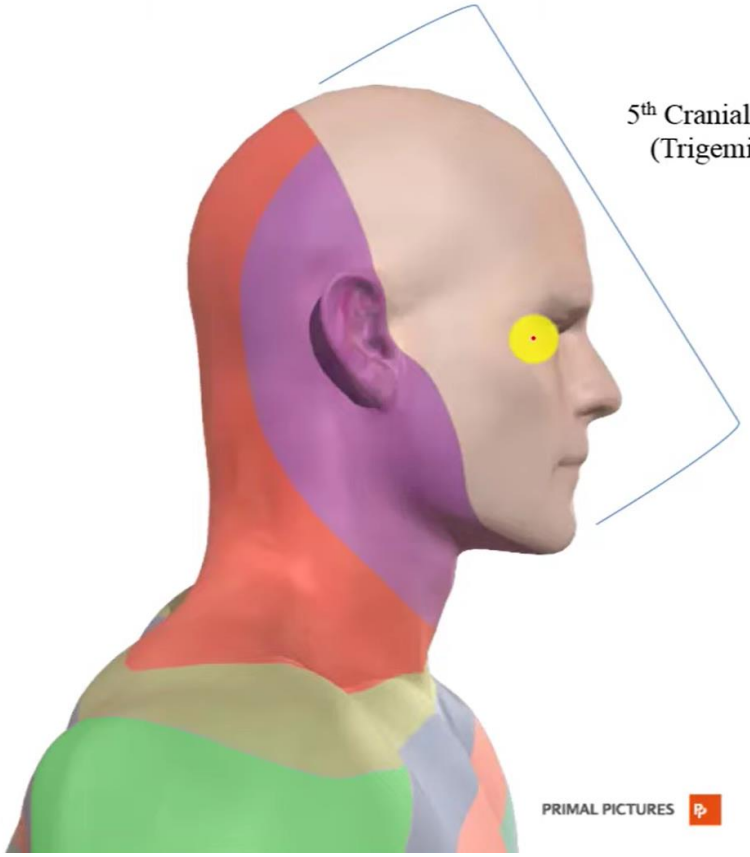
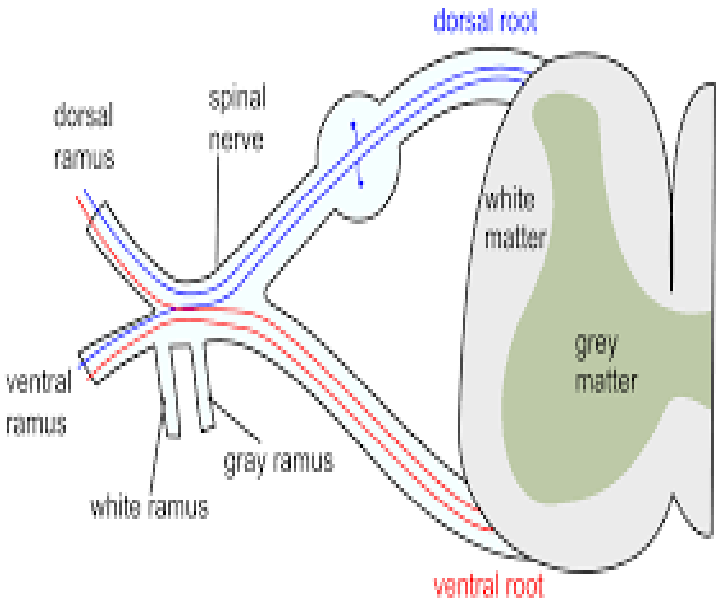
Scalp 2

Dr. Heba Kalbouneh
Associate Professor of Anatomy and Histology





Sensory enervation of the head and neck area:

Sensation from the skin of the face is carried by the trigeminal nerve (5th cranial neve), while the skin of the remanent areas of head and neck is supplied by the spinal nerves.

The Face ⟹ Trigeminal nerve (5th cranial nerve)

The back of the head
The back of the neck
The anterolateral side of the neck
⟹ Spinal nerves

Quick revision for the spinal nerves:

We have 31 pairs of spinal nerves emerging from the spinal cord, each one emerges by two roots, ventral root (motor) and dorsal root (sensory) with a ganglion presented at the dorsal root where the cell bodies of the sensory fibers located (the dorsal root ganglion). The union between these two roots results in the formation of the spinal nerve which is mixed (sensory and motor), short nerve that divides into two rami, dorsal and ventral.

- The posterior aspect of the scalp and the posterior surfaces of the neck and trunk are supplied segmentally by the dorsal rami of the spinal nerves starting from the second cervical spinal nerve until the coccygeal spinal neve (note: the first cervical spinal nerve has no cutaneous branches)
- The ventral rami of the spinal nerve supply the anterolateral aspect of the body including upper and lower limbs
- The ventral rami only can form plexuses while the dorsal rami cannot because of their short length except for the ventral rami of the thoracic spinal nerves cannot form plexuses because they are separated by the ribs and they are called intercostal nerves because they pass in between ribs

Nerve supply of the scalp

10 sets of nerves on each side of the scalp

5 in front the auricle

5 behind the auricle

4 sensory
1 motor

4 sensory
1 motor

Nerves **in front** the auricle

1- Supratrochlear nerve
2 Supraorbital nerve
3 Zygomaticotemporal nerve
4 Auriculotemporal nerve
5 Temporal branch of facial nerve

Nerves **behind**the auricle

1- Great auricular nerve (ant rami C2 C3)
2- Lesser occipital nerve (ant rami C2)
3- Greater occipital nerve (post rami C2)
4- Third occipital nerve (post rami C3)
5- Posterior auricular branch of facial nerve

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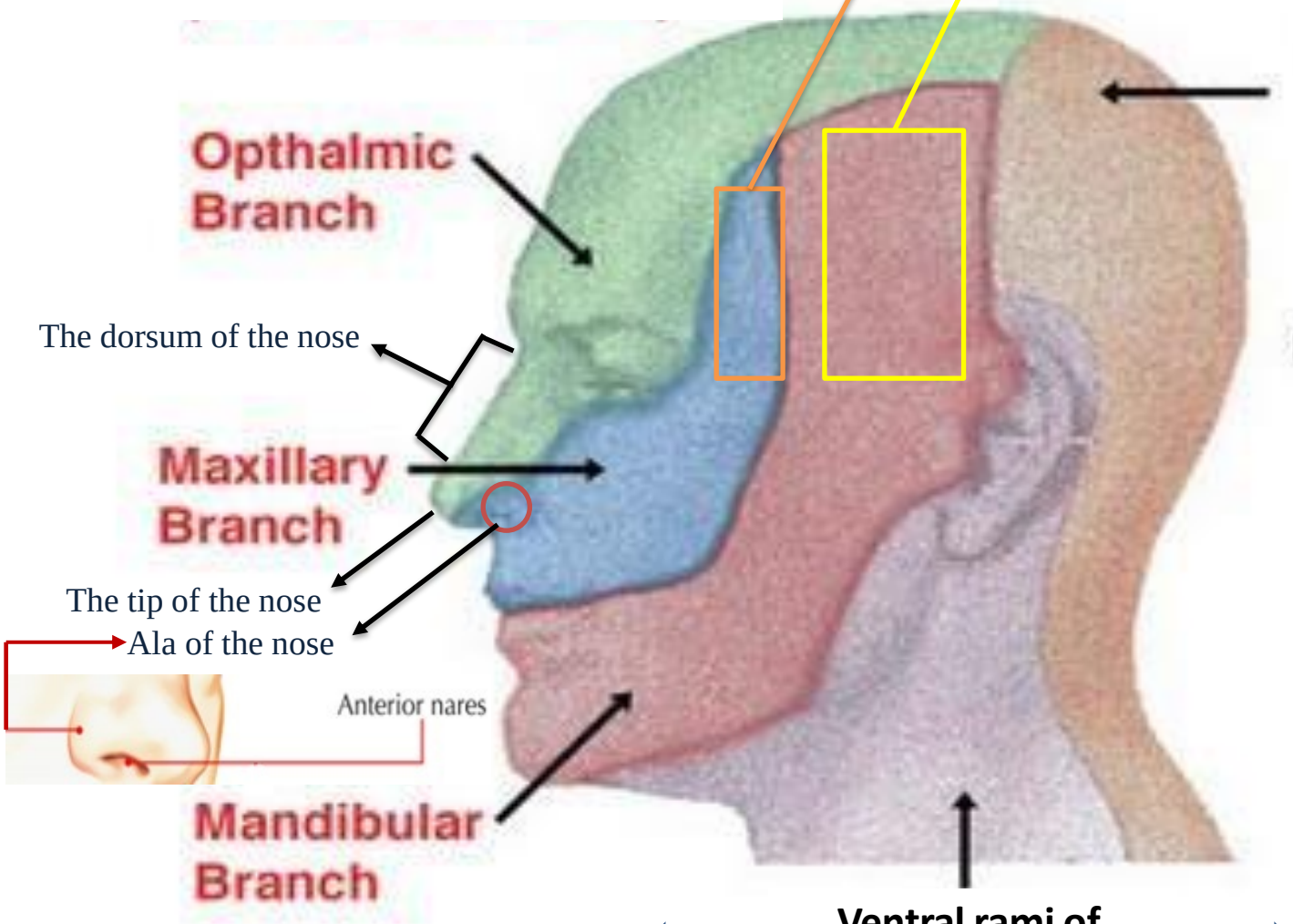
Nerve supply of the scalp

The skin of the face is supplied by the branches of Trigeminal nerve, except for the skin over the angle of the mandible which is supplied by branches from the cervical plexus



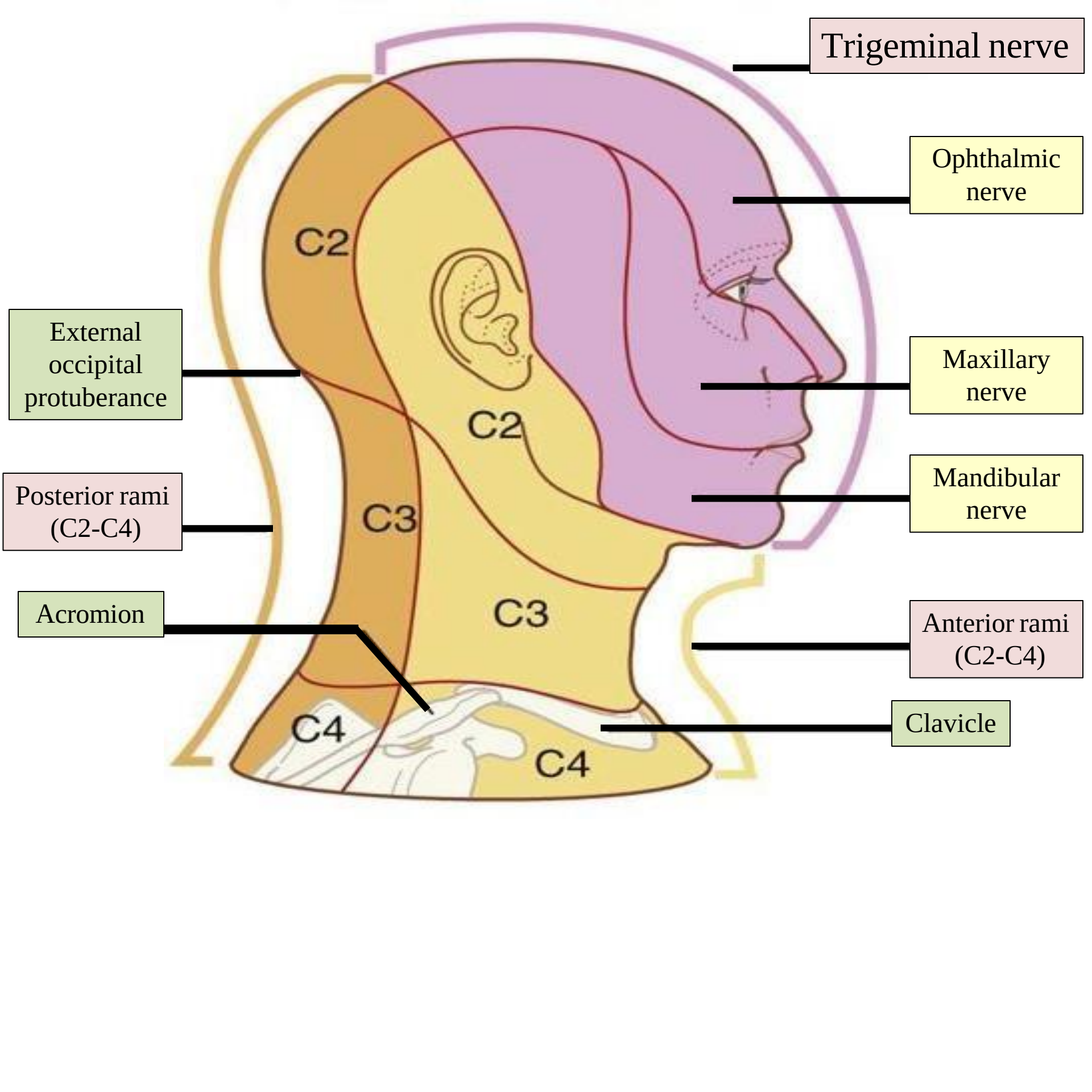
Dorsal rami of cervical nerves

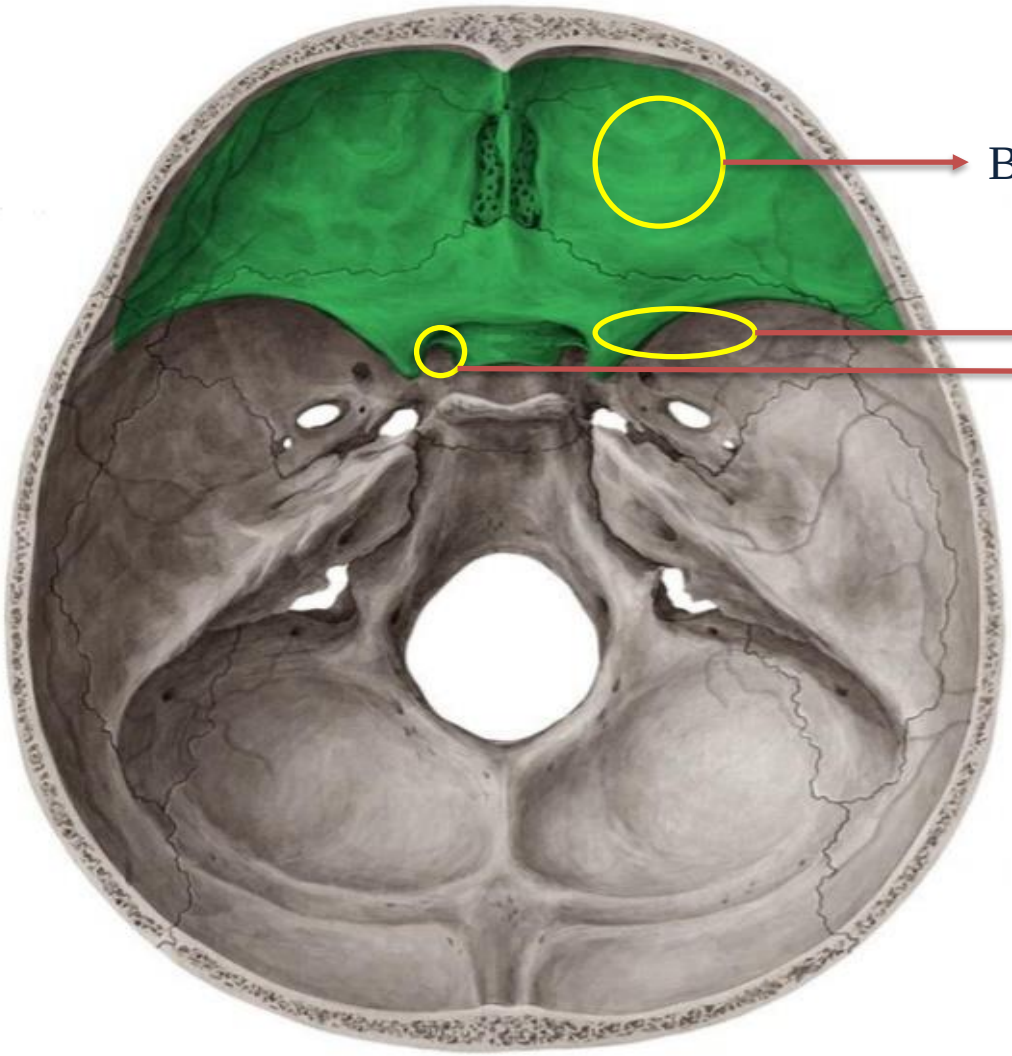
Supplies the skin of the posterior aspect of the scalp and the posterior surface of the neck

From the cervical plexus which is formed by the anterior primary rami of the first 4 cervical spianl nerves

Ventral rami of cervical nerves

Supplies the anterolateral aspect of the neck

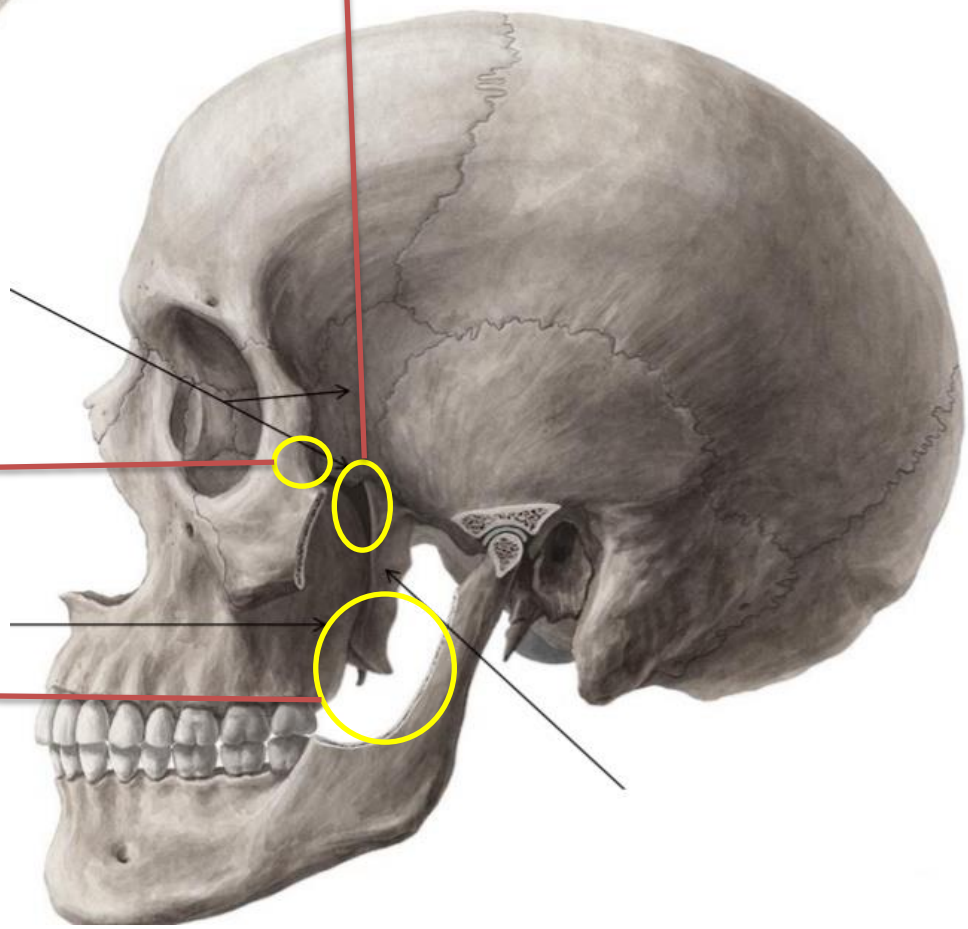

Trigeminal nerve
Ophthalmic nerve
Maxillary nerve
Mandibular nerve
Anterior rami (C2-C4)
Clavicle
External occipital protuberance
Posterior rami (C2-C4)
Acromion
C2
C2
C3
C3
C4
C4



Beneath this plate we have the orbit

Superior orbital fissure & optic canal
Which are the only pathways between the middle cranial fossa and the orbital cavity

Pterygopalatine fossa



Inferior orbital fissure provides communication between the orbital cavity and pterygopalatine fossa with the orbital cavity

Infraorbital fossa

Sensory Nerves of the Face

Ophthalmic, orbital, ciliary… these terms related to the eyeball

Ophthalmic nerve

It passes through the superior orbital fissure to bring sensations from this area

Maxillary nerve

Passes through foramen rotundum and then it will be within pterygopalatine fossa and then passes through the infra orbital fissure, on the orbital roof and then exit through the infraorbital foramen as infraorbital nerve

Mandibular nerve

Passes through the foramen ovale to reach the infraorbital fossa

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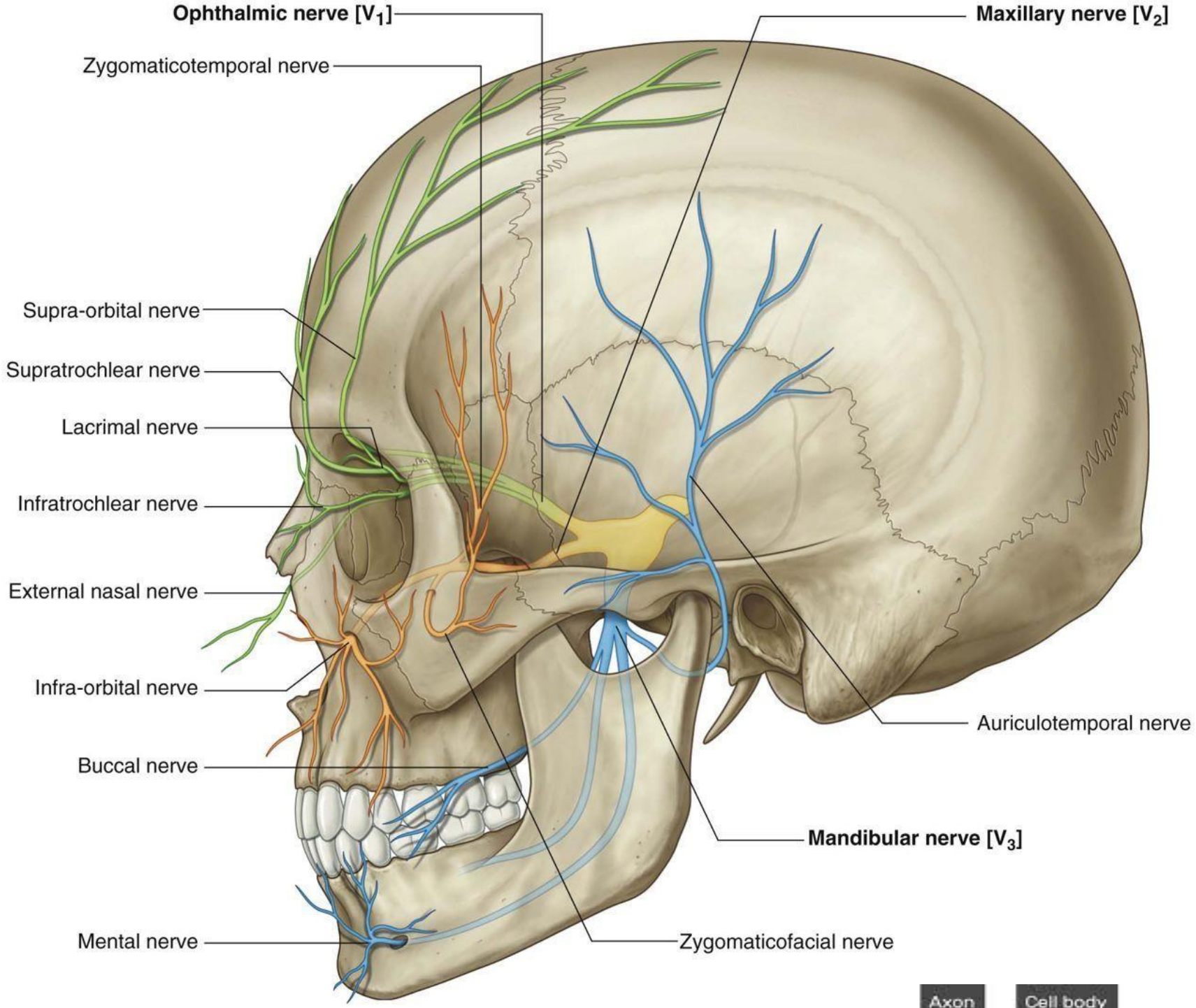
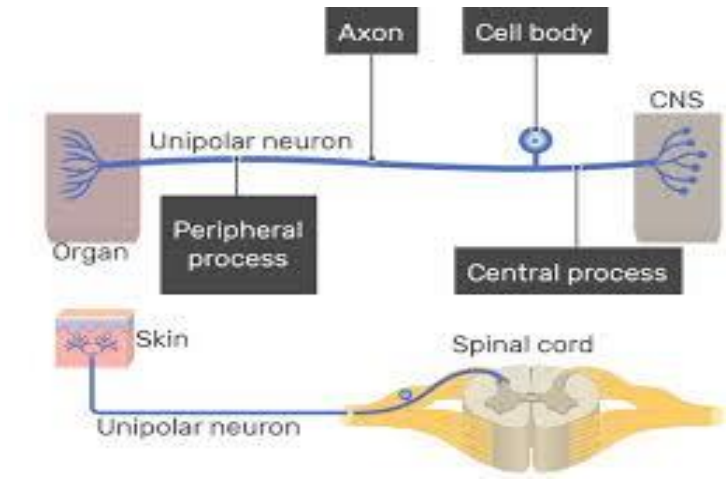
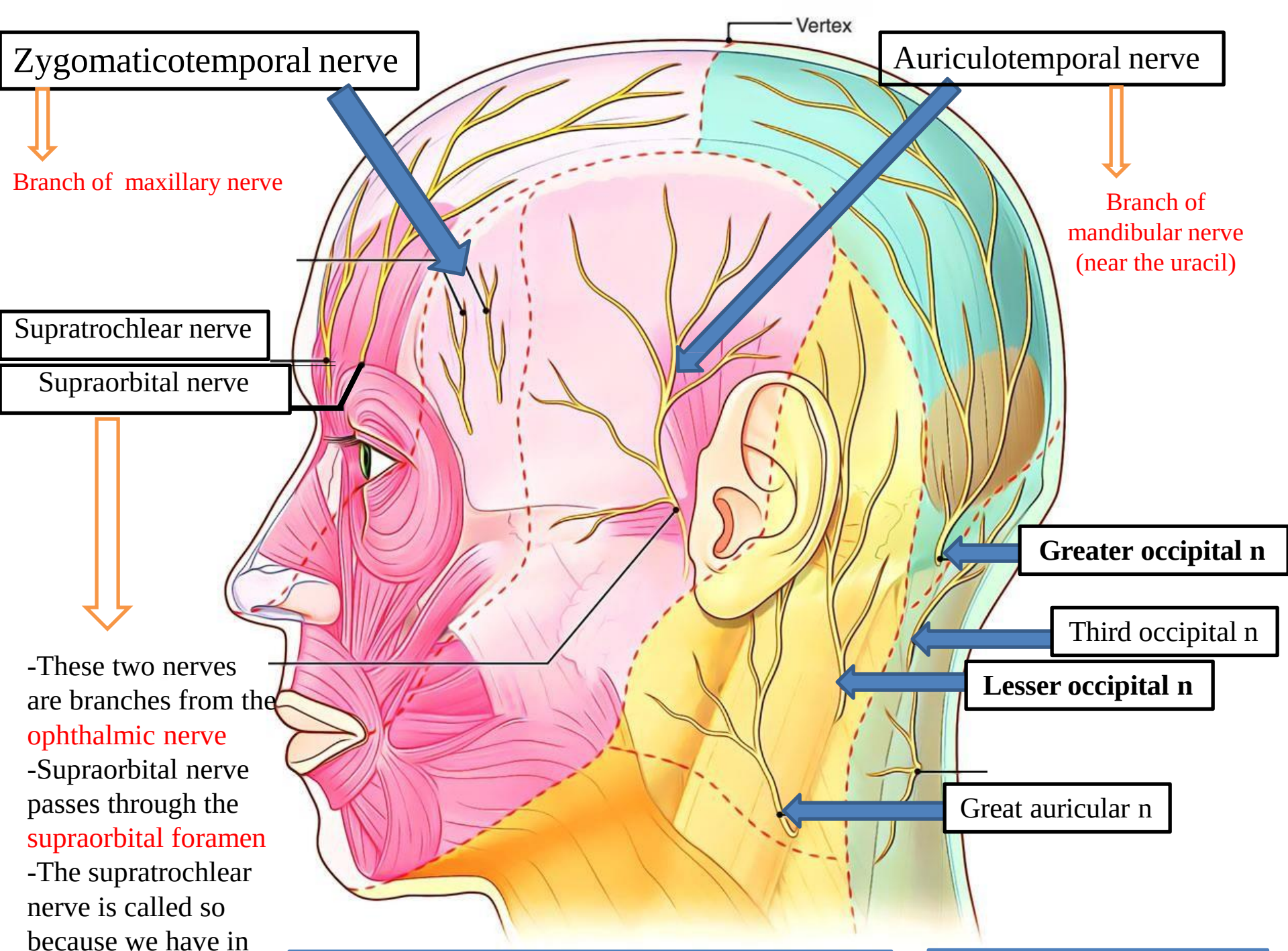


Trigeminal nerve (5th cranial nerve):

Mixed nerve, has large sensory root and small motor root, the sensory root passes through the cranial cavity and it forms a ganglion (Trigeminal ganglion), for the collection of cell bodies of sensory neurons, which is equivalent to the dorsal root ganglion of the spinal nerve where we have the central process of the pseudounipolar neuron located within the brain stem, the cell bodies then cluster to form the ganglion and the peripheral processes form the **three** branches of the trigeminal nerve (that carry sensation toward the central nervous system)





-These two nerves are branches from the ophthalmic nerve
-Supraorbital nerve passes through the supraorbital foramen
-The supratrochlear nerve is called so because we have in the most superior-anterior-medial part of the orbit structure called the trochlea بكرة where the muscle wind around and this nerve passes just above it

The four sensory nerves anterior to the uracil:

- **Supratrochlear nerve** (Branch of ophthalmic nerve)
- **Supraorbital nerve** (Branch of ophthalmic nerve)
- **Zygomaticotemporal nerve** (Branch of maxillary nerve)
- **Auriculotemporal nerve** (Branch of Auriculotemporal nerve)

Area behind the uracil:

Is divided into posterior part (supplied by the dorsal rami) and lateral part (supplied by the ventral rami of cervical plexus)

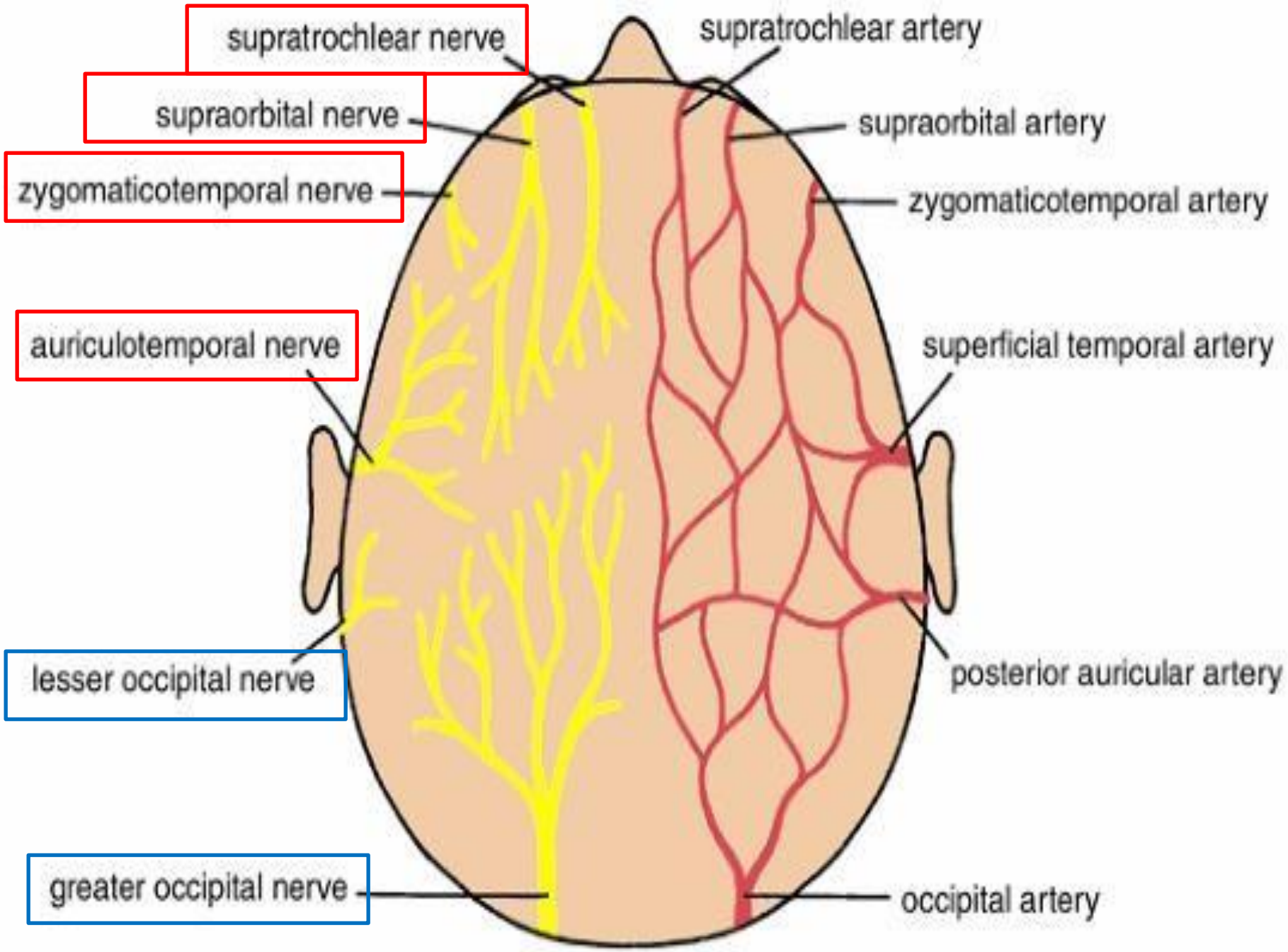
Area behind the uracil:

- **Great auricular nerve (branch from the cervical plexus):** brings sensations from the area overlaying the angle of the mandible and large area of the uracil

- **Lesser occipital nerve (Branch of the cervical plexus):** supplies the small area on the lateral side of the scalp posterior to the uracil

- **Greater occipital nerve (Branch from the dorsal ramus) :** brings sensations from the skin of the back of the scalp (large area of the occipit)

- **Third occipital nerve**


supratrochlear nerve
supraorbital nerve
zygomaticotemporal nerve
auriculotemporal nerve
lesser occipital nerve
greater occipital nerve
supratrochlear artery
supraorbital artery
zygomaticotemporal artery
superficial temporal artery
posterior auricular artery
occipital artery

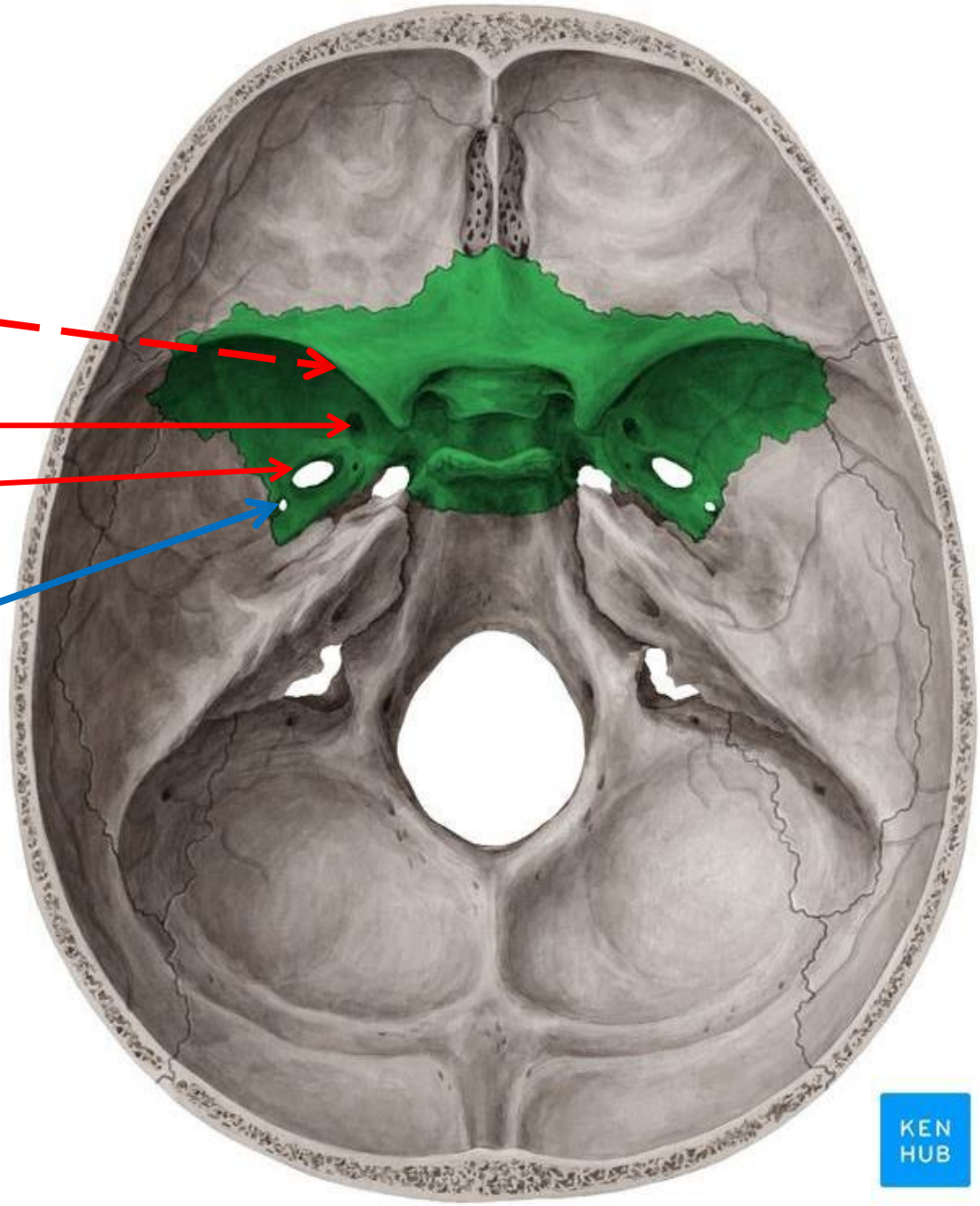
Sphenoid bone

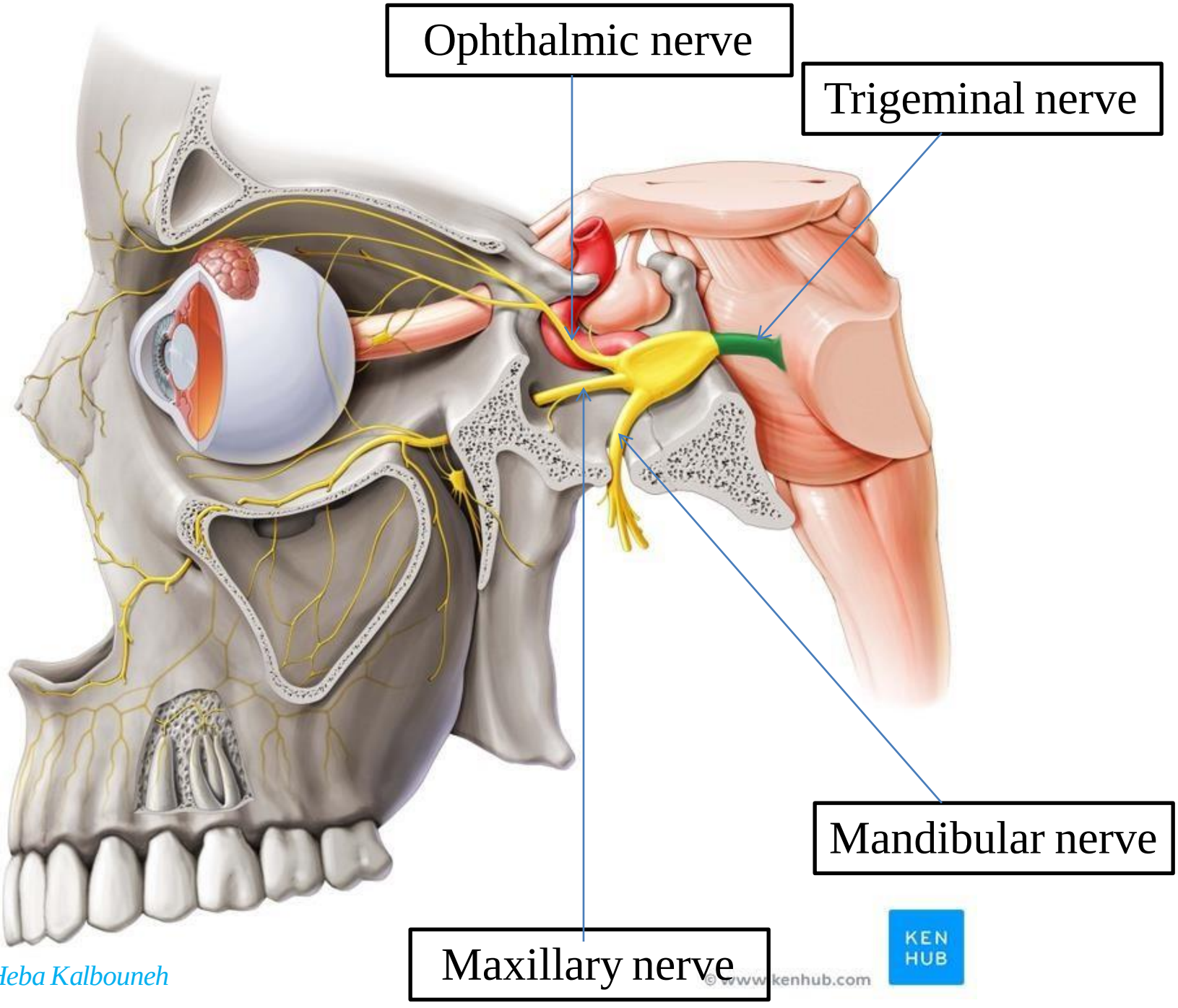
Superior orbital fissure
(branches of ophthalmic nerve)

Foramen rotundum
(maxillary nerve)

Foramen ovale
(mandibular nerve)

Foramen spinosum





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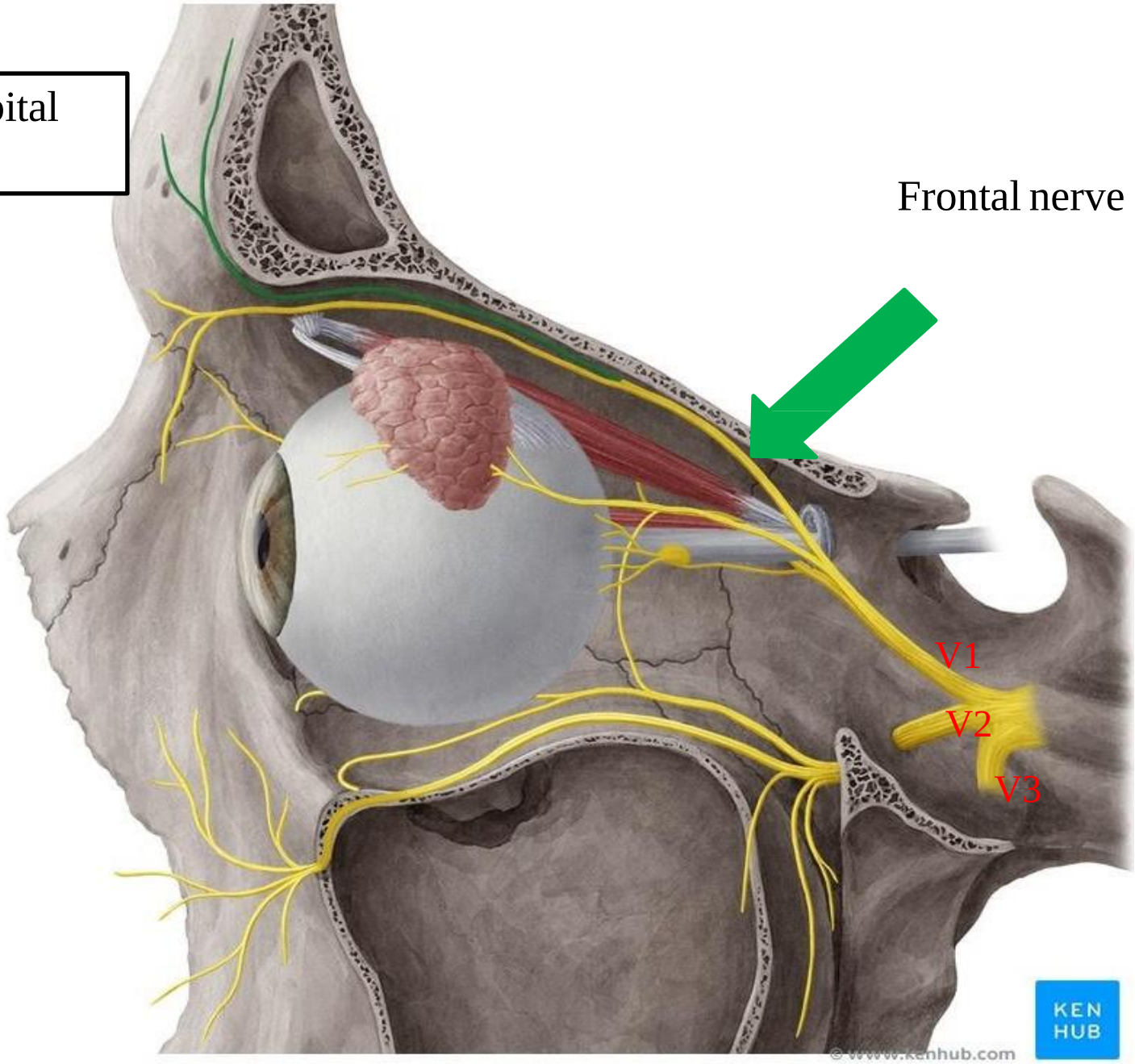

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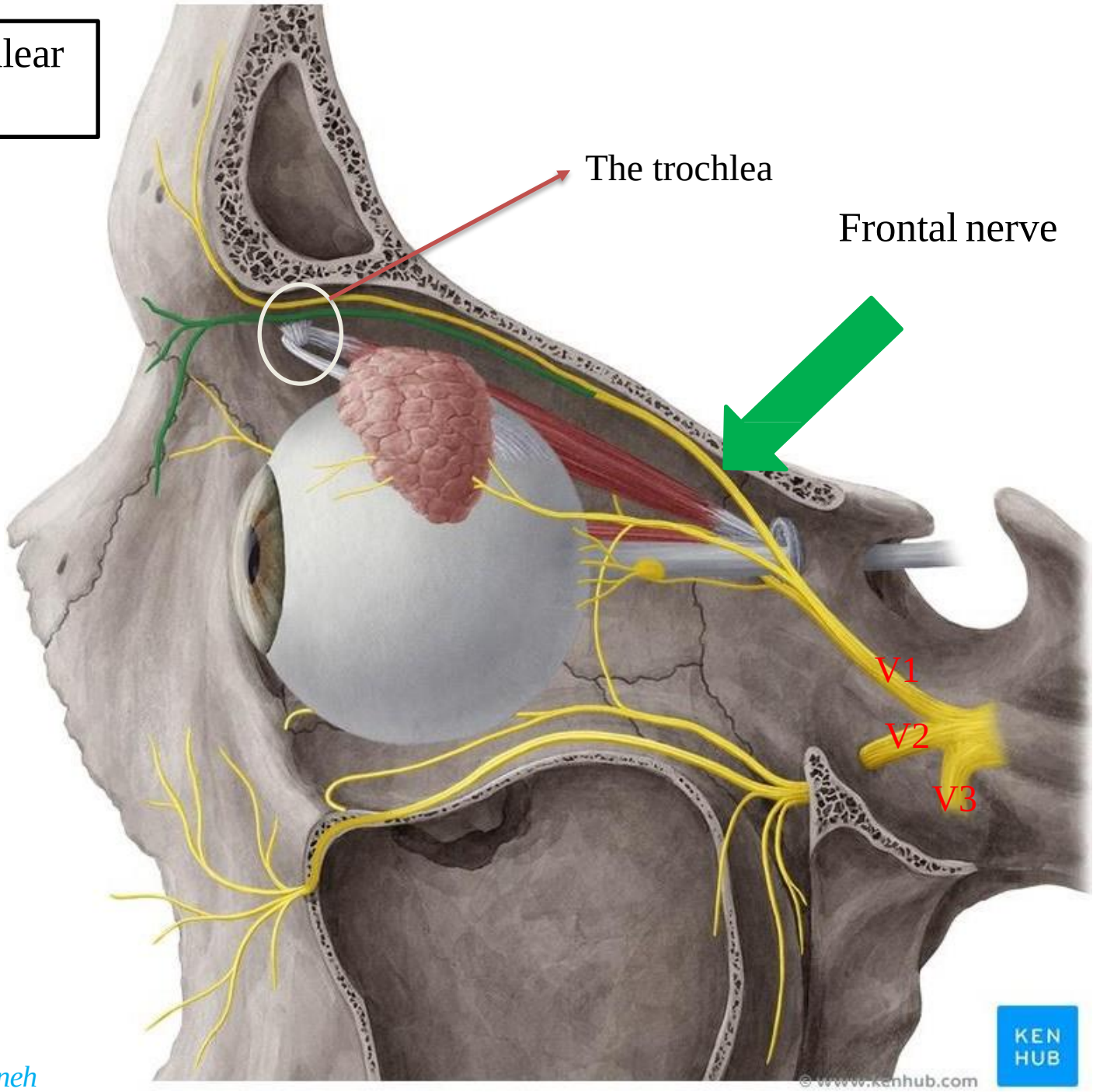
The branches of the ophthalmic nerve passes through the superior orbital fissure and not the nerve it self

- The first passes superiorly exactly under the frontal bone (bellow the roof of the orbit) **THE FRONTAL NERVE**
- The second passes laterally (note that at the lateral side of the orbit we have the lacrimal gland, the tear producing gland), **THE LACRIMAL NERVE** supplies the lacrimal gland
- The third passes medially passes on the medial wall of the orbit (the lateral wall of the nasal cavity **THE NASOCILLIARY NERVE**

Supratrochlear nerve



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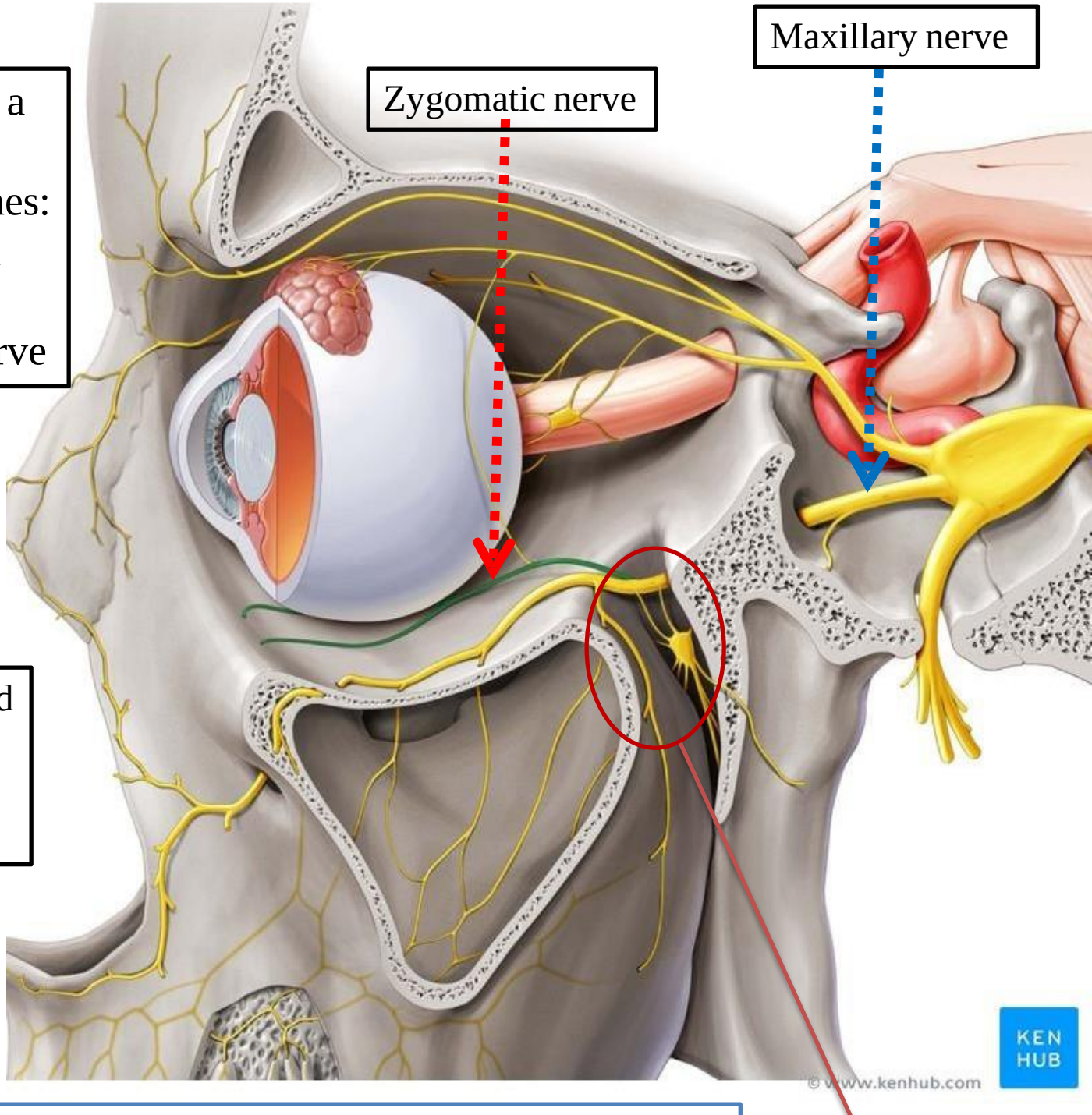
Frontal nerve divides into two branches:

- The supraorbital nerve moves within the bone and then passes through the supraorbital foramen
- The supratrochlear nerve more medially

The zygomatic nerve is a branch from maxillary nerve, it has two branches:
1- Zygomaticotemporal nerve
2- Zygomaticofacial nerve



The maxillary nerve and its zygomatic branch pass through inferior orbital fissure

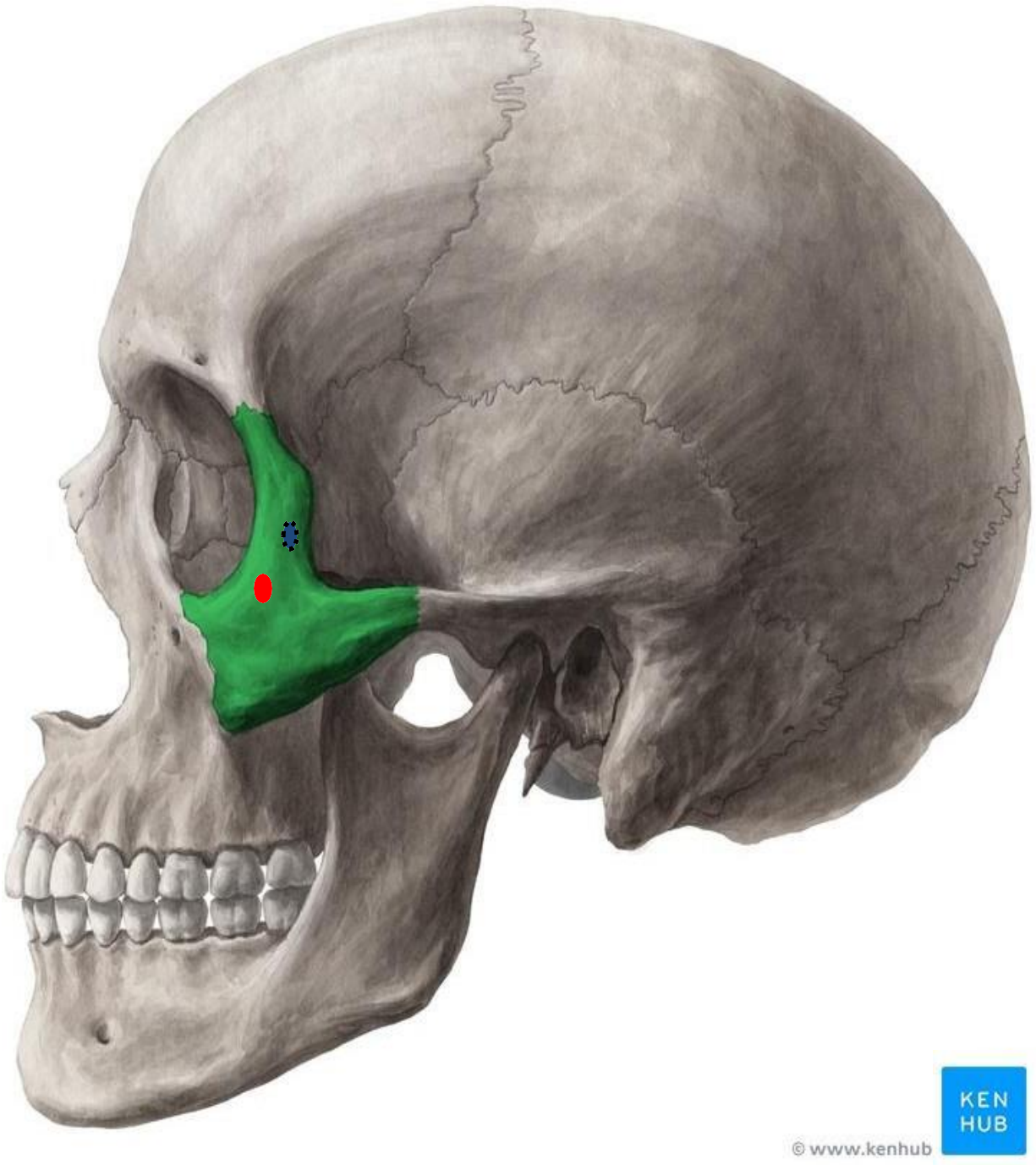
The maxillary nerve passes through the foramen rotundum to enter pterygopalatine fossa that is located directly bellow the apex of the orbital fossa, the passes through the inferior orbital fissure to enter the orbit, passes on the floor of the orbit and then leave the orbit through the infraorbital fossa as infraorbital nerve , while the maxillary nerve passes through the pterygopalatine fossa it give a branch called zygomatic nerve that passes also through the infraorbital fissure

1- The zygomaticotemporal nerve

- A branch of the zygomatic nerve (maxillary nerve)
- Emerges in the temporal fossa through a small foramen on the posterior surface of the zygomatic bone. It supplies the skin over the temple **(Zygomaticotemporal foramen)**

2- The zygomaticofacial nerve

- A branch of the zygomatic nerve (maxillary nerve)
- Passes onto the face through a small foramen on the anterior side of the zygomatic bone. It supplies the skin over the prominence of the cheek **(Zygomaticofacial foramen)**



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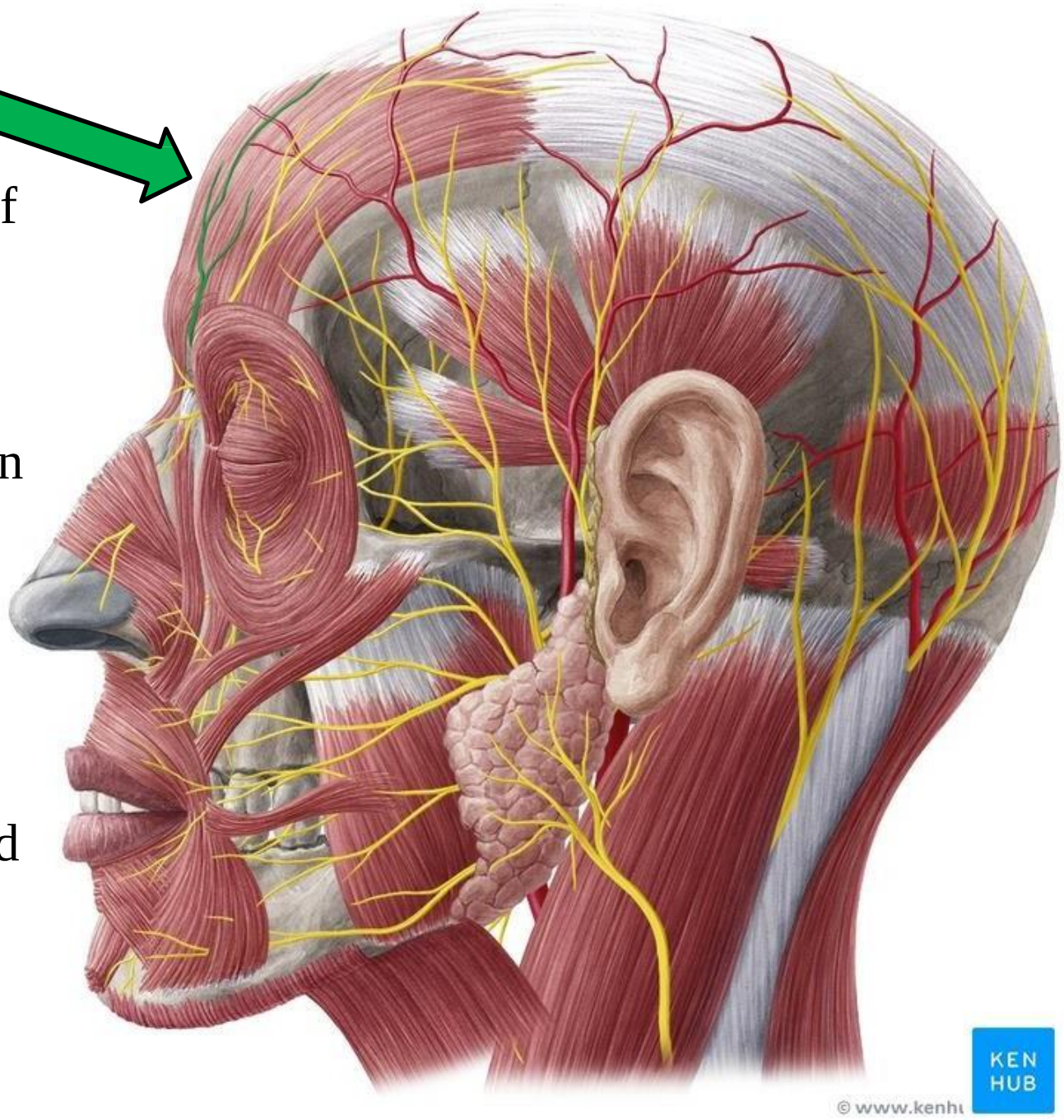
Supratrochlear nerve

-A branch of the ophthalmic division of the trigeminal nerve

-Winds around the superior orbital margin and ascends over the forehead close to the median plane

- It supplies the scalp nearly as far backward as the vertex.



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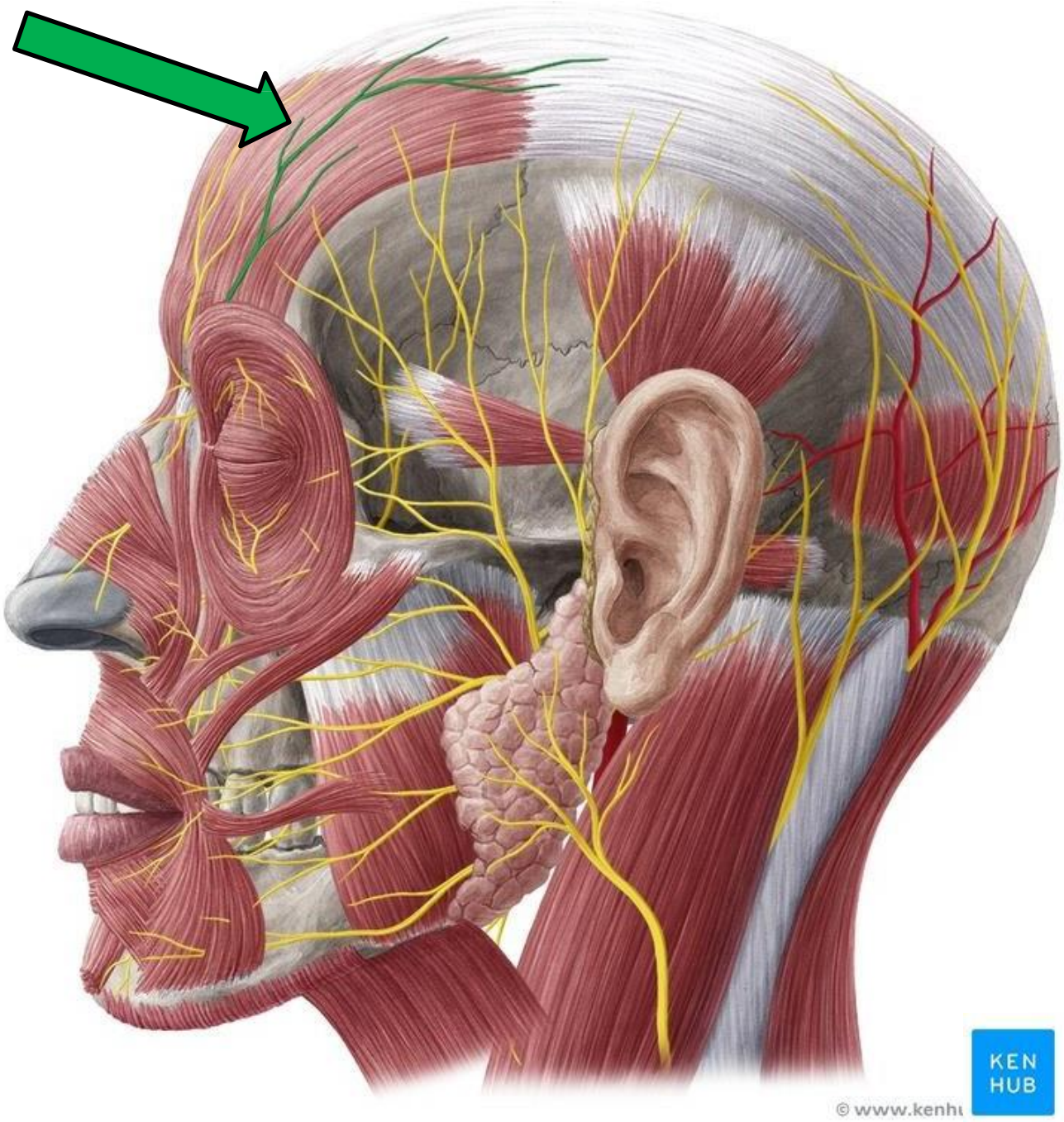
Supraorbital nerve

-A branch of the ophthalmic division of the trigeminal nerve

-Passes through the supraorbital foramen and ascends over the forehead

- It supplies the scalp as far backward as the vertex.



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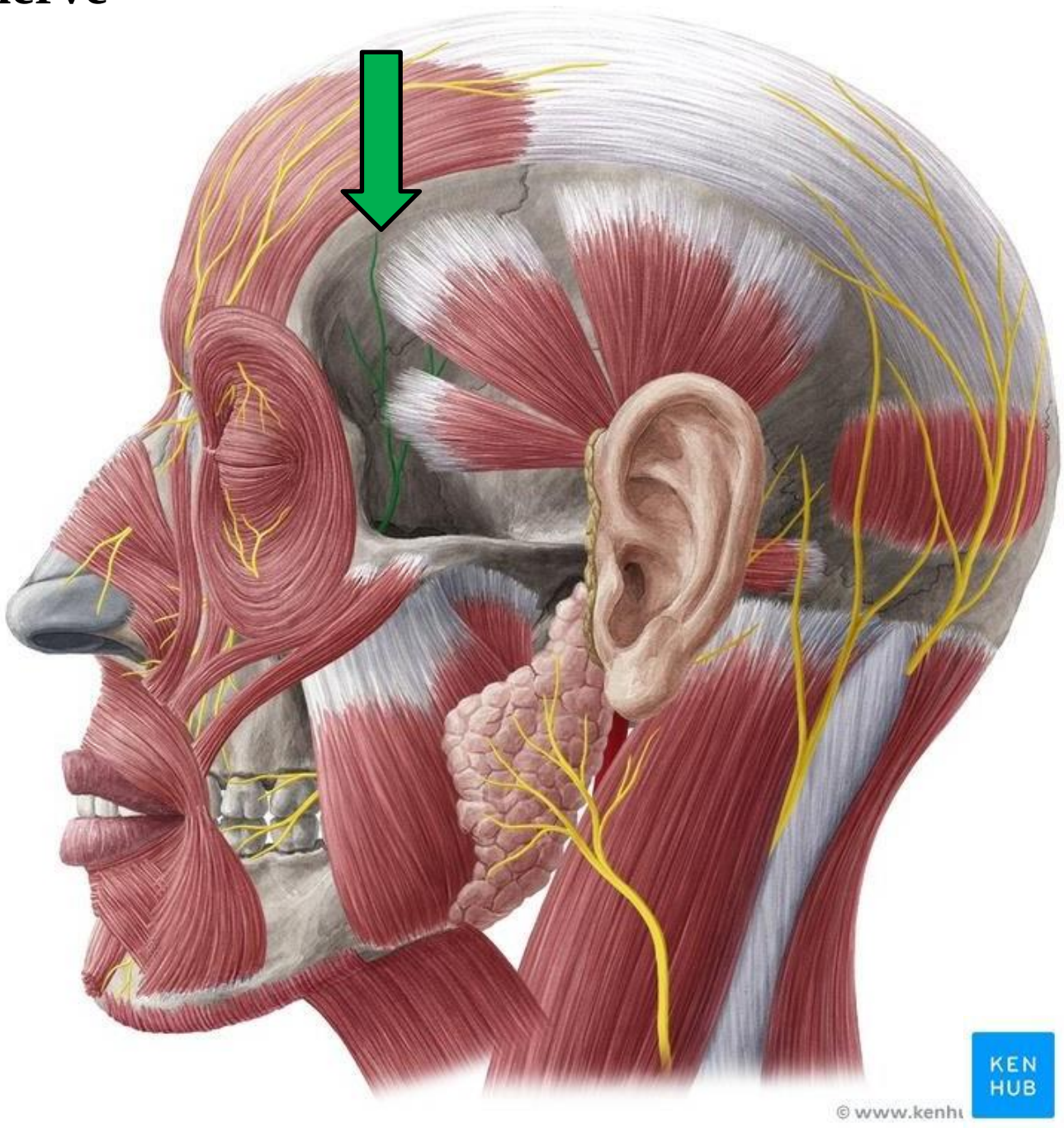
Zygomaticotemporal nerve

-A branch of the maxillary division of the trigeminal nerve

-Supplies the skin over the temporal region

Note:
Zygomaticotemporal foramen (present on the posterior surface of zygomatic bone



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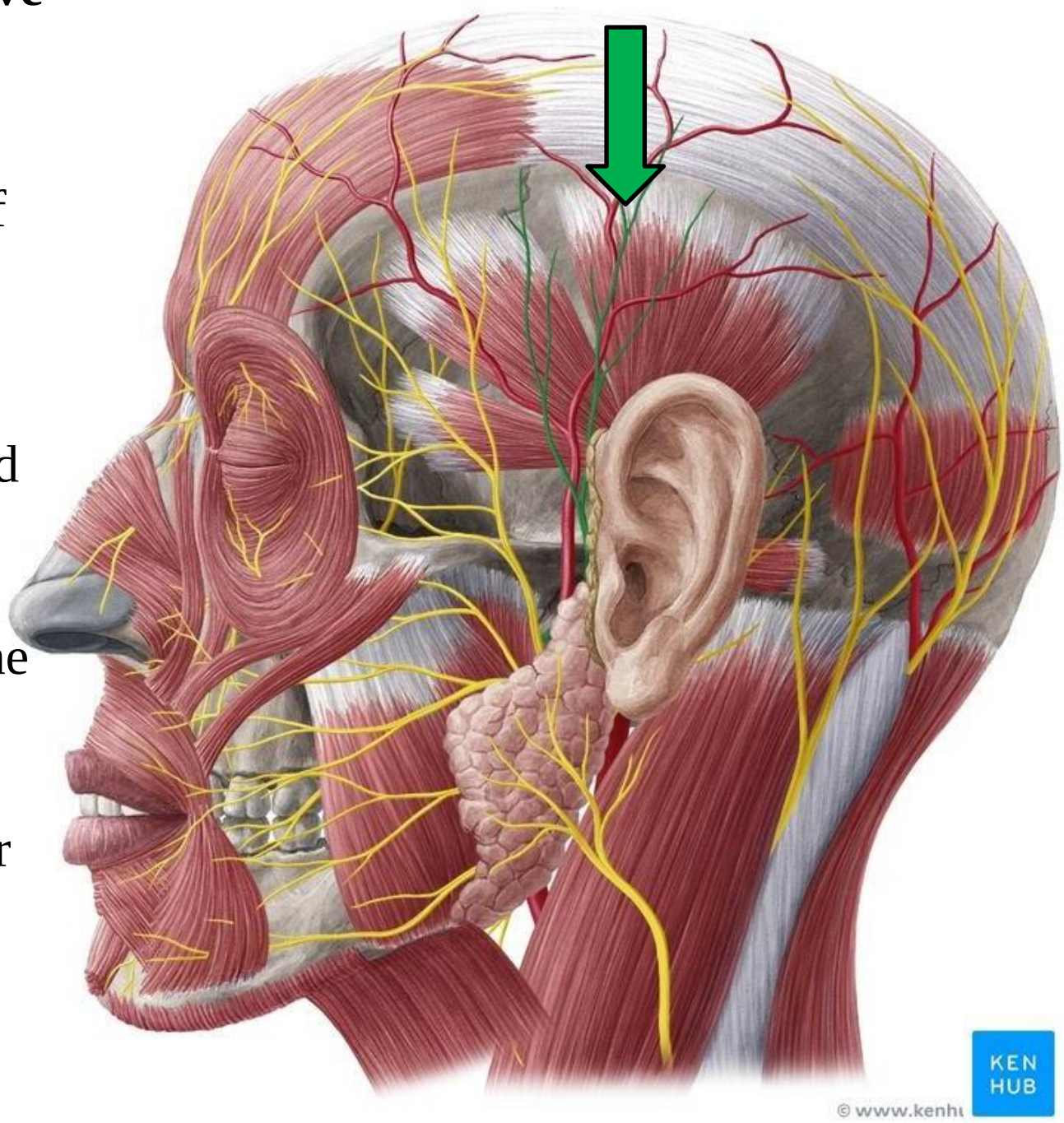
Auriculotemporal nerve

-A branch of the mandibular division of the trigeminal nerve

-Emerges from the upper border of parotid gland

-Ascends in front of the auricle

-Supplies the skin over the temporal region.



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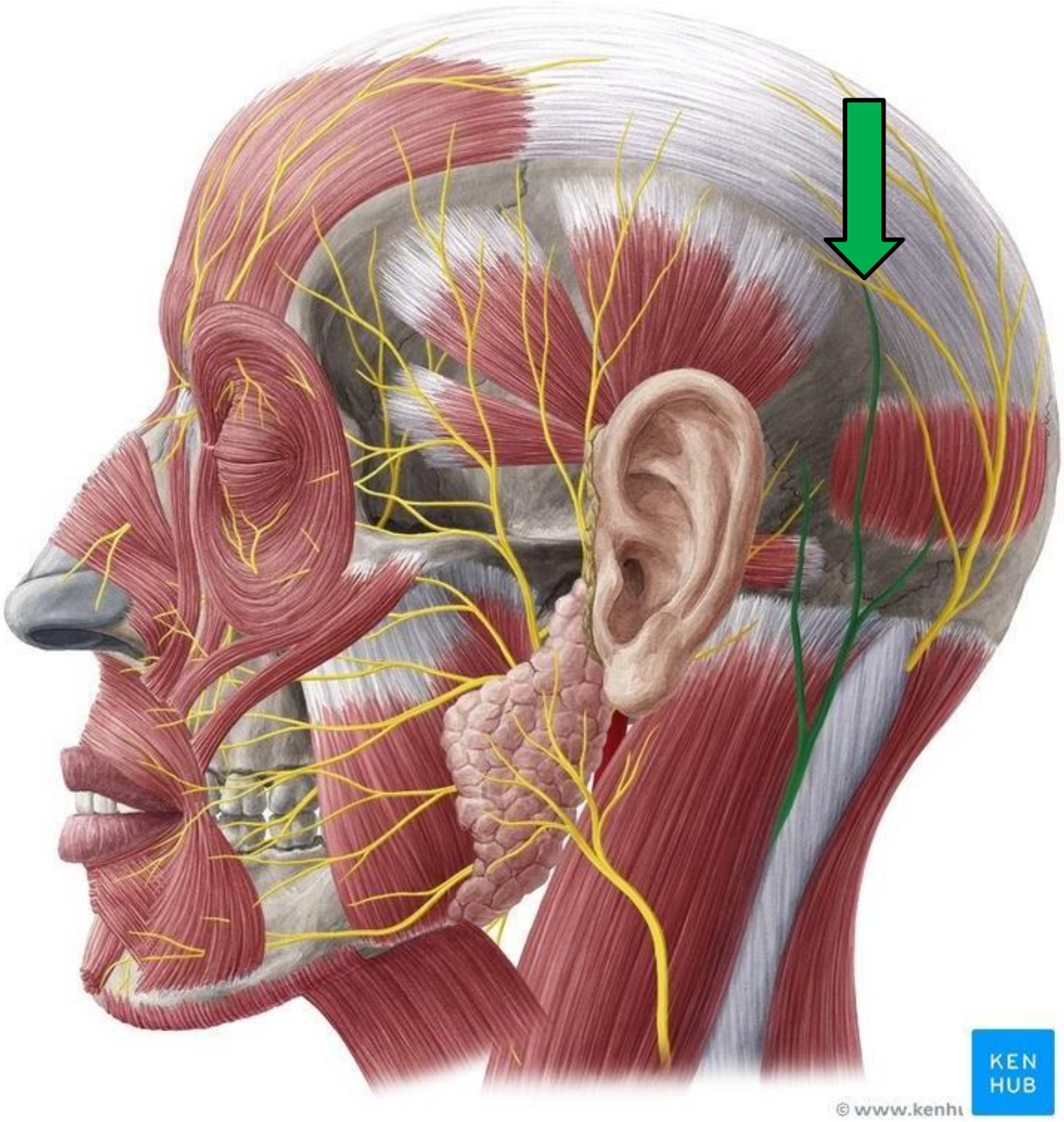
Lesser occipital nerve

-A branch of the cervical plexus (C2)

- Supplies the skin over the lateral part of scalp behind the auricle



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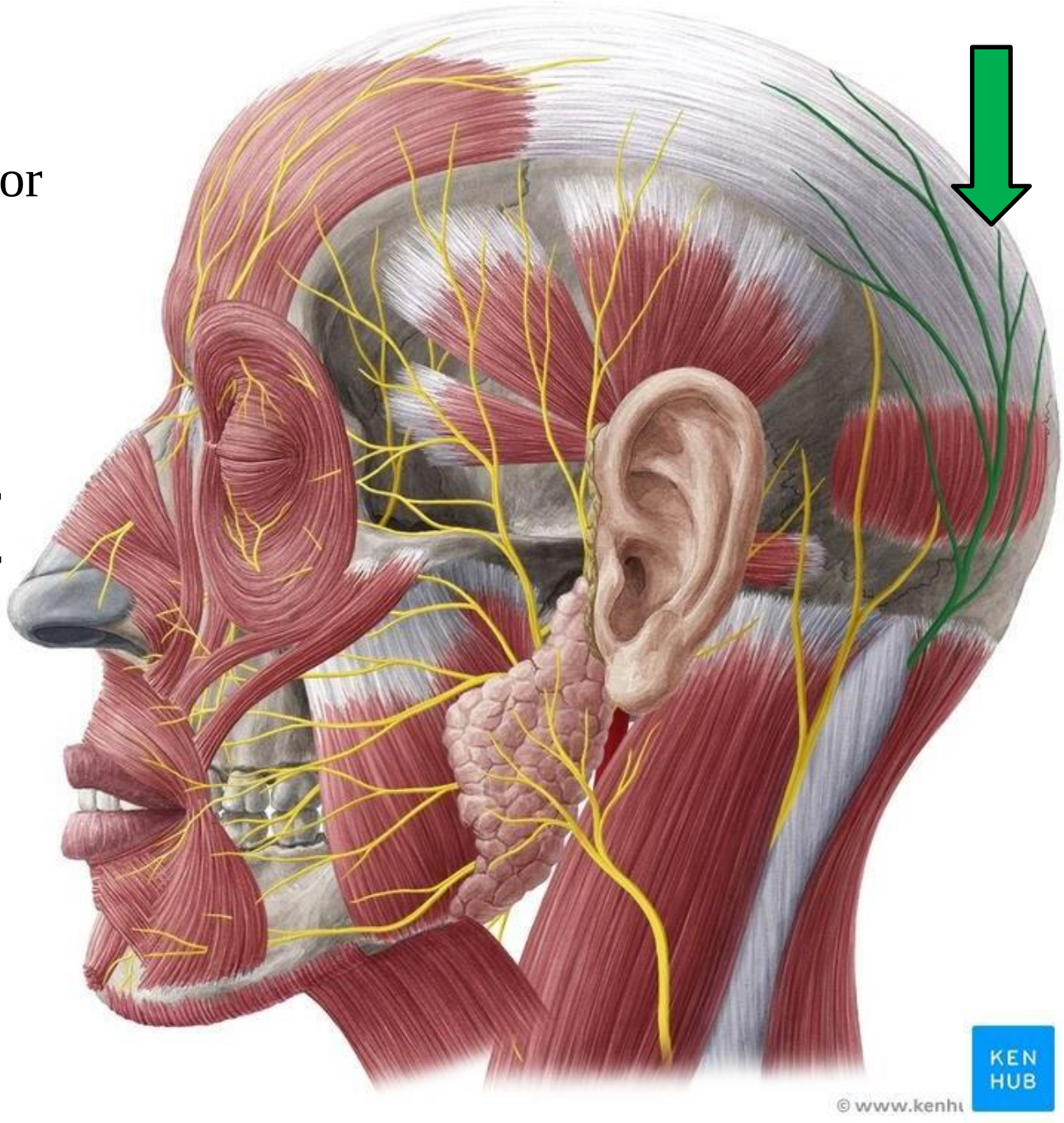
Greater occipital nerve

-A branch of the posterior ramus of the second cervical nerve (C2)

- Supplies the skin over the back of scalp as far forward as the vertex



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Blood supply of the scalp

5 sets of arteries on each side of the scalp

3 in front of the auricle

2 behind the auricle

Out of 5
2 arteries (indirectly from internal carotid artery)

3 arteries (directly from the external carotid artery)

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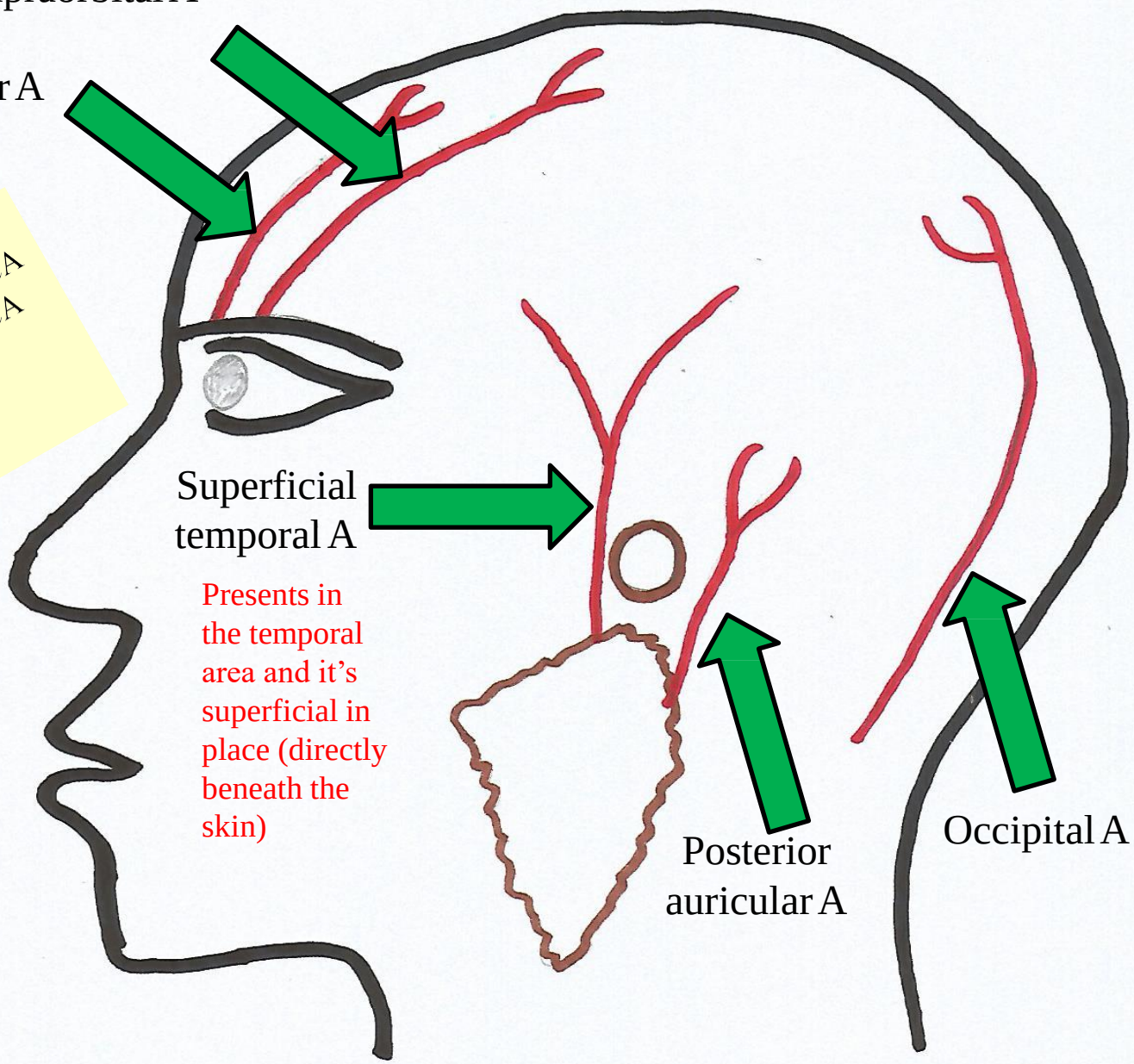
Emerges from the supraorbital foramen along with supraorbital nerve

Supraorbital A

Supratrochlear A

Blood supply of the scalp

1- Supratrochlear--Opthalmic artery--ICA
2- Supraorbital --Opthalmic artery--ICA
3- Superficial temporal artery--ECA
4- Posterior auricular artery--ECA
5- Occipital artery--ECA



Presents in the temporal area and it's superficial in place (directly beneath the skin)

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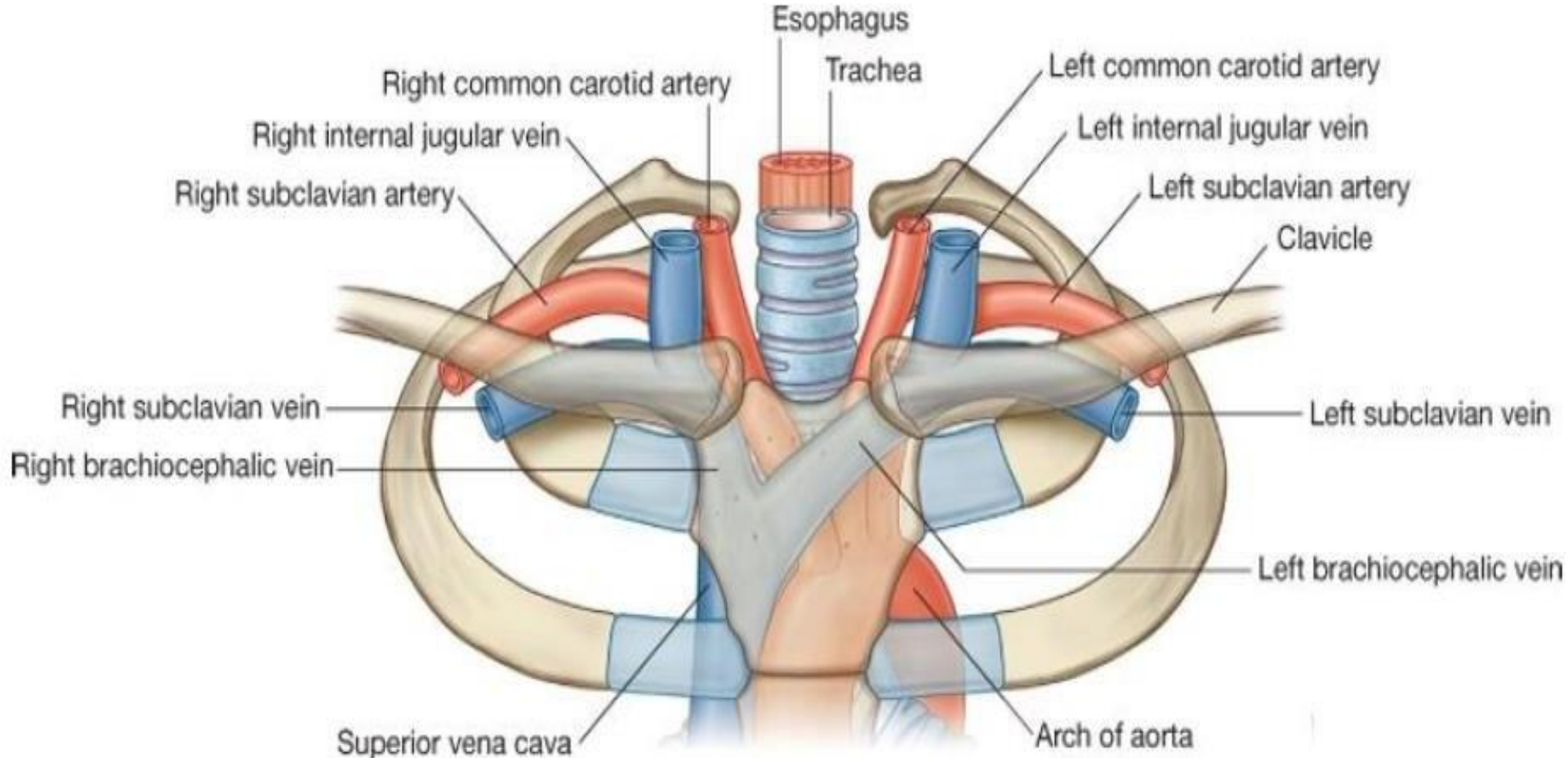
Common carotid artery



- Right common carotid: from the brachiocephalic artery
- Left common carotid artery: from arch of the aorta
- **Begins**: sternoclavicular joint
- **Ends**: upper border of the thyroid cartilage (C4).
- **Divisions**: External and internal carotid arteries

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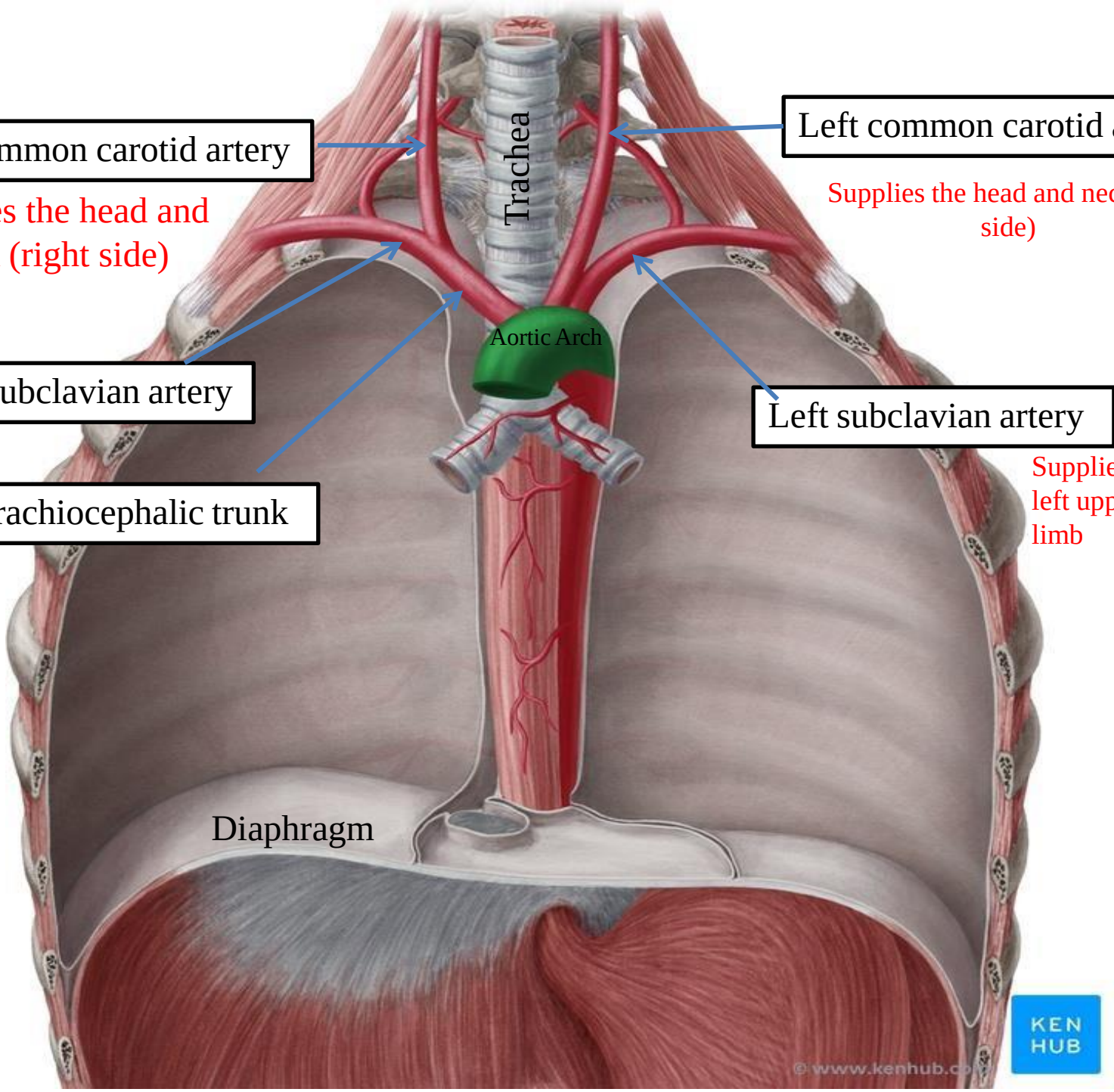
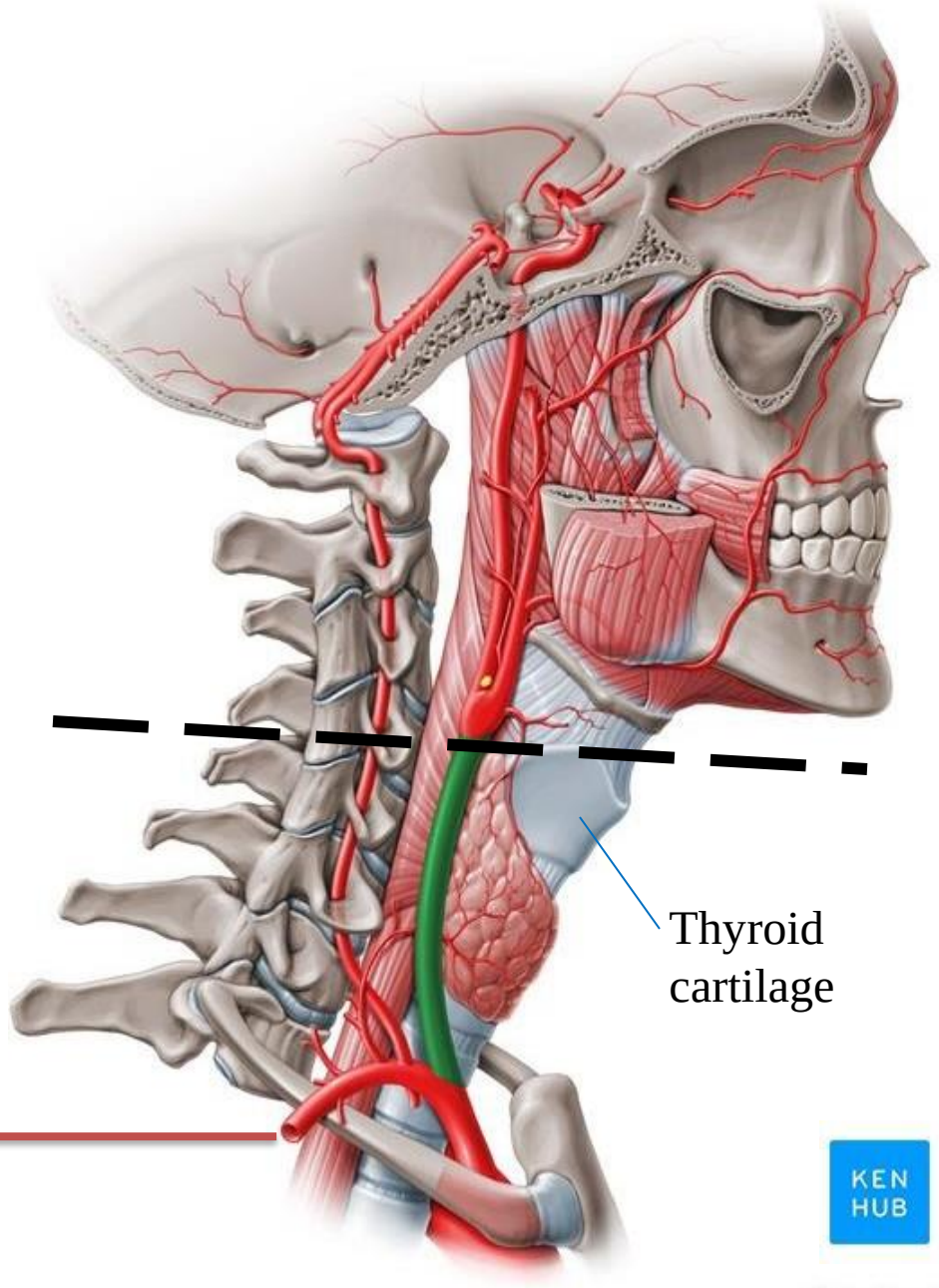


Common carotid artery

Passes through the neck and does not sends any branches within the neck until it reaches the level of the anterior thyroid cartilage it divides into internal and external carotid arteries



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Internal carotid artery

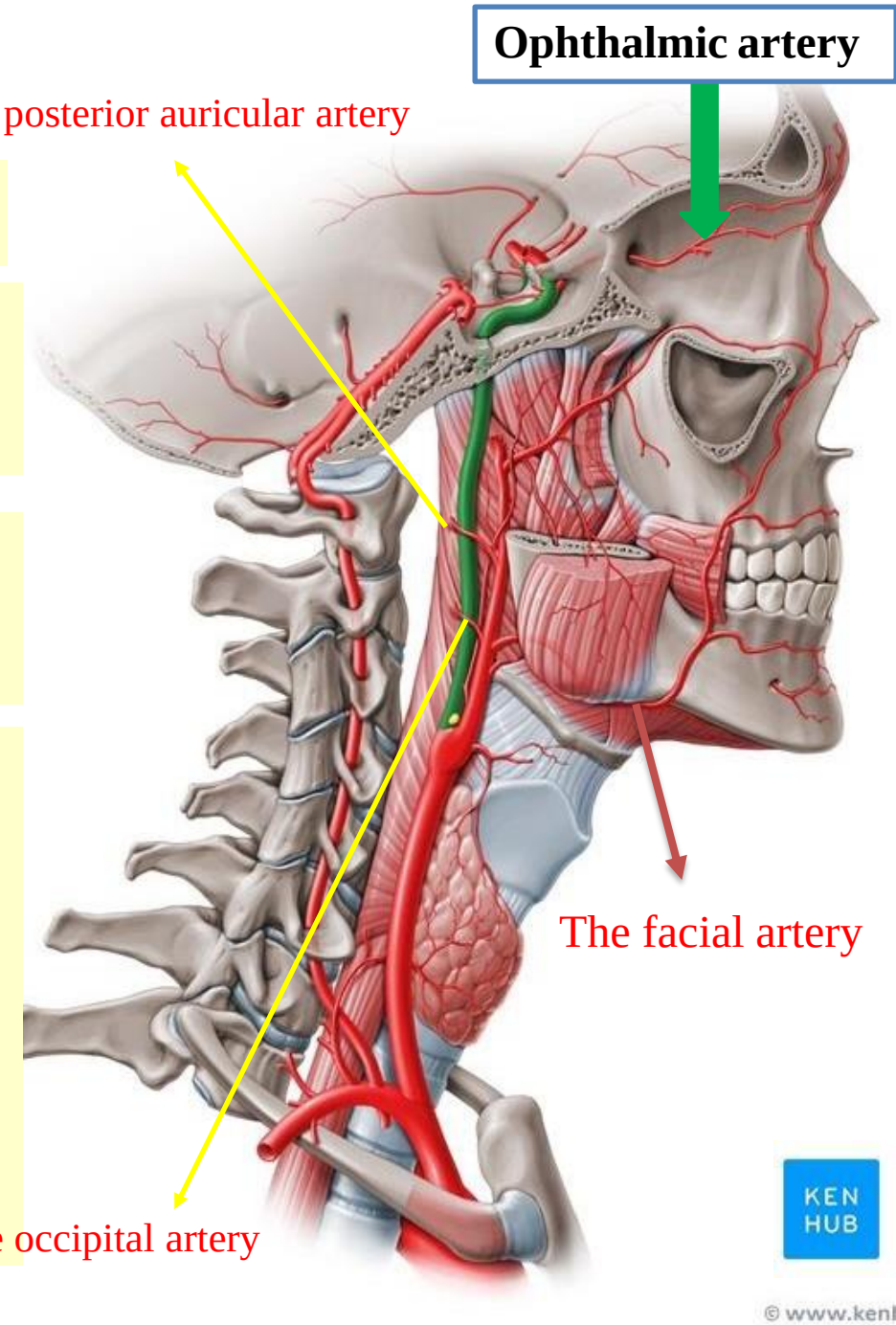
Has no branches in the neck

Enters the carotid canal in the skull base

Ophthalmic artery is one of its branches

Ophthalmic artery enters the orbit through optic canal

It gives two branches:
1-Supraorbital artery
2- Supratrochlear artery



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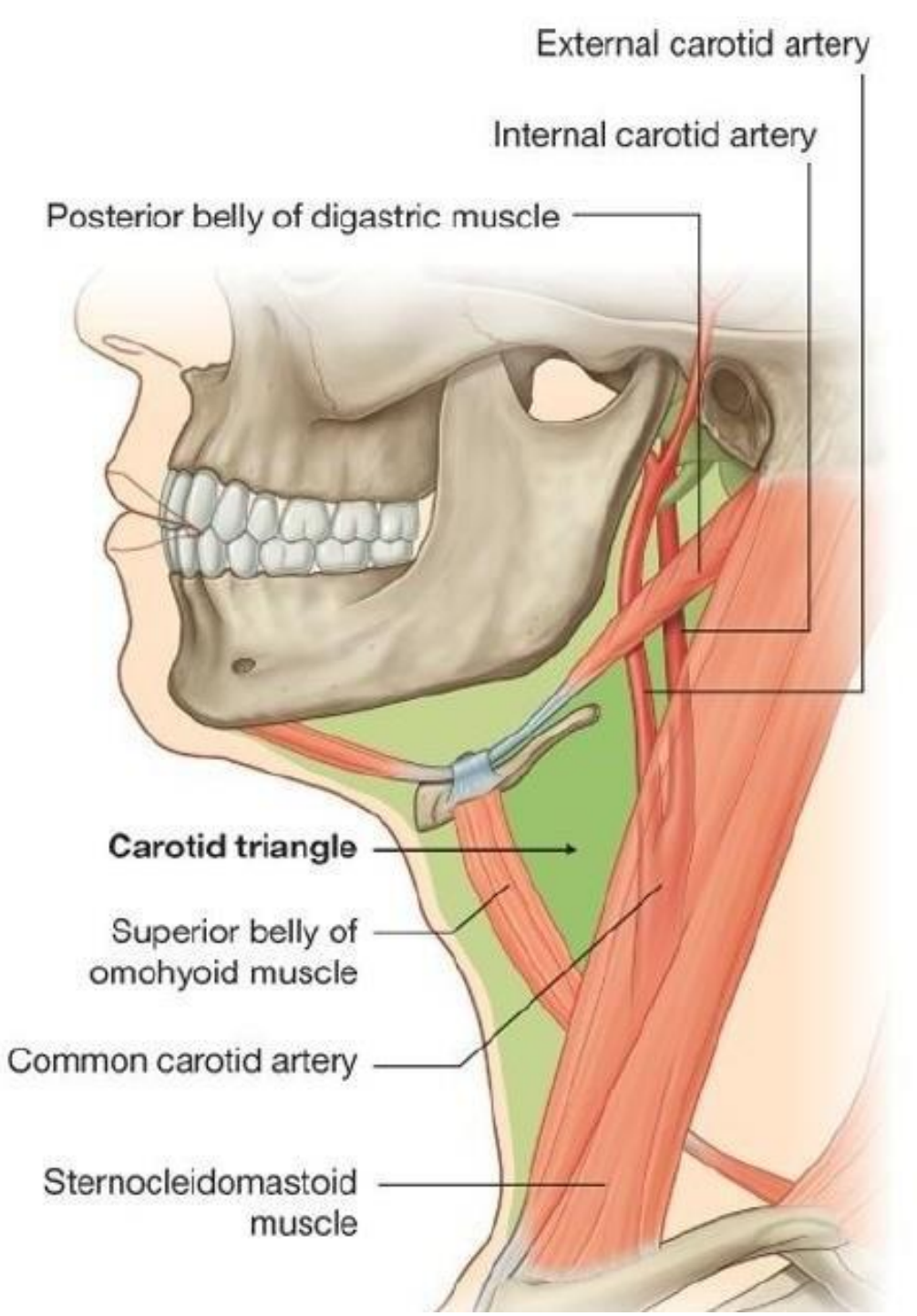
External carotid artery

Medial to the internal carotid artery, then passes backward and lateral to it.



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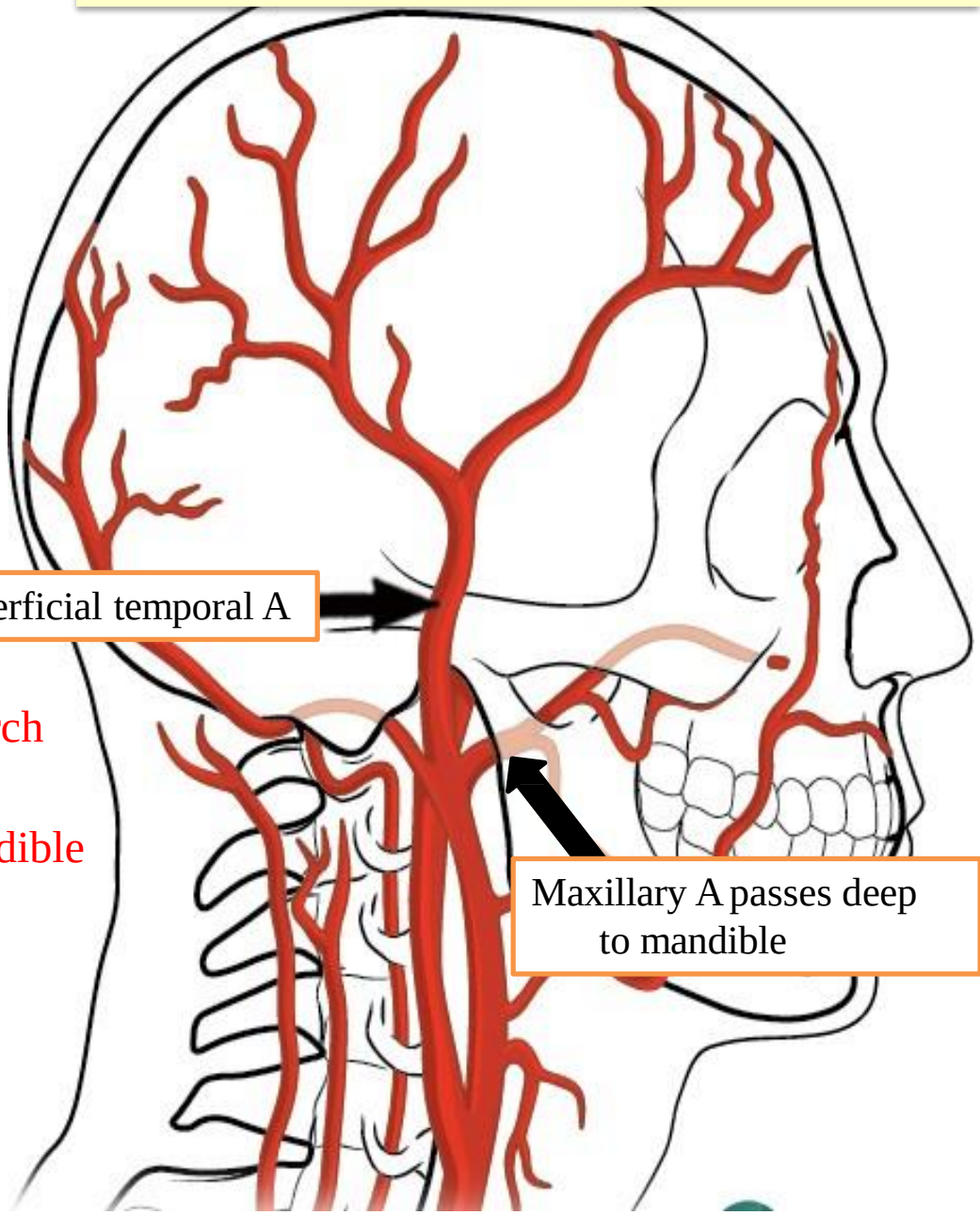
External carotid artery

Some **A**merican **L**adies **F**ind **O**ur **P**etra **S**o **M**agnificent

❖ Branches:

a. Superior thyroid artery
b. Ascending pharyngeal artery
c. Lingual artery
d. Facial artery
e. Occipital artery
f. Posterior auricular artery
g. Superficial temporal artery Crosses the zygomatic arch
h. Maxillary artery Passes deep to the neck of the mandible

These are the two terminal branches of ECA



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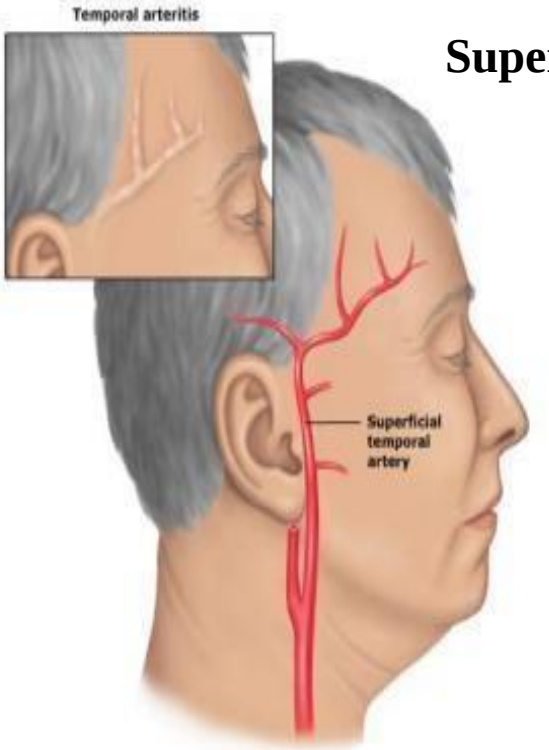
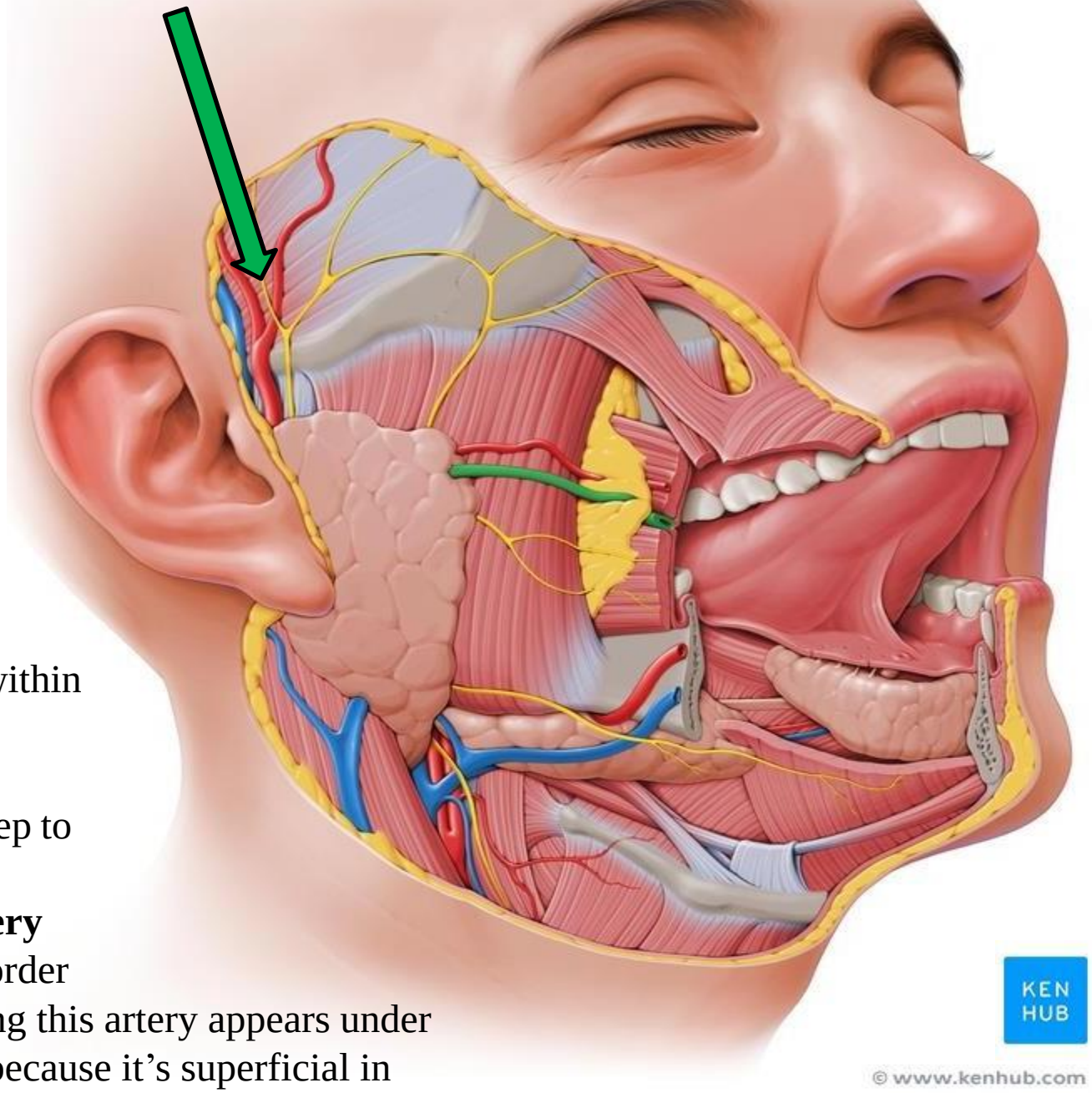


Superficial temporal artery



❖ The external carotid artery terminates as two branches (within the parotid gland):

1. Maxillary artery passes deep to the neck of the mandible
2. **Superficial temporal artery** emerges from the upper border of parotid gland ,With aging this artery appears under the skin, because it's superficial in location and with age we have loss of the fat

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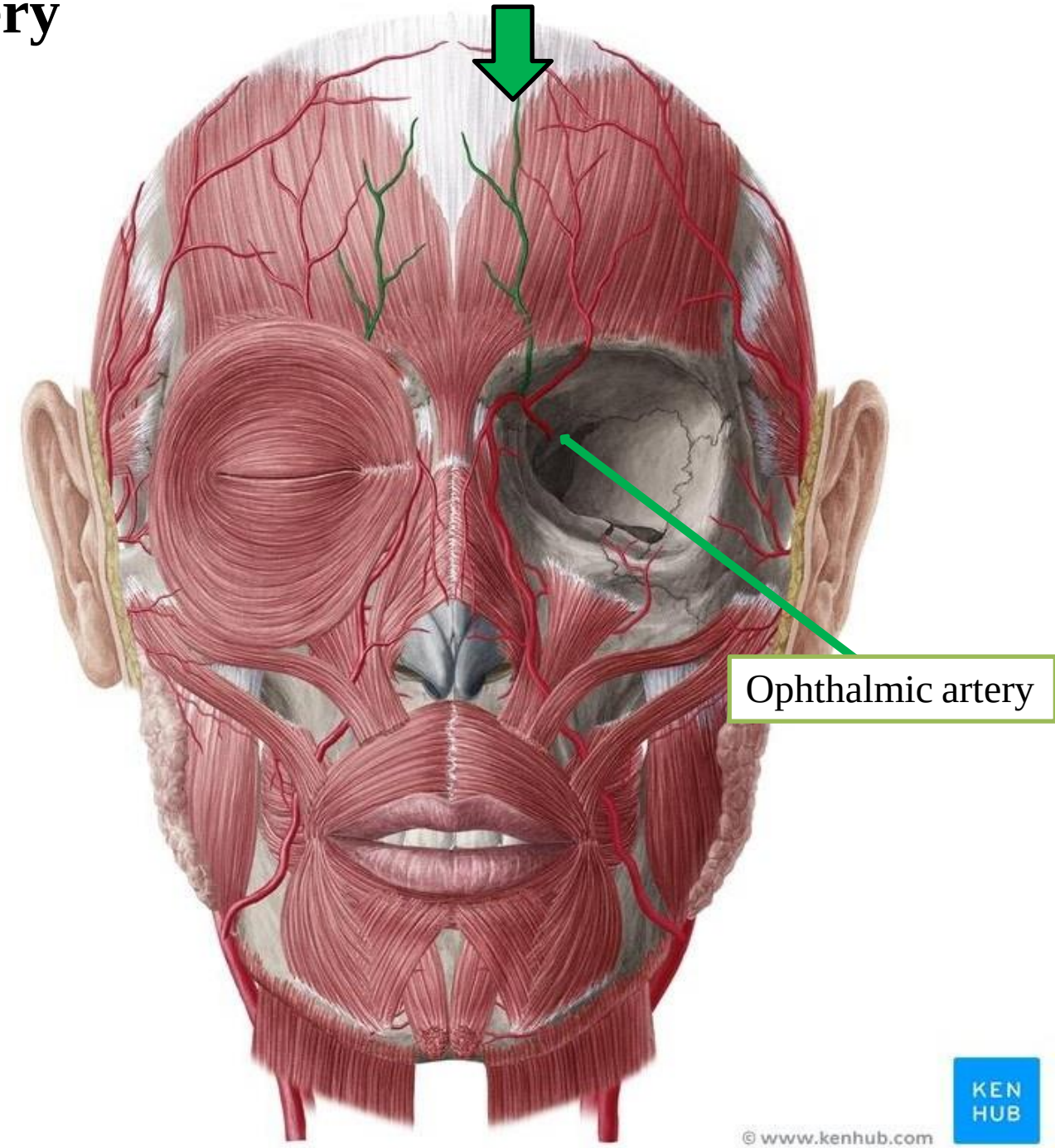
Supratrochlear artery

-A branch of ophthalmic artery

- Ascends over the forehead in company with the supratrochlear nerve

-Supplies the upper eyelid, and the skin of the forehead and the scalp.



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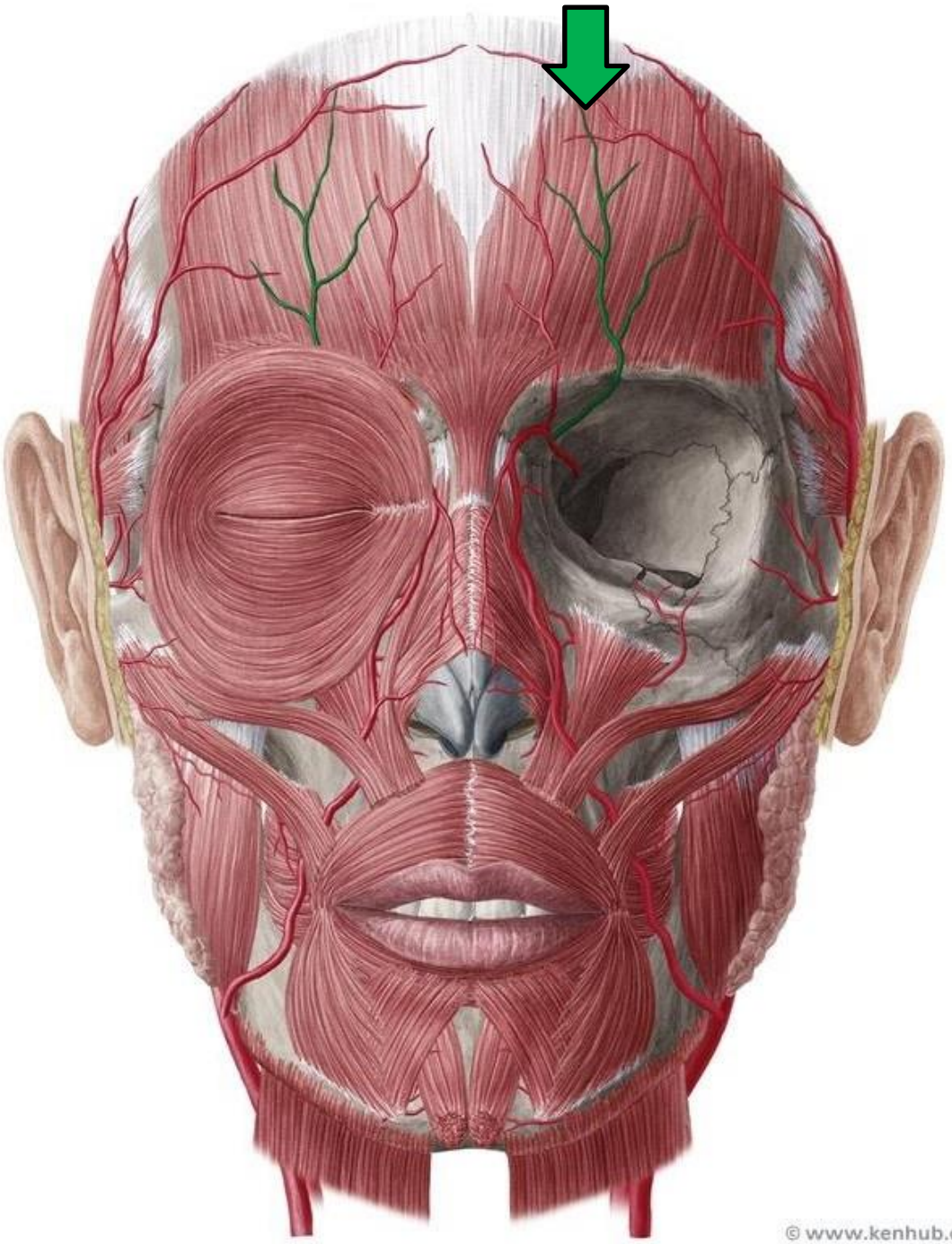
Supraorbital artery

-A branch of ophthalmic artery

-Passes through the supraorbital foramen

-Ascends over the forehead in company with the supraorbital nerves

-Supplies the upper eyelid, and the skin of the forehead and the scalp.



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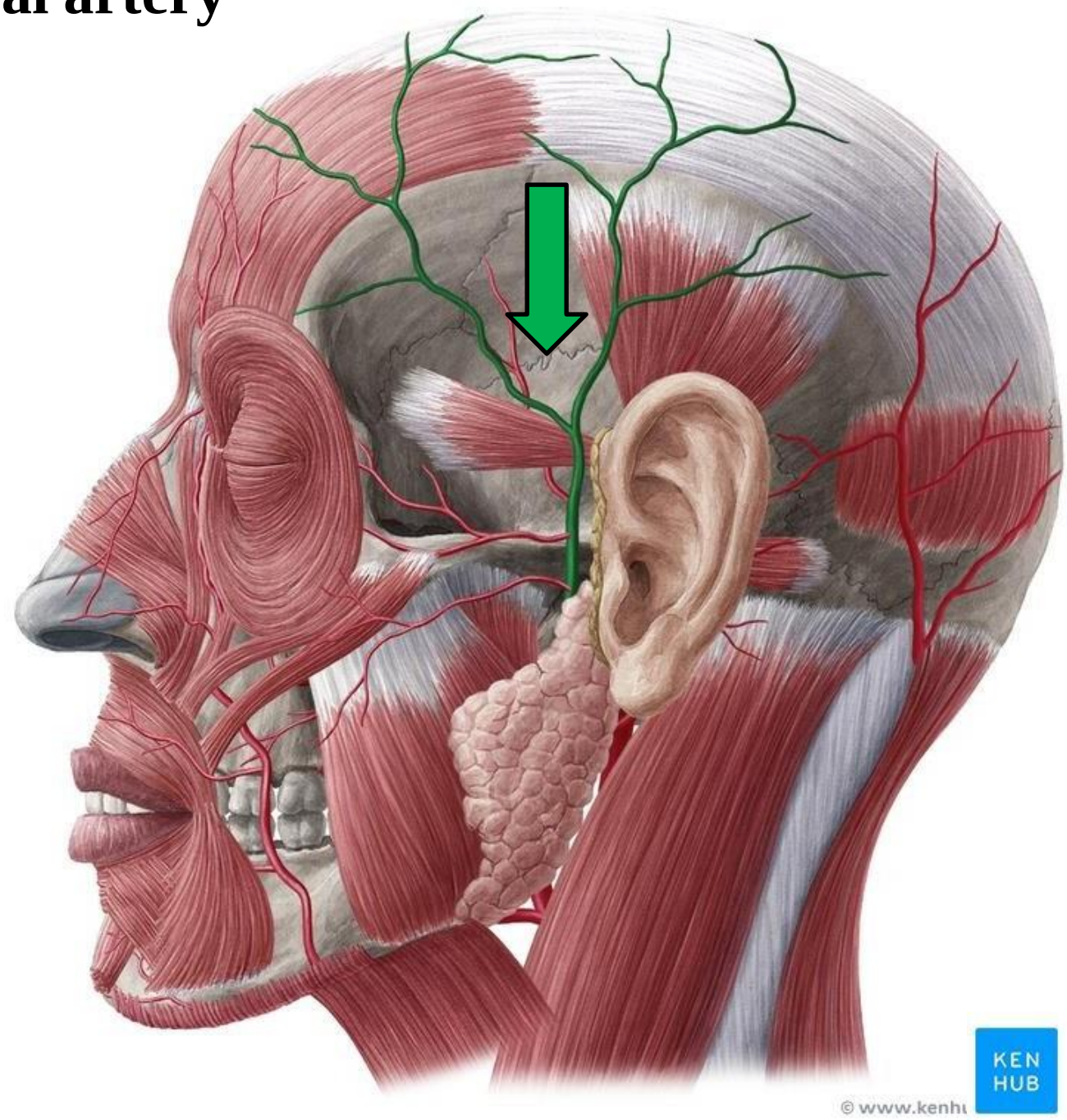
Superficial temporal artery

-The smaller terminal branch of the external carotid artery

-Ascends in front of the auricle

-Crosses over the root of zygomatic arch (pulse)

-It divides into anterior and posterior branches, which supply the skin over the frontal and temporal regions.



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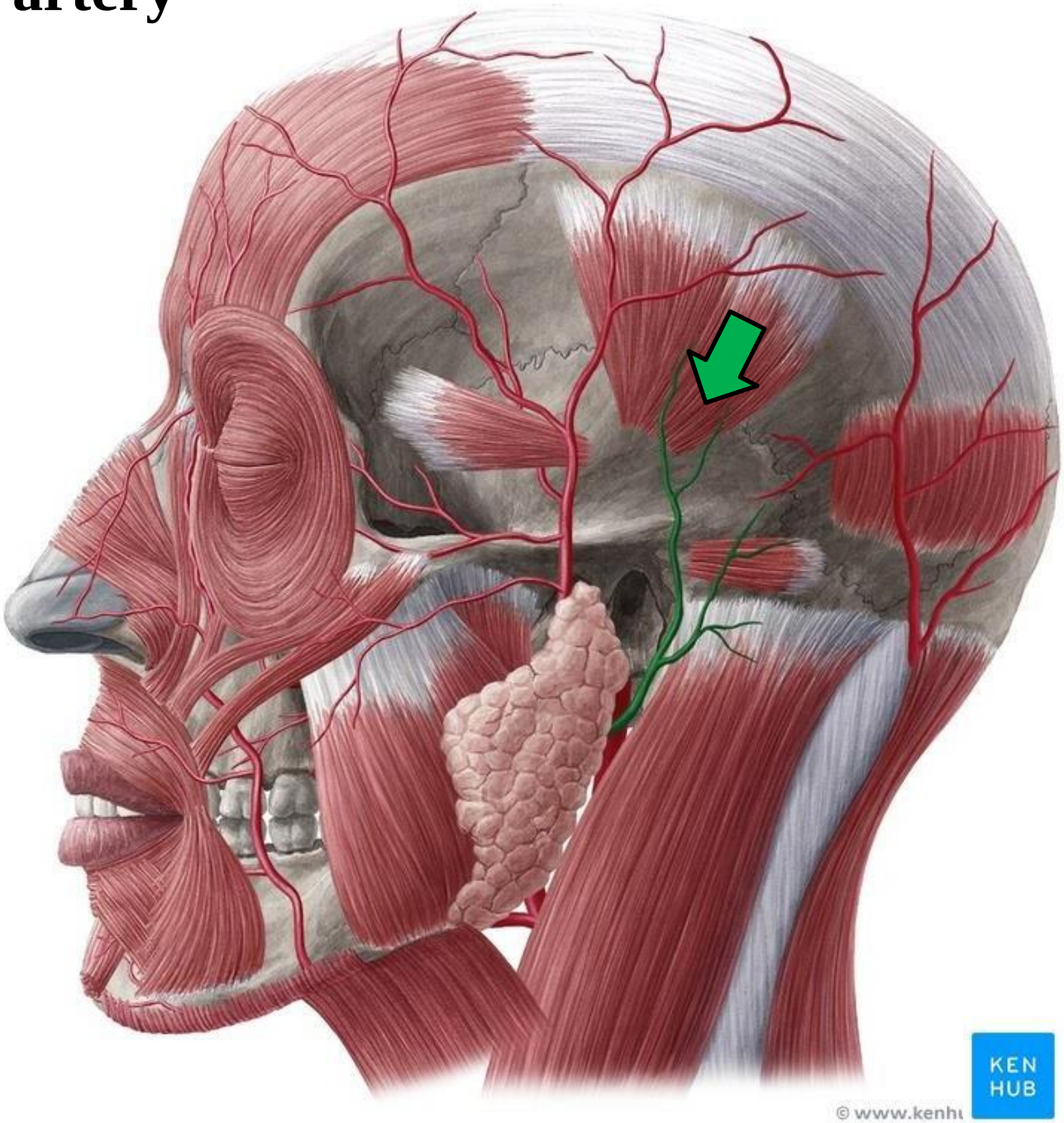
Posterior auricular artery

-A branch of External carotid artery

-Ascends behind the auricle to supply the lateral part of scalp behind the auricle



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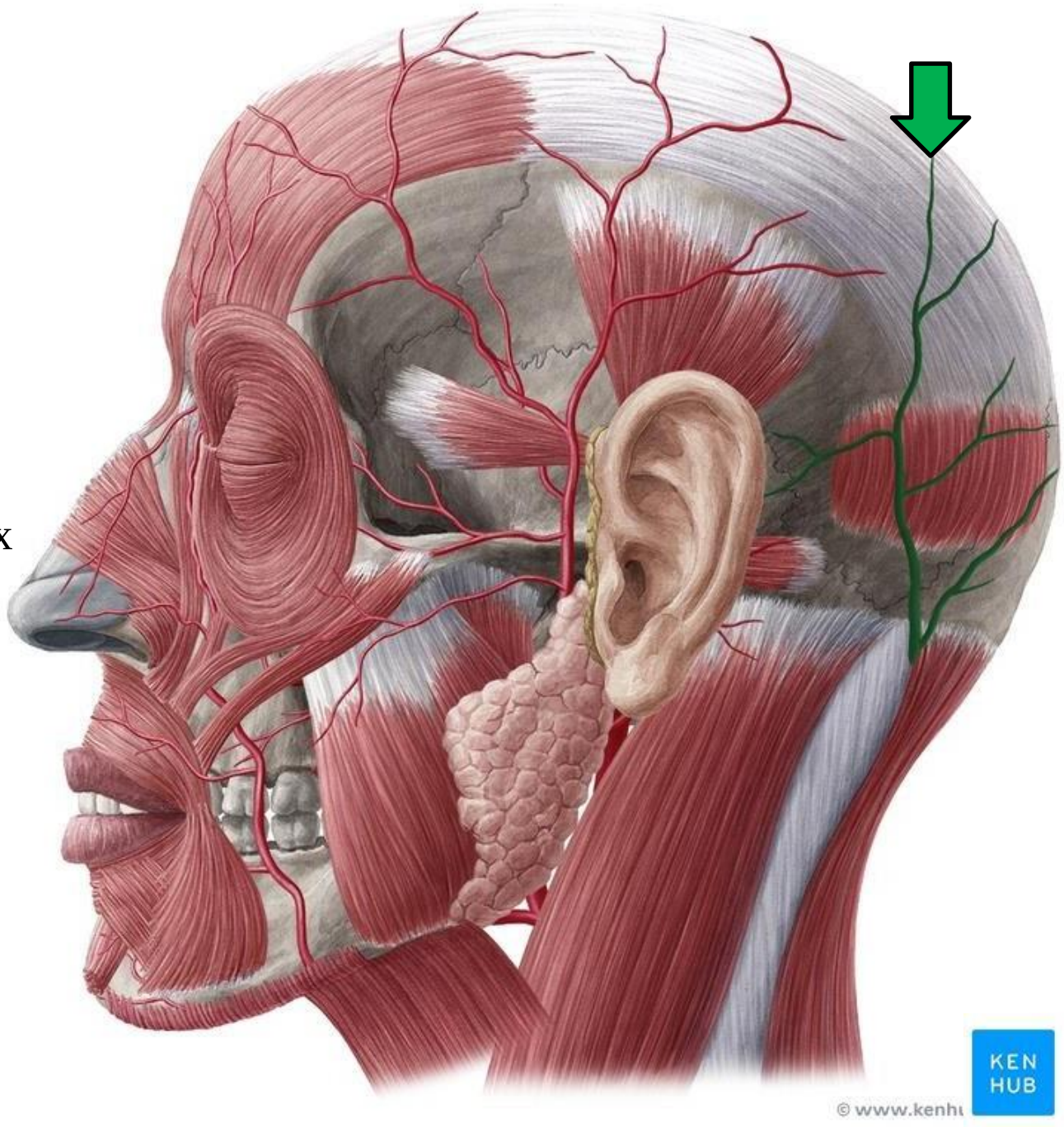
Occipital artery

-A branch of External carotid artery

- Supplies the skin over the back of the scalp and reaches as high as the vertex



Dr. Heba Kalbouneh

Anatomically, it is useful to remember in an emergency that all the superficial arteries supplying the scalp ascend from the face and the neck. Thus, in an emergency situation, encircle the head just above the ears and eyebrows with a tie, shoelaces, or even a piece of string and tie it tight. Then insert a pen, pencil, or stick into the loop and rotate it so that the tourniquet exerts pressure on the arteries

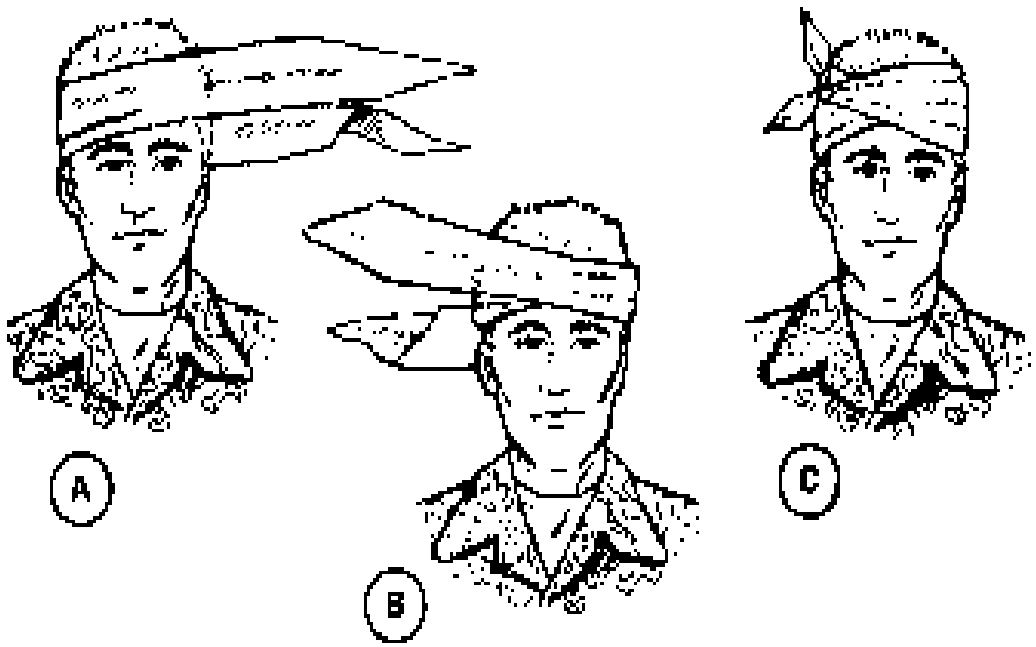
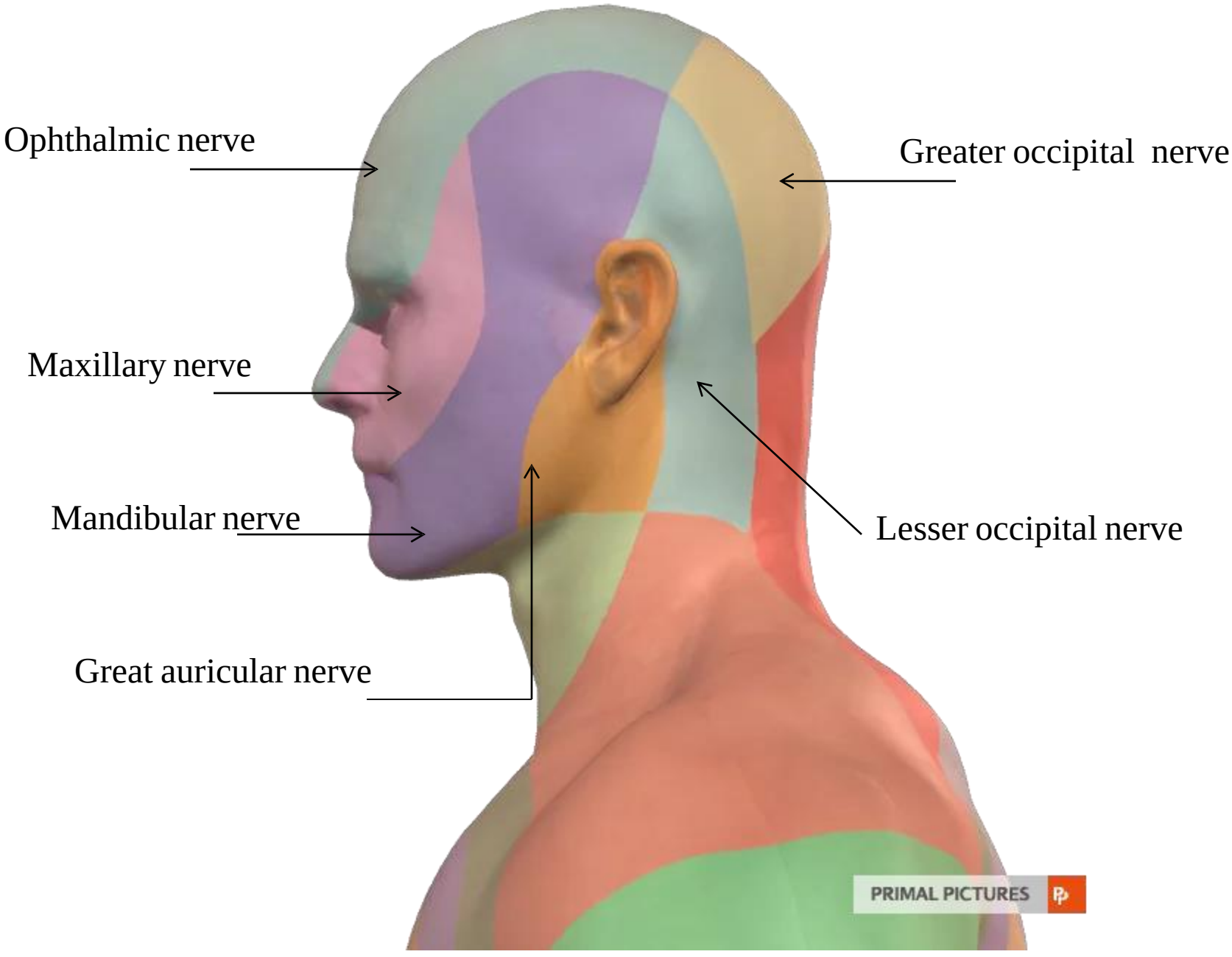


Figure 3-11. Cravat bandage applied to head (Illustrated A thru C).


Ophthalmic nerve
Greater occipital nerve
Maxillary nerve
Mandibular nerve
Lesser occipital nerve
Great auricular nerve
PRIMAL PICTURES