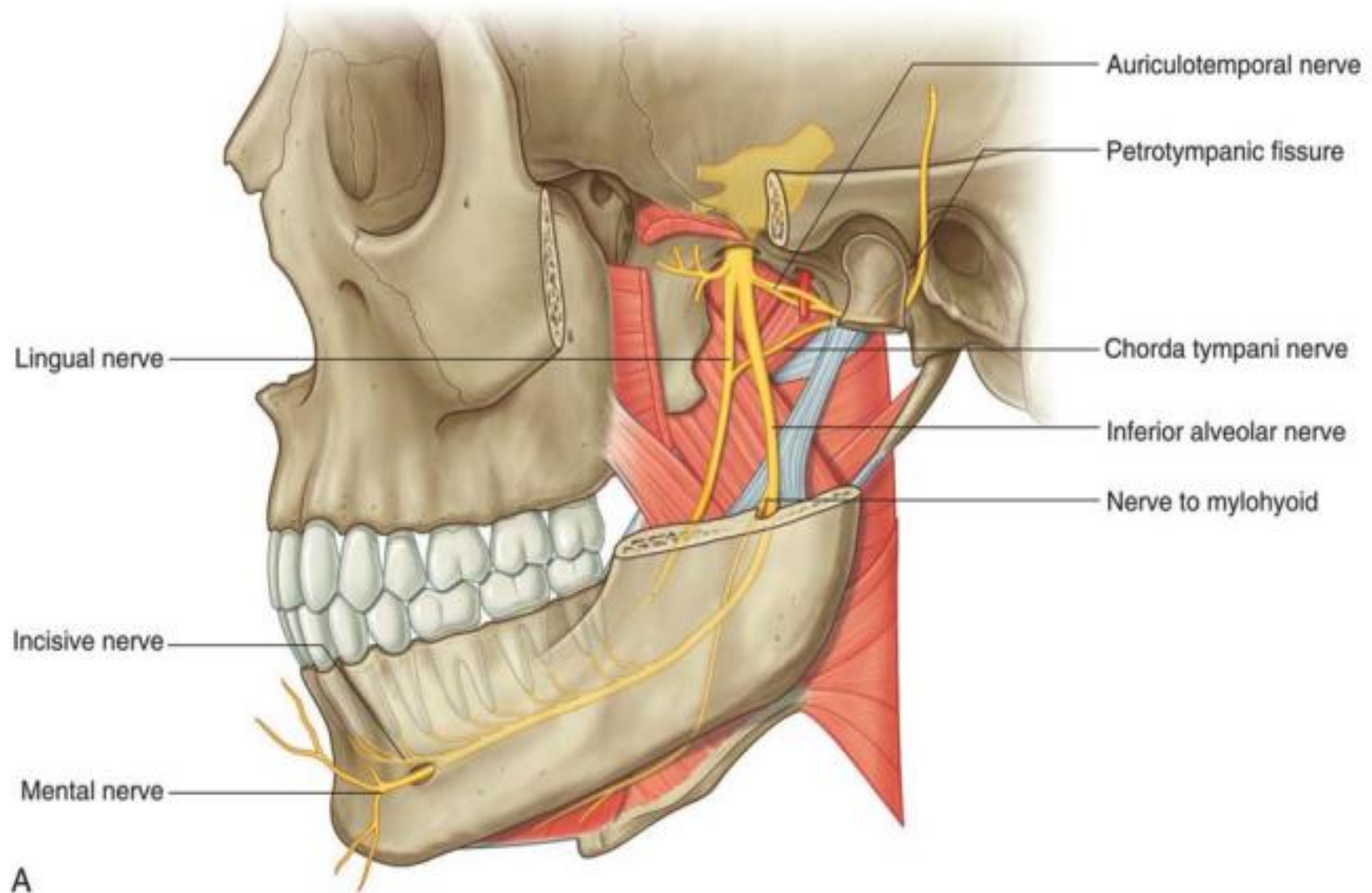


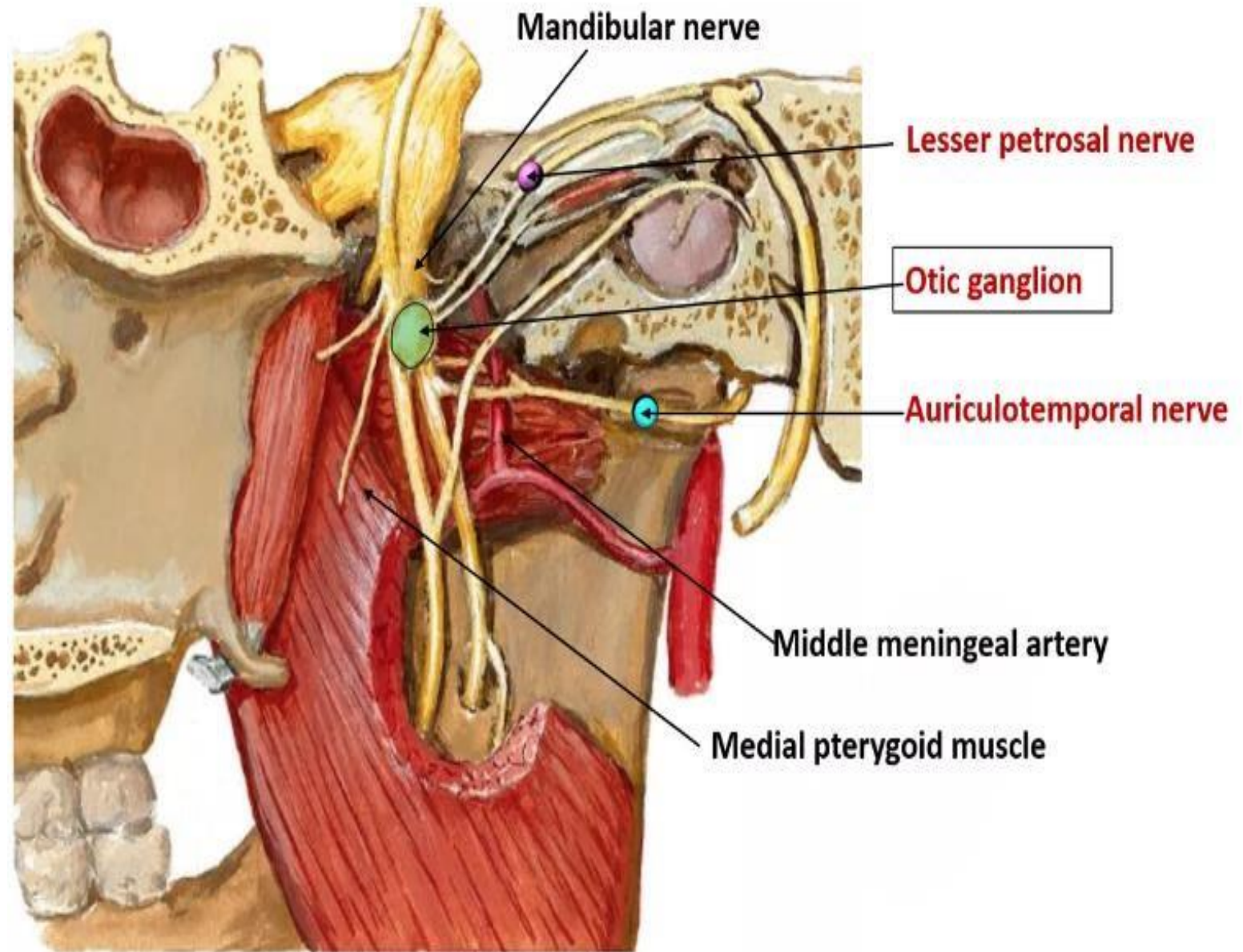
Mandibular Nerve

Course of Mandibular

Nerve:

- It leaves the skull through foramen ovale.
- It lies between:
 1. Lateral pterygoid laterally
 2. Tensor palati medially
 3. Medial pterygoid anteriorly
 4. Middle meningeal artery posteriorly.





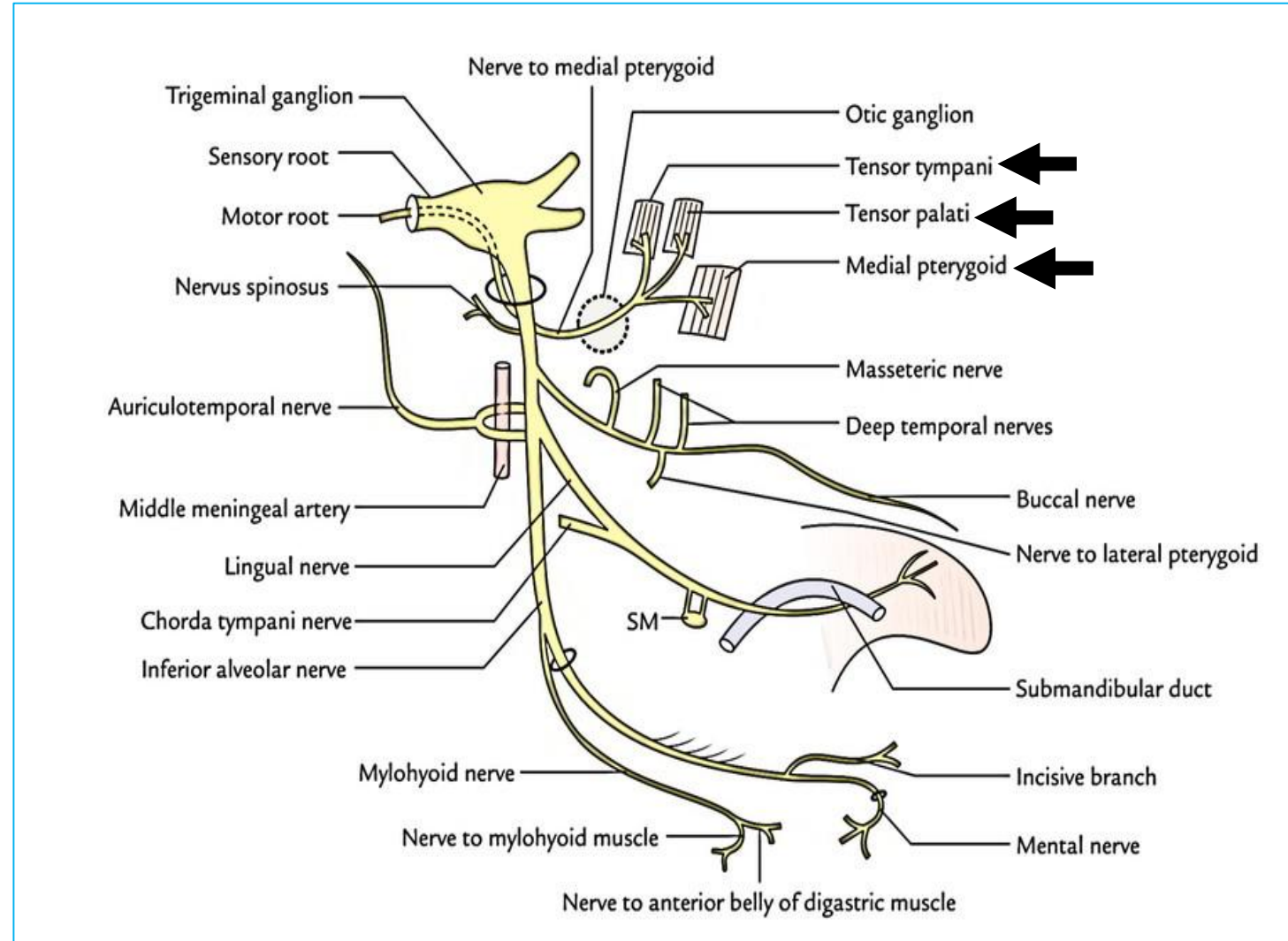
Branches from Trunk of mandibular nerve

■ Nervus spinosus (sensory) :

- A meningeal branch which enters the skull through the foramen spinosum and supplies the meninges in the middle cranial fossa.

■ Nerve to medial pterygoid (motor):

- Supplies the medial pterygoid muscle.
- It gives off 2 branches, which pass through the otic ganglion to supply the **tensor tympani and tensor palati**.



Branches of Anterior Division of Mandibular Nerve

- All are **motor** except the **buccal** nerve

1. Masseteric nerve (motor)

Passes with the corresponding artery through the mandibular notch to the deep surface of masseter.

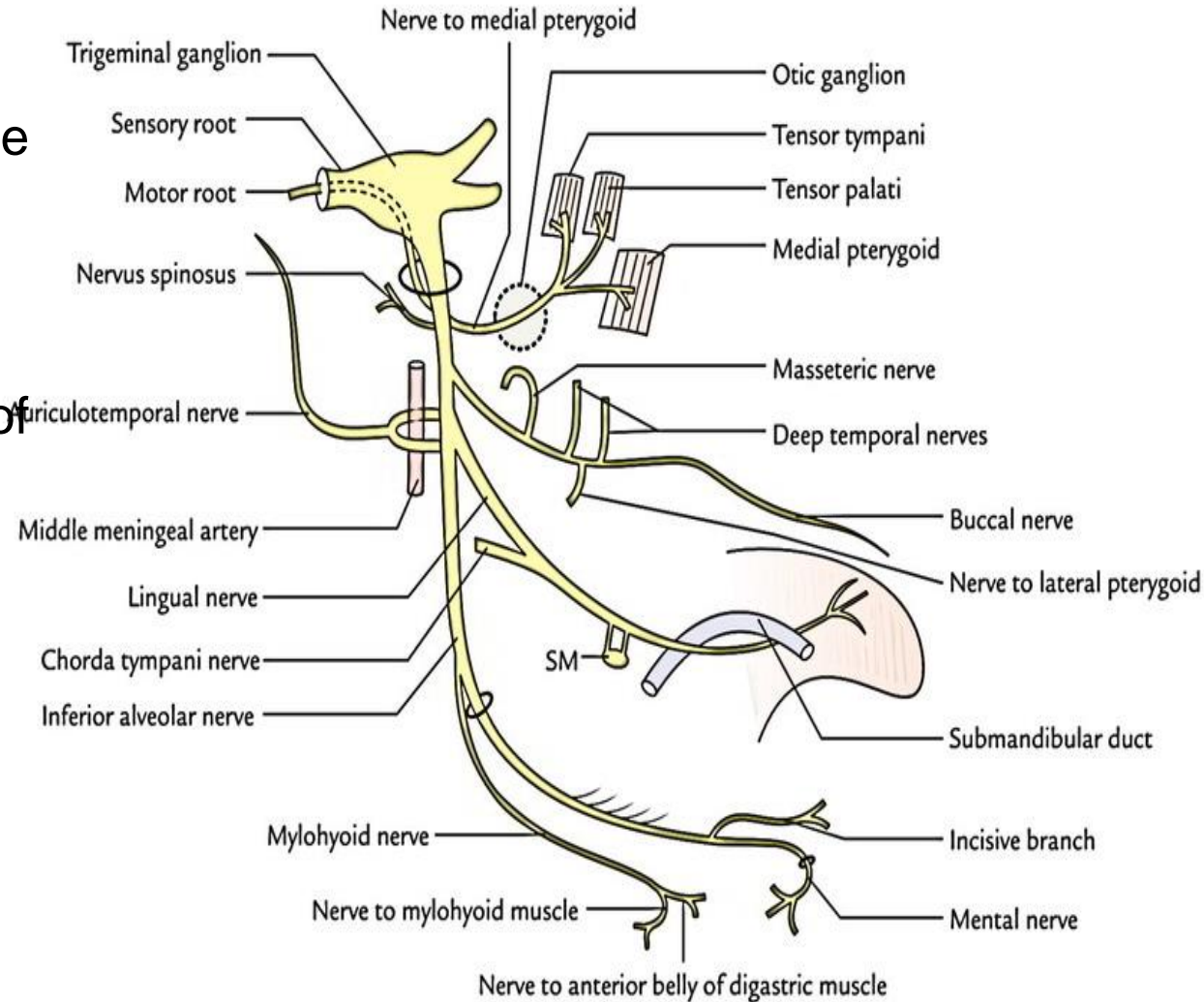
2. Deep temporal nerves (Two nerves motor)

Run upward and emerge to enter the deep surface of the temporalis muscle.

3. Nerve to the lateral pterygoid (motor)

4. The buccal nerve (sensory)

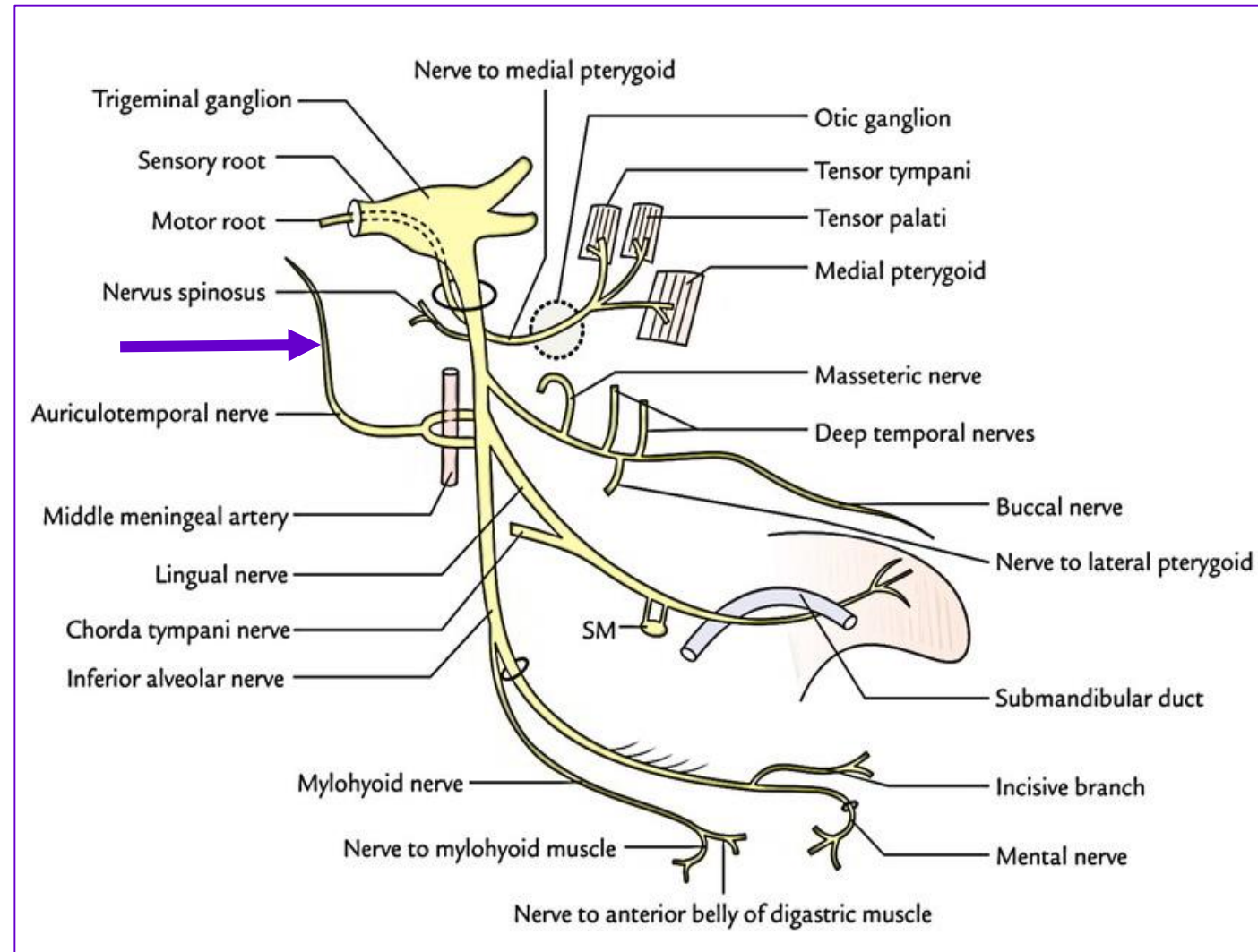
Runs forward between the two heads of the lateral pterygoid. It supplies the skin over the cheek and the mucous membrane lining it.



Branches of Posterior Division of Mandibular Nerve

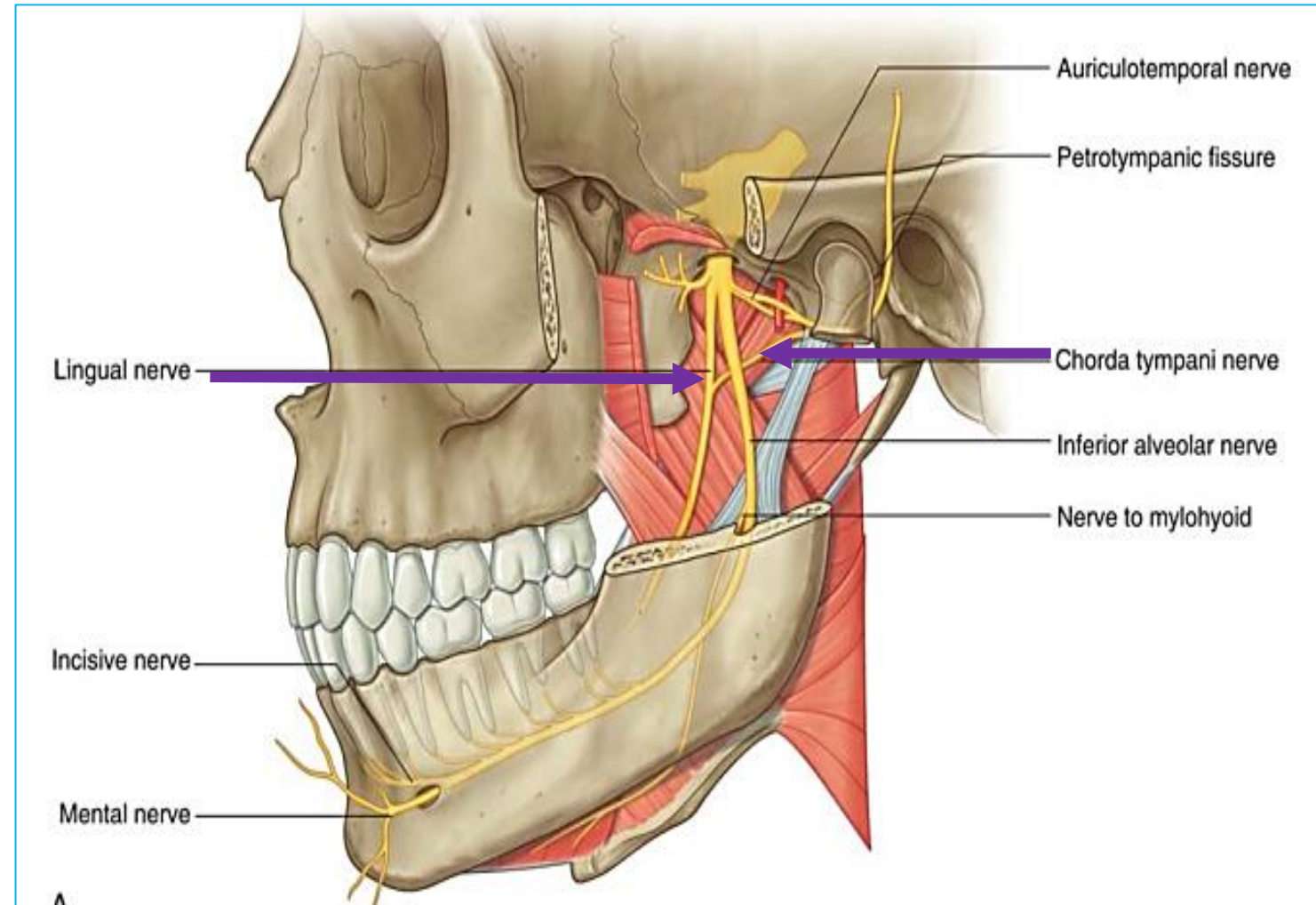
1. Auriculotemporal nerve (sensory) :

- Arises by two roots that surround the middle meningeal artery.
- It gives:
 - Sensory fibers** to skin of the external acoustic meatus, auricle, temple, temporo-mandibular joint and parotid gland.
 - Postganglionic parasympathetic secretory fibers** from the otic ganglion to the parotid gland.



2. Lingual nerve

- It appears at the lower border of the lateral pterygoid in front of the inferior alveolar nerve.
- It descends superficial to the medial pterygoid where it is joined by the chorda tympani, branch of the facial nerve, at an acute angle.
- It passes on the inner aspect of the mandible close to the medial side of the root of the 3rd molar tooth.

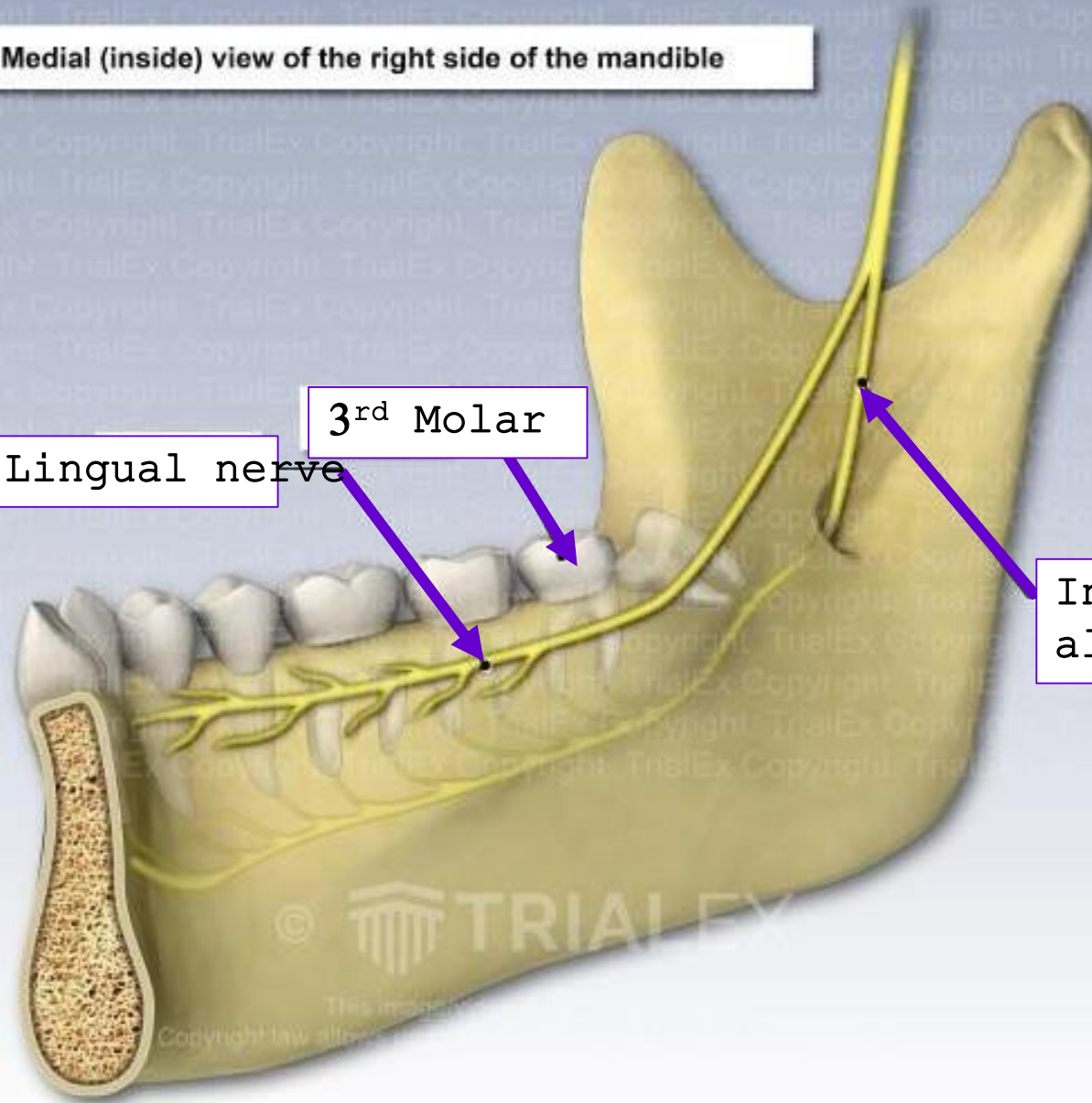


Medial (inside) view of the right side of the mandible

Lingual nerve

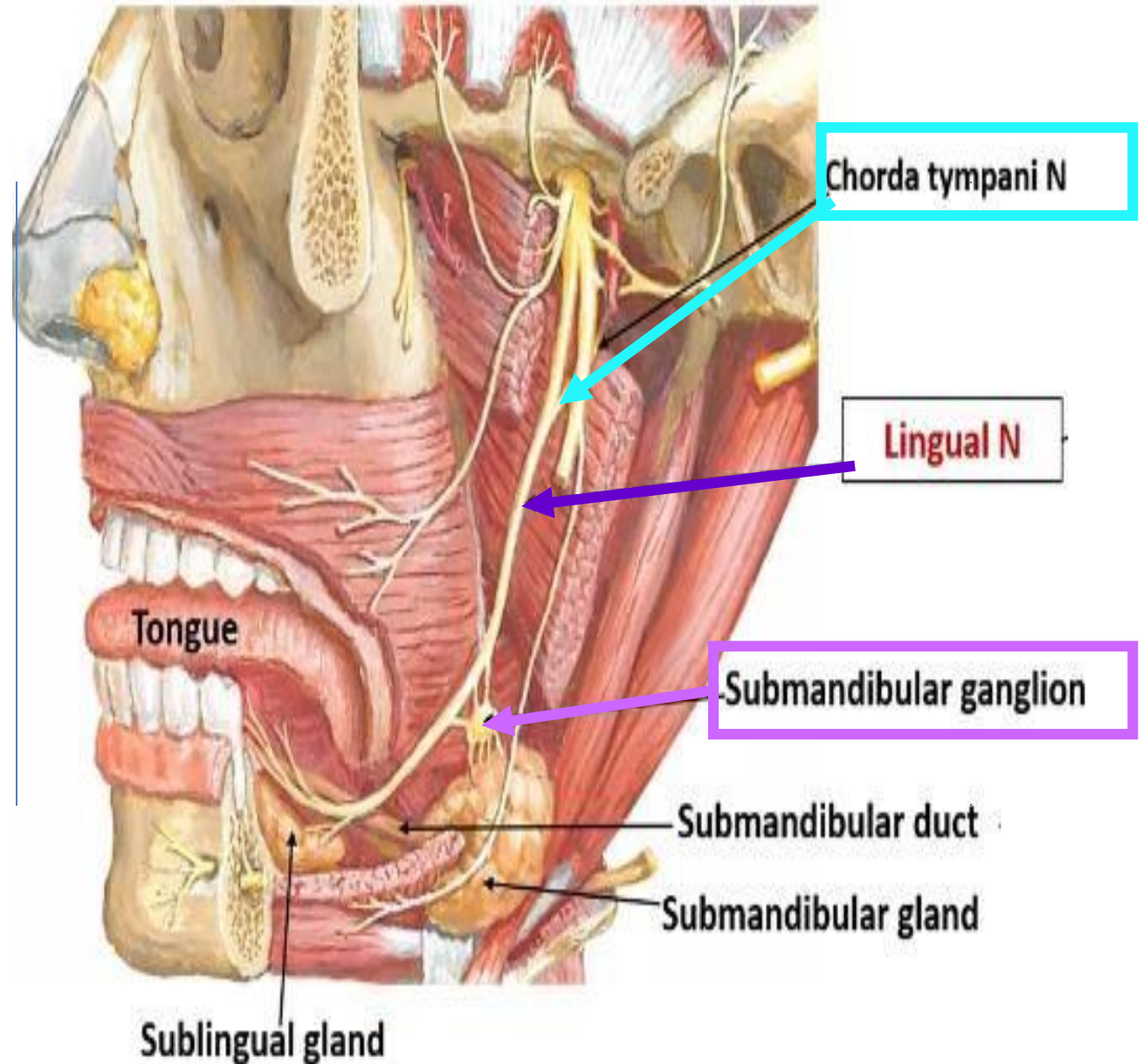
3rd Molar

Inferior alveolar nerve



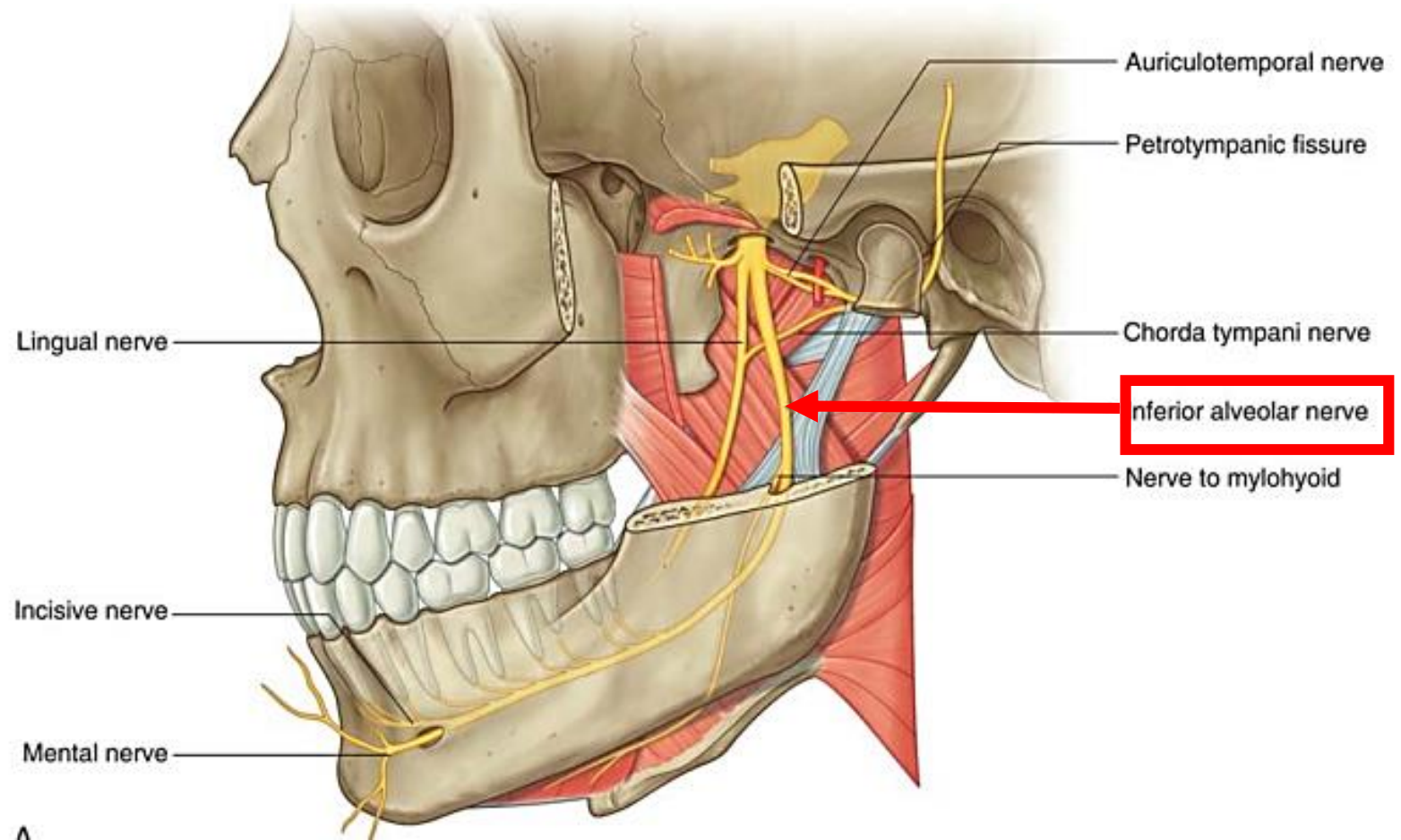
2. Lingual nerve

- It reaches the floor of the mouth where the submandibular ganglion is suspended from it.
 - It carries general sensations from the anterior $\frac{2}{3}$ of the tongue
- The chorda tympani fibers carry:
 1. Taste fibers from the anterior $\frac{2}{3}$ of the tongue.
 2. Preganglionic secretomotor which relay in the submandibular ganglion to supply the submandibular and sublingual salivary glands.



3. Inferior alveolar nerve:

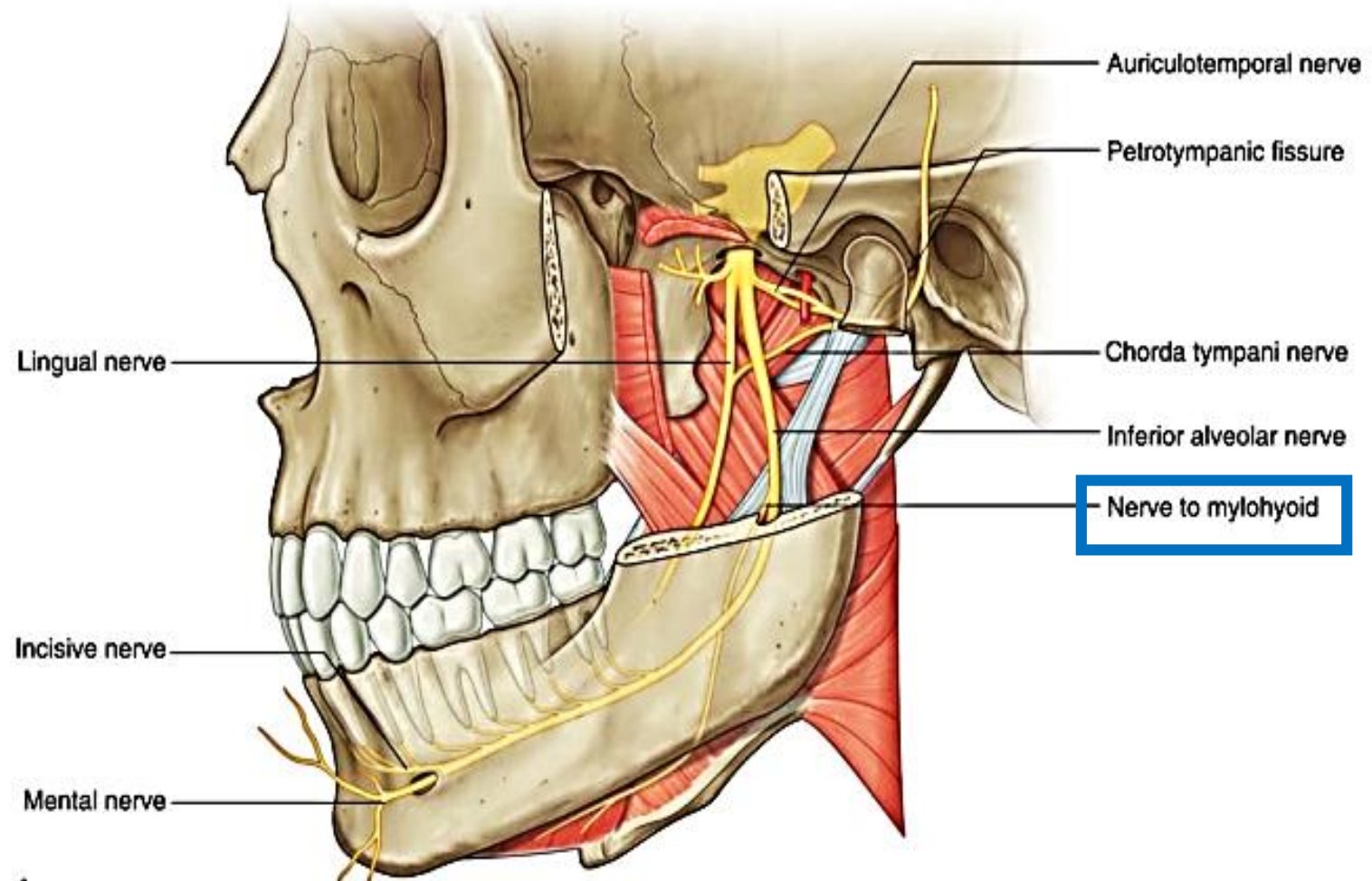
- It appears at the lower border of the lateral pterygoid behind the lingual nerve.
- It descends superficial to the medial pterygoid.
- It then enters the mandibular canal through the mandibular foramen and runs forward below the teeth.



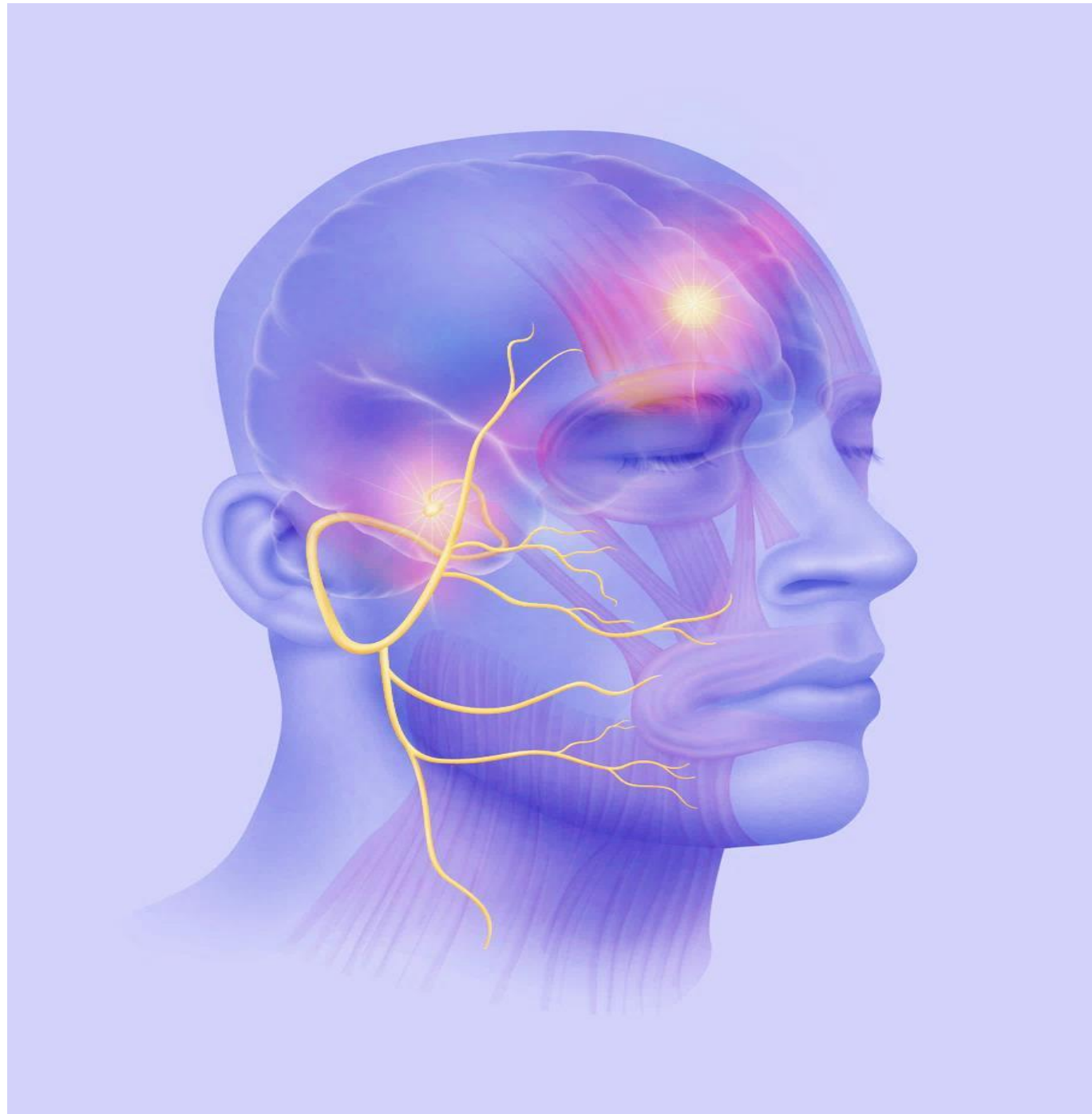
3. Inferior alveolar nerve

Branches

1. Mylohyoid nerve supplies mylohyoid & anterior belly of digastric muscles.
2. Branches to the teeth of the lower jaw.
3. Terminal branches: mental for chin and incisive for incisors of lower jaw.



Facial nerve (VII) cranial nerve



Cranial nerves originating from Pons

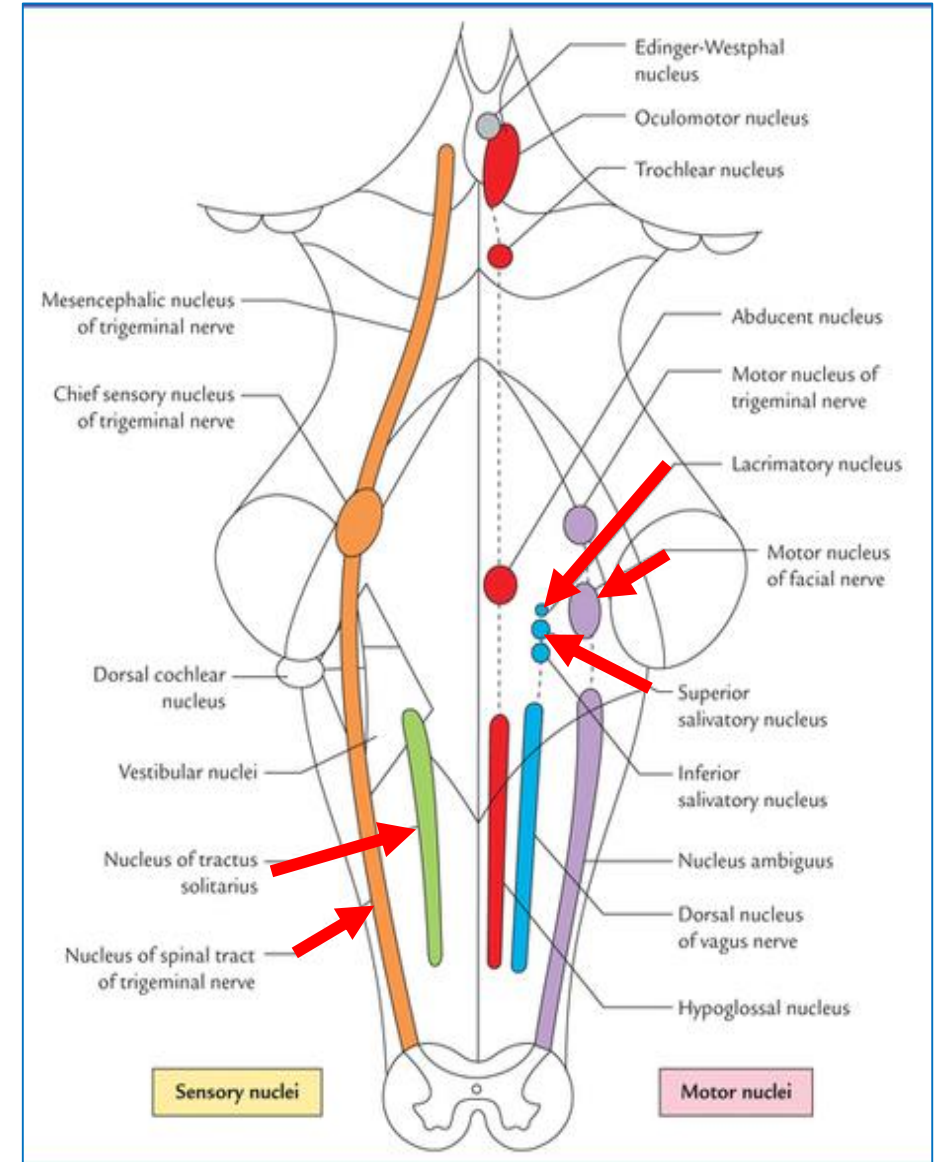
Facial nerve (VII)

It arises from:

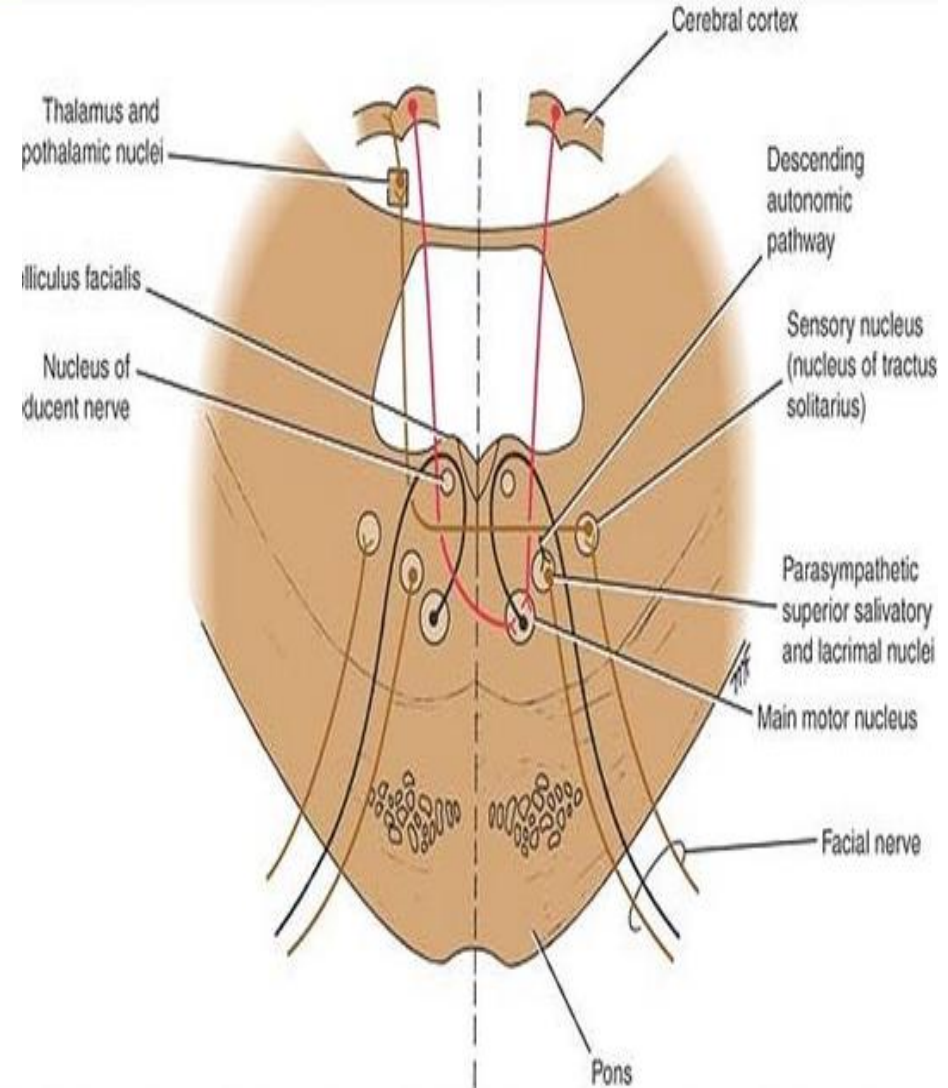
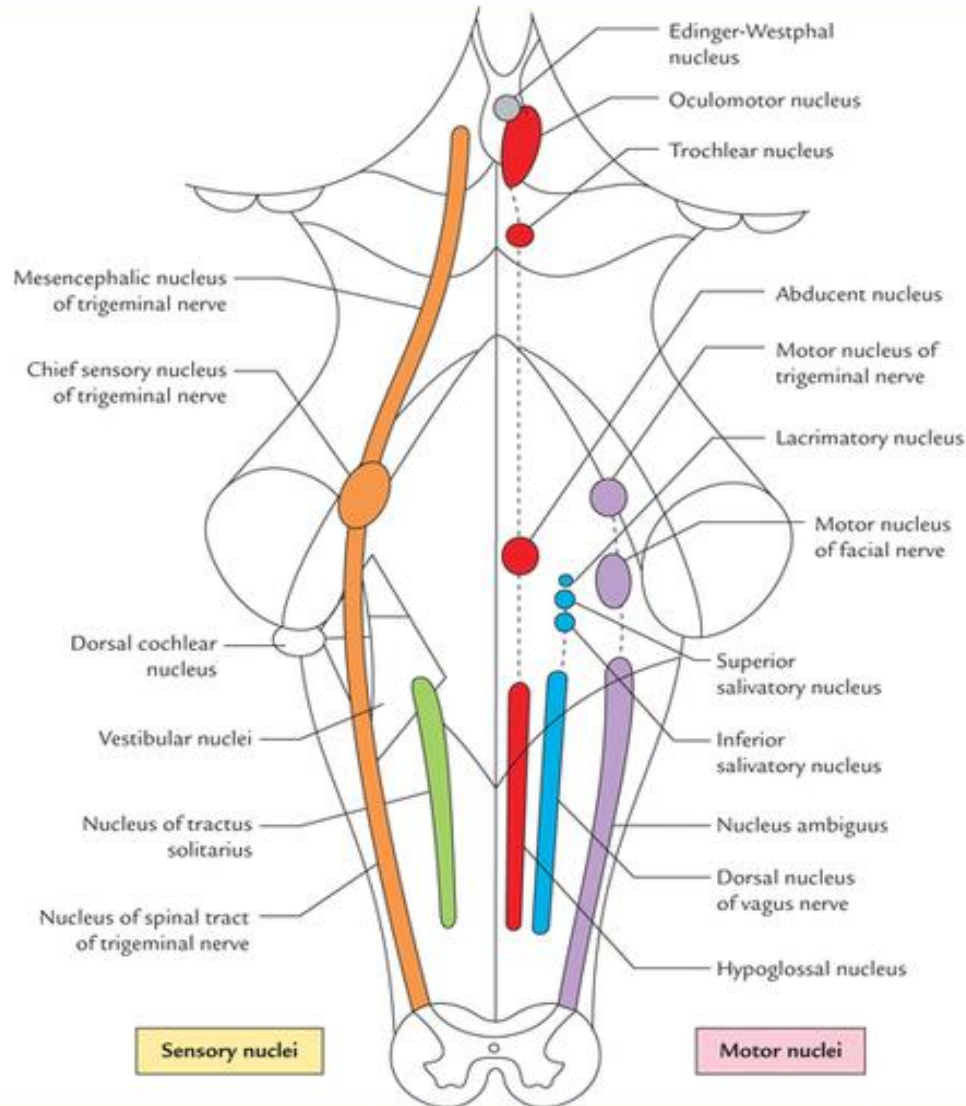
- Facial motor nucleus SVE
- Superior salivatory nucleus GVE
- Solitary tract and nucleus SVA
- Spinal trigeminal tract and nucleus GSA

Consists of :

- Facial nerve proper (motor division) which supply the facial muscles (SVE)
- Intermediate nerve (sensory division) which contains GVE, SVA and GSA fibres. The 1st order neurons of these fibres are in the geniculate ganglion within the temporal bone. It mediates taste, salivation and lacrimation.



Facial nerve (VII)



Deep origin of the Facial Nerve

1. **Motor root** : lies in the lower part of pons , **arises from facial nerve motor** nucleus and gives rise to the fibers of facial nerve which supplies the facial muscles (**Derived from mesoderm of 2nd branchial arch**).

2 **Secretomotor parasympathetic fibers** :

from superior salivary and lacrimatory nuclei, to

a. Submandibular salivary, and sublingual (*Chorda tympani nerve*).

b. Glands of the palate, nose, lacrimal glands and nasopharynx (*greater petrosal nerve*)

3- **Sensory root (nervus intermedius):**

A- sensory fibres: It receives taste sensations from the anterior 2/3 of the **tongue to lateral Part of Solitary nucleus**

B- sensory fibers: sensation from external ear **to spinal trigeminal tract & nucleus.**

Function of the Facial Nerve

- 1. Motor function to muscles of facial expression.**
- 2. Parasympathetic to glands in head
(submandibular, sublingual and lacrimal , nasal ,
palatine glands)**
- 3. Taste from anterior 2/3 of the tongue.**
- 4. Sensation from the posterior surface of the auricle
via posterior auricular branch of facial.**

Course and Relations of the Facial Nerve

A. Intracranial course of the facial nerve.

B. Extracranial course of the facial nerve.

A. Intracranial Course of the Facial Nerve

- The facial nerve emerges from the lower border of the pons at **ponto-cerebellar angle**.
- It leaves the cranial cavity by entering **the internal auditory meatus**.
- It runs through a facial canal inside petrous temporal bone.
- In the facial canal gives **three branches**.



Branches of the facial nerve

Intra-petrous part gives

1. Greater superficial petrosal nerve

- Arises from the geniculate ganglion
- It contains the preganglionic parasympathetic fibers to the sphenopalatine ganglion

2. Nerve to stapedius

- Arises from the facial nerve as it descends in the facial canal

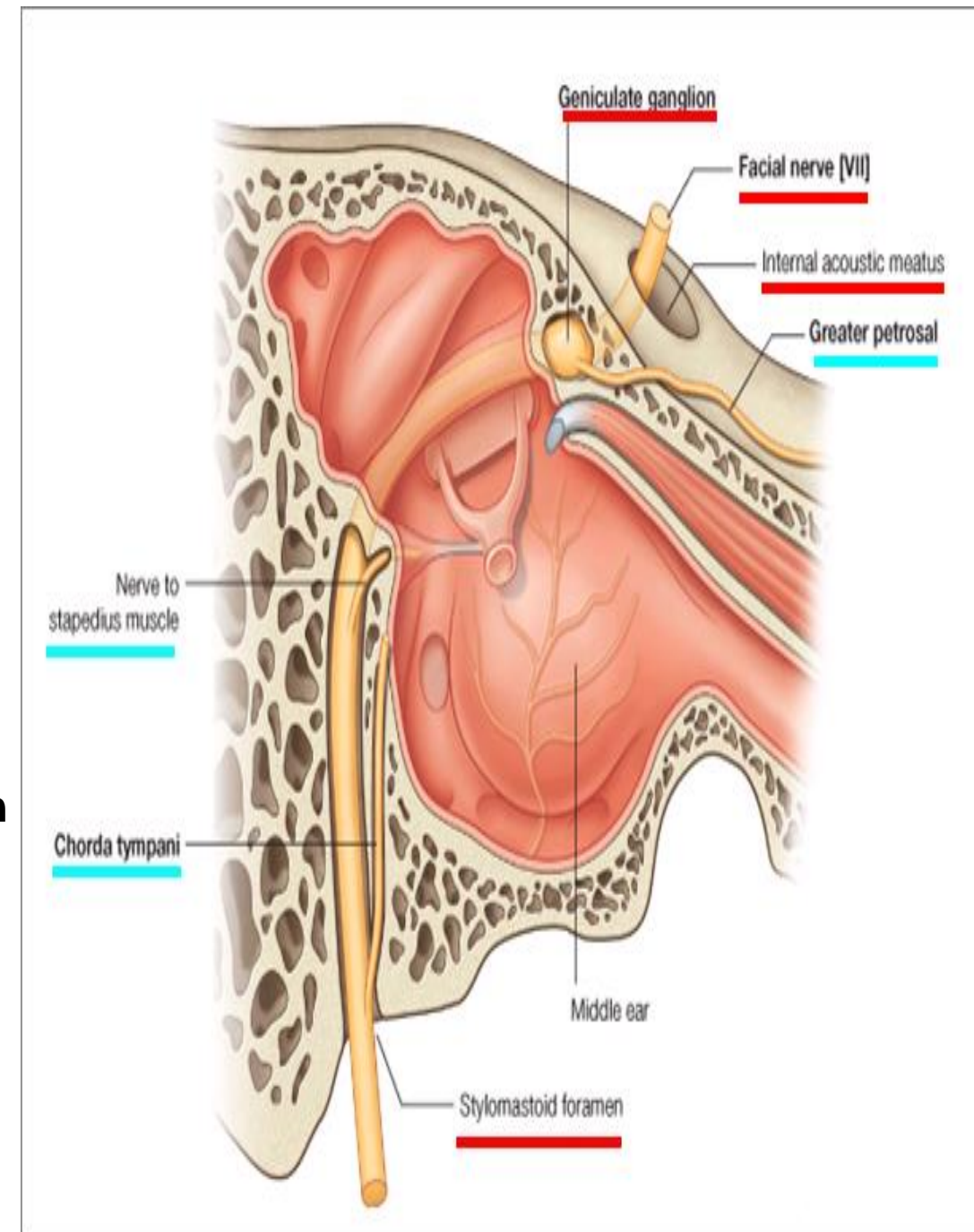
3. Chorda tympani nerve

- Arises from the facial nerve above the stylomastoid foramen
- it joins the lingual nerve in the infratemporal fossa .

– It contains:

* Taste fibers from the anterior 2/3 of the tongue

* Preganglionic parasympathetic fibers to submandibular ganglion.



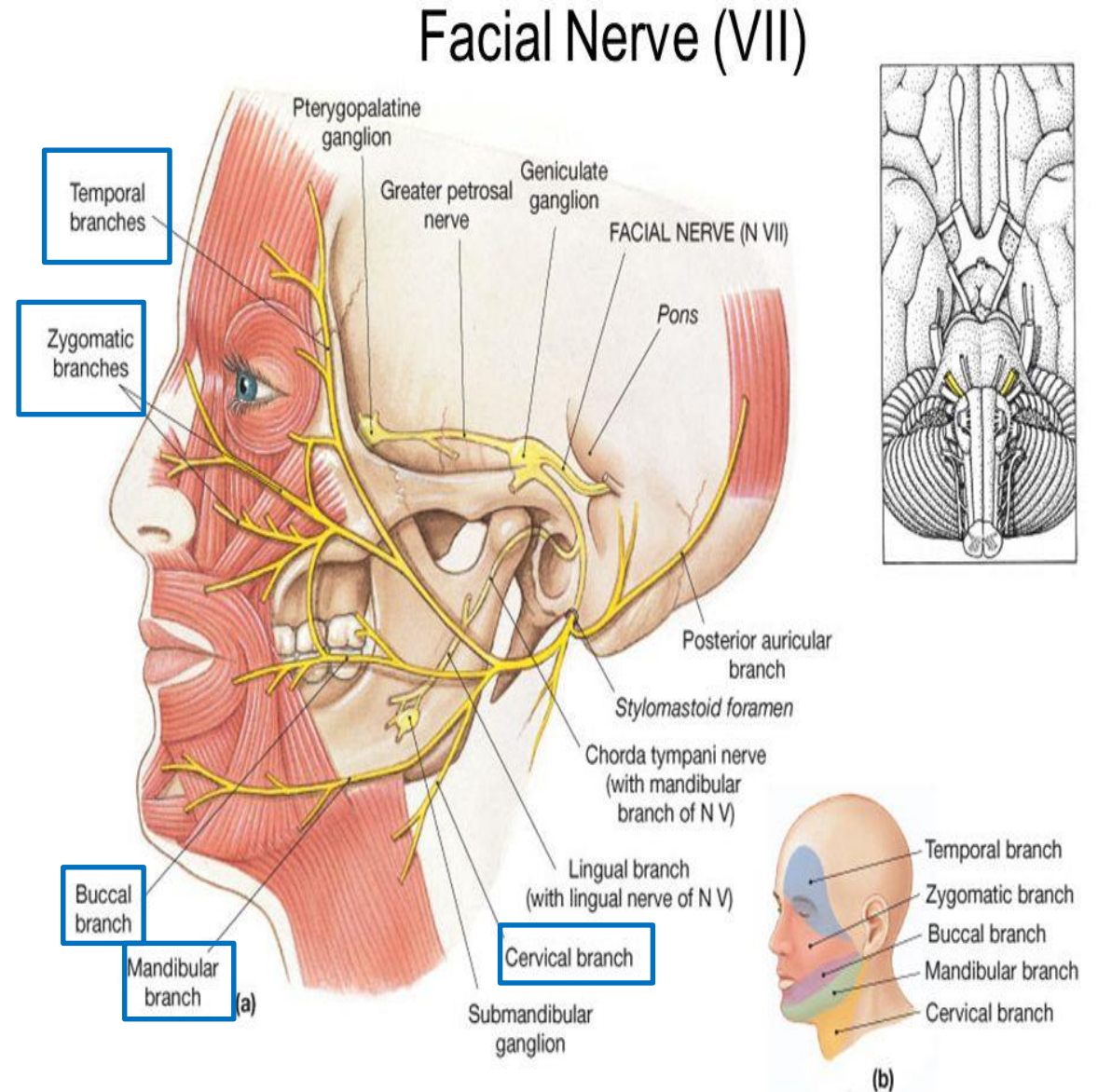
B. Extracranial Course of the Facial Nerve

Outside the stylomastoid foramen it gives:

1. *Posterior auricular nerve*
2. *Nerve to posterior belly of digastric and stylohyoid*

Terminal branches inside the parotid gland:

- 1- Temporal
- 2- Zygomatic
- 3- Buccal
- 4- Mandibular
- 5- Cervical



Thank
you

