ANATOMY OF ORBIT

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By

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Intended Learning Outcomes (ILOs)

1. Outline the bony wall of the orbit.
2. Describe the contents of the orbit.
3. Explain anatomy of the eye ball, including muscles, vessels and nerves.

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Agenda

1. The bony wall of the orbit. MCQ
2. Contents of the orbit. SAQ
3. Anatomy of the eye ball, including muscles, vessels and nerves.

Origin & insertion (MCQ)
Nerve supply & Action (SAQ)

مهم نعرف ال beginning, termination & branches

Boundaries of bony orbit

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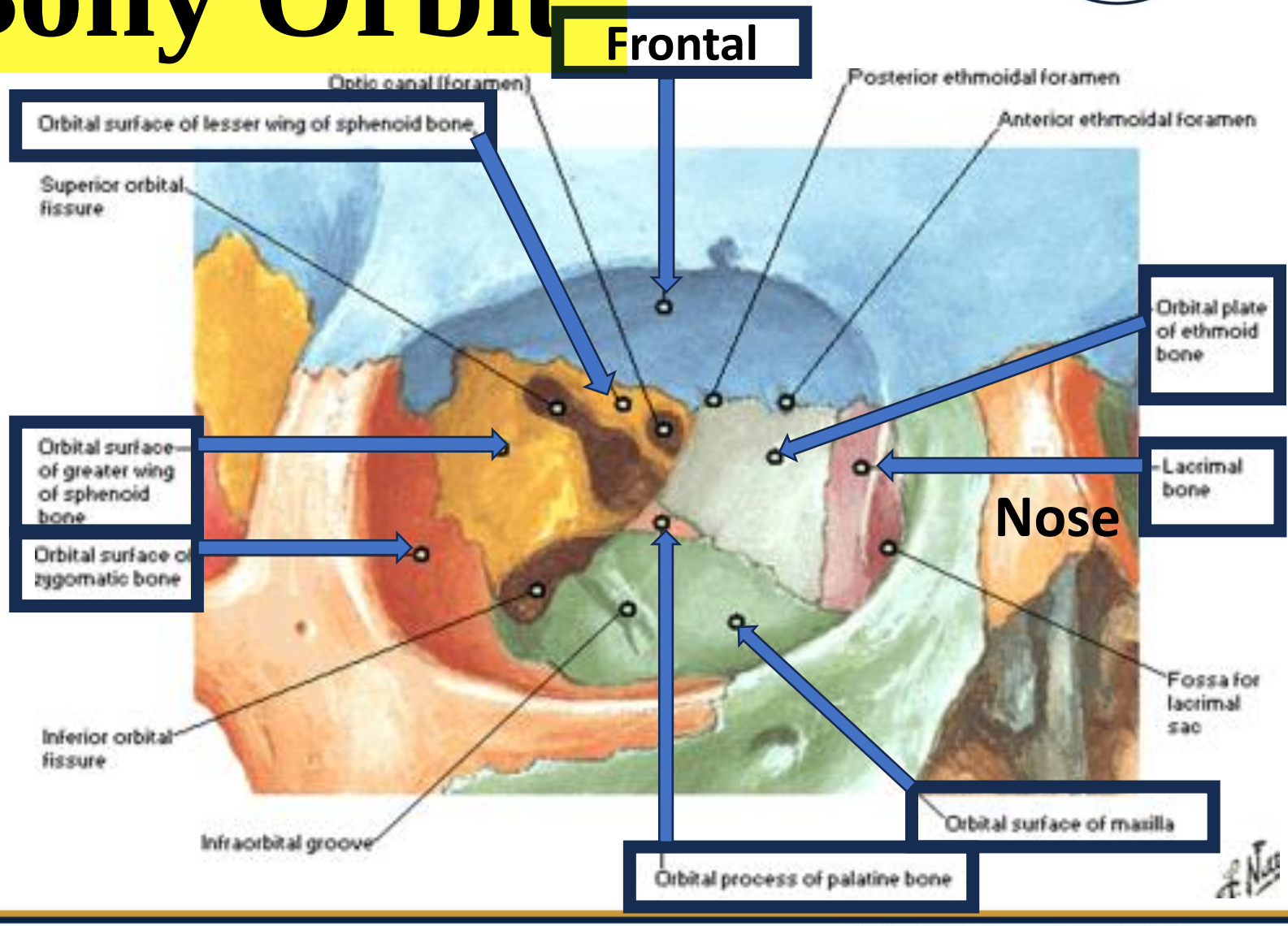
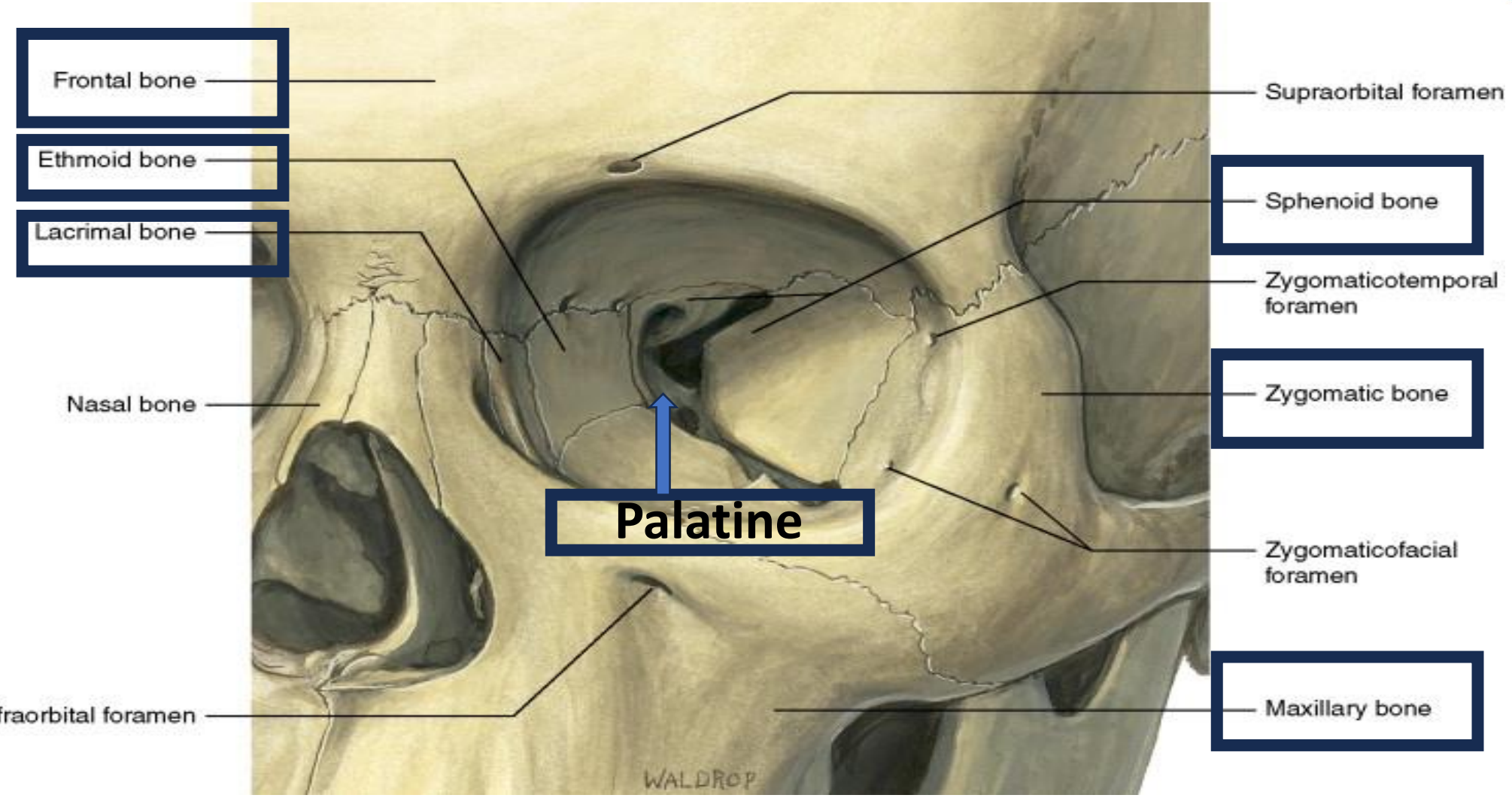
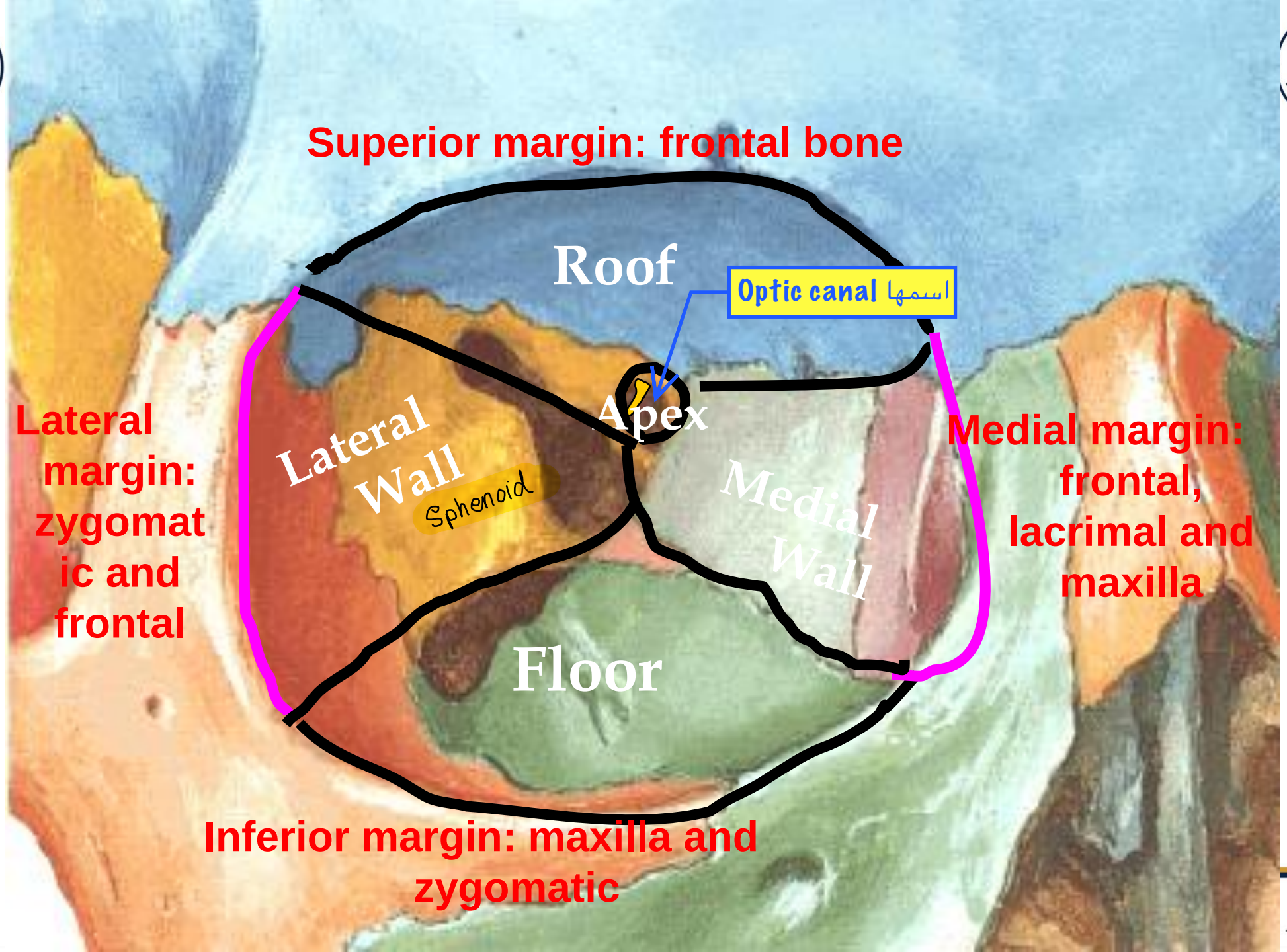
Bony Orbit

Made by 7 Bones:-

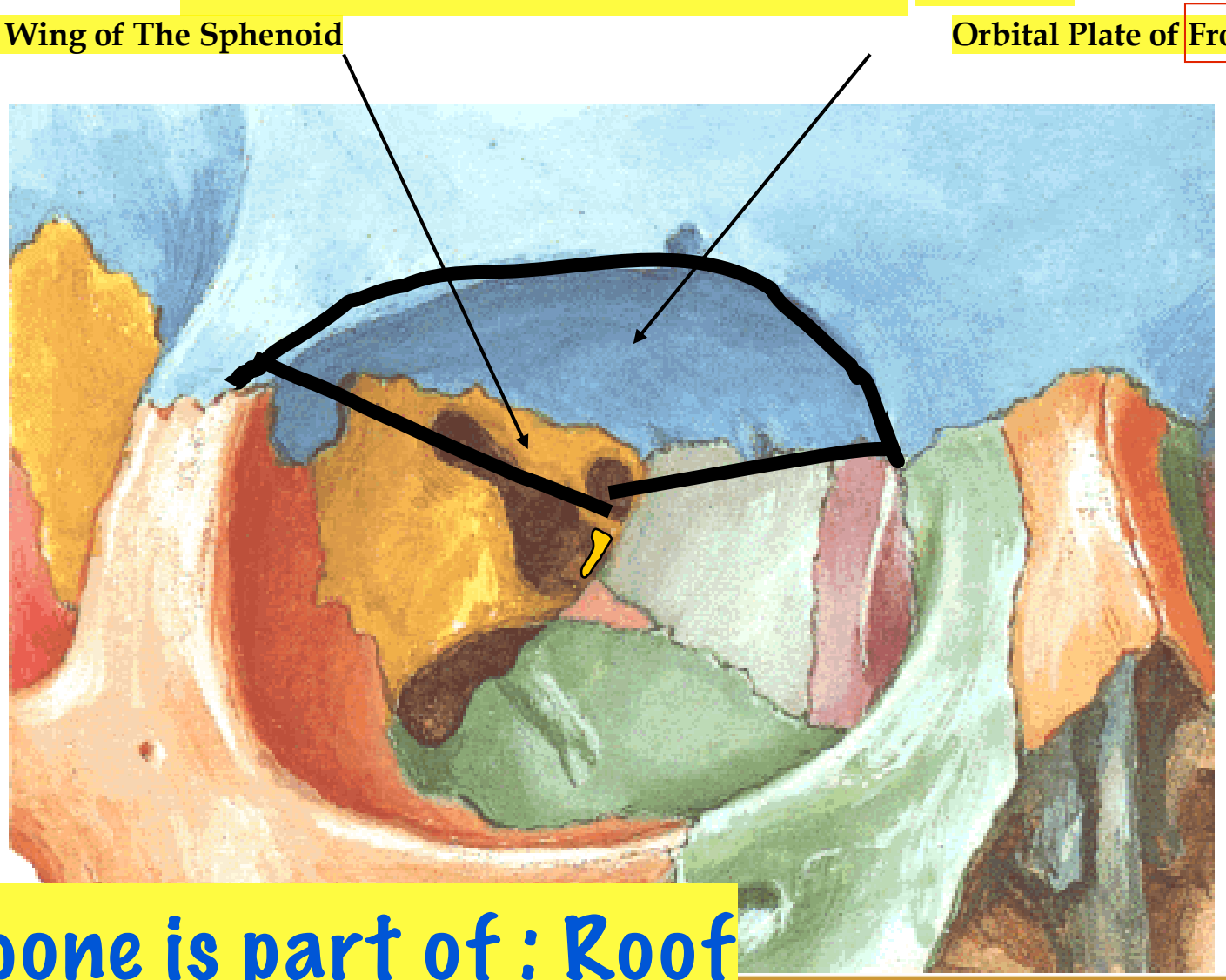
1. Frontal
2. Zygomatic
3. Maxilla
4. Lacrimal
5. Ethmoid
6. Sphenoid
7. Palatine




Frontal bone
Ethmoid bone
Lacrimal bone
Nasal bone
Infraorbital foramen
Supraorbital foramen
Sphenoid bone
Zygomaticotemporal foramen
Zygomatic bone
Zygomaticofacial foramen
Maxillary bone
Palatine
WALDROP


Superior margin: frontal bone
Roof
Optic canal اسمها
Apex
Lateral Wall
Sphenoid
Medial Wall
Floor
Lateral margin: zygomatic and frontal
Medial margin: frontal, lacrimal and maxilla
Inferior margin: maxilla and zygomatic

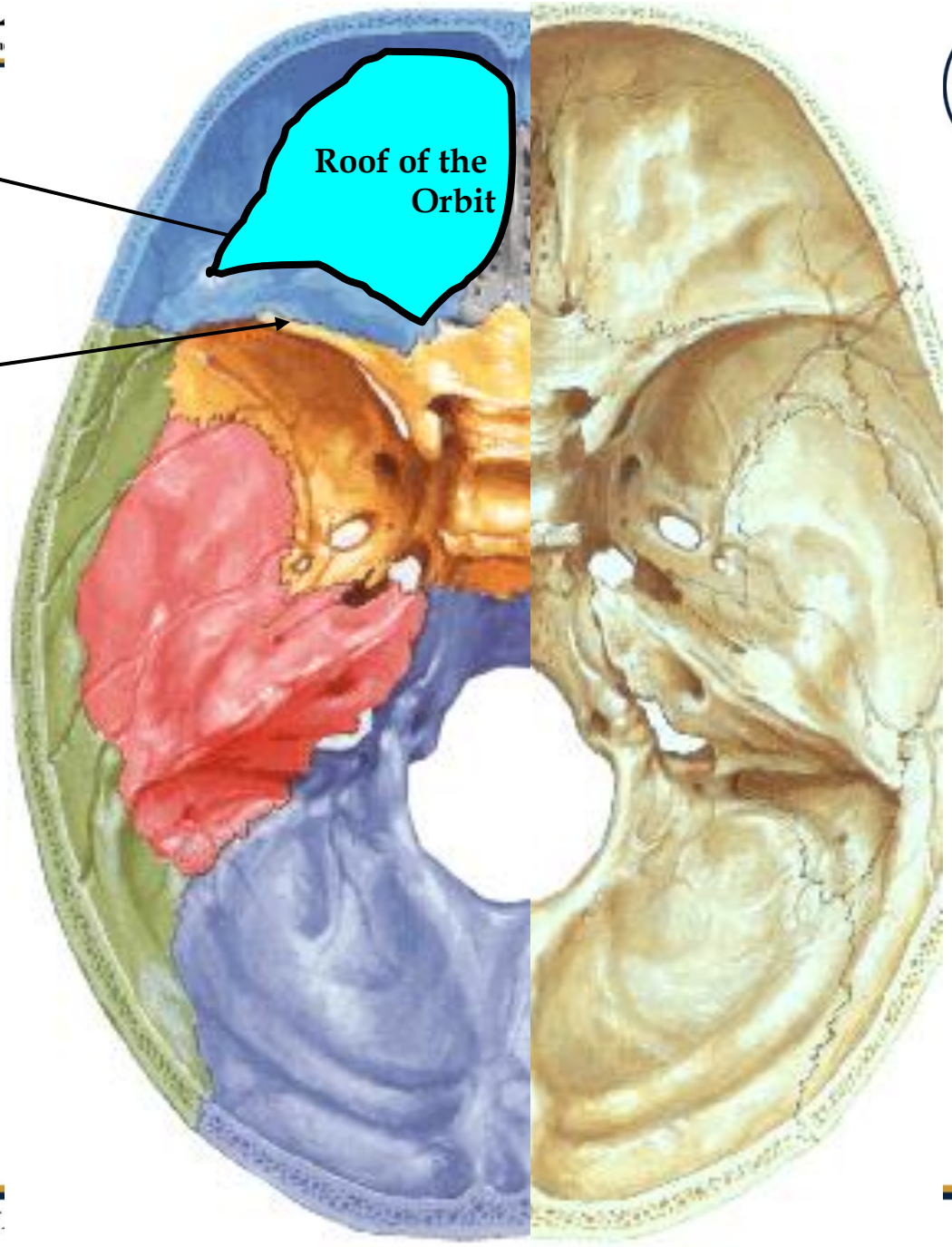
Roof of the Orbit MCQ



MCQ : Frontal bone is part of : Roof

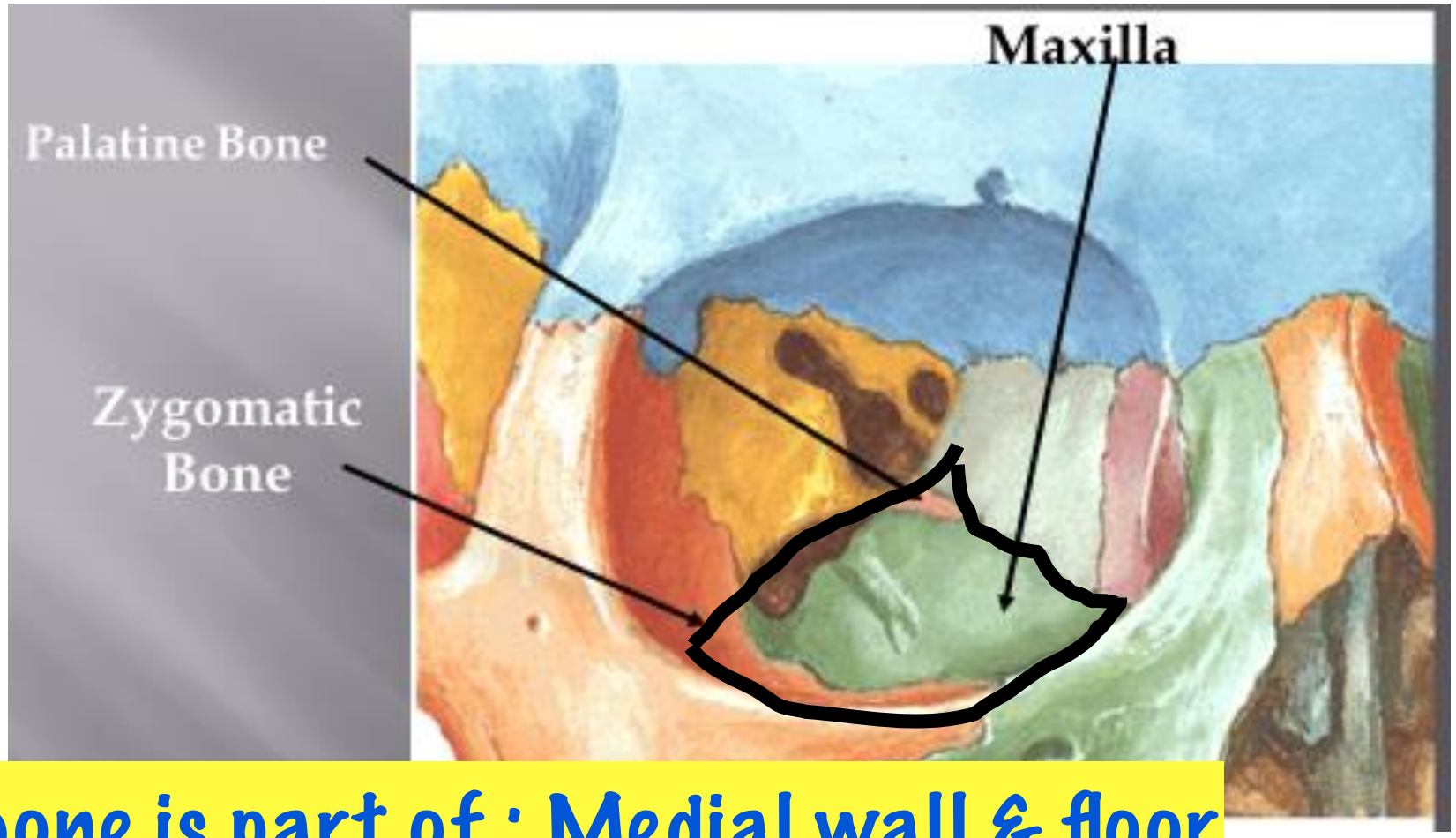
Orbital Plate of Frontal Bone

Lesser Wing of The Sphenoid



Floor of the Orbit MCQ

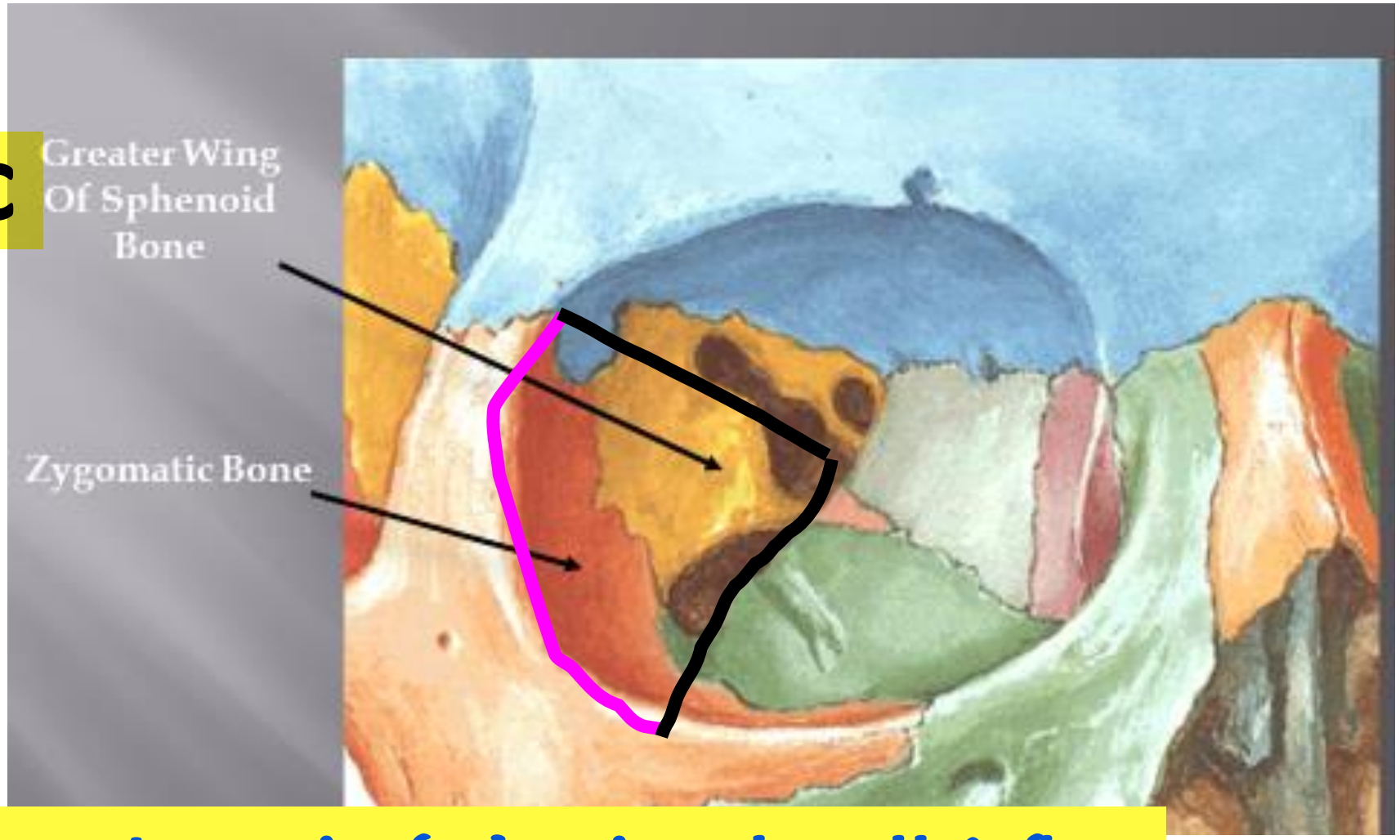
1. Maxilla,
2. Zygomatic bone
3. Palatine bone



MCQ : Maxillary bone is part of : Medial wall & floor

Lateral wall of the Orbit

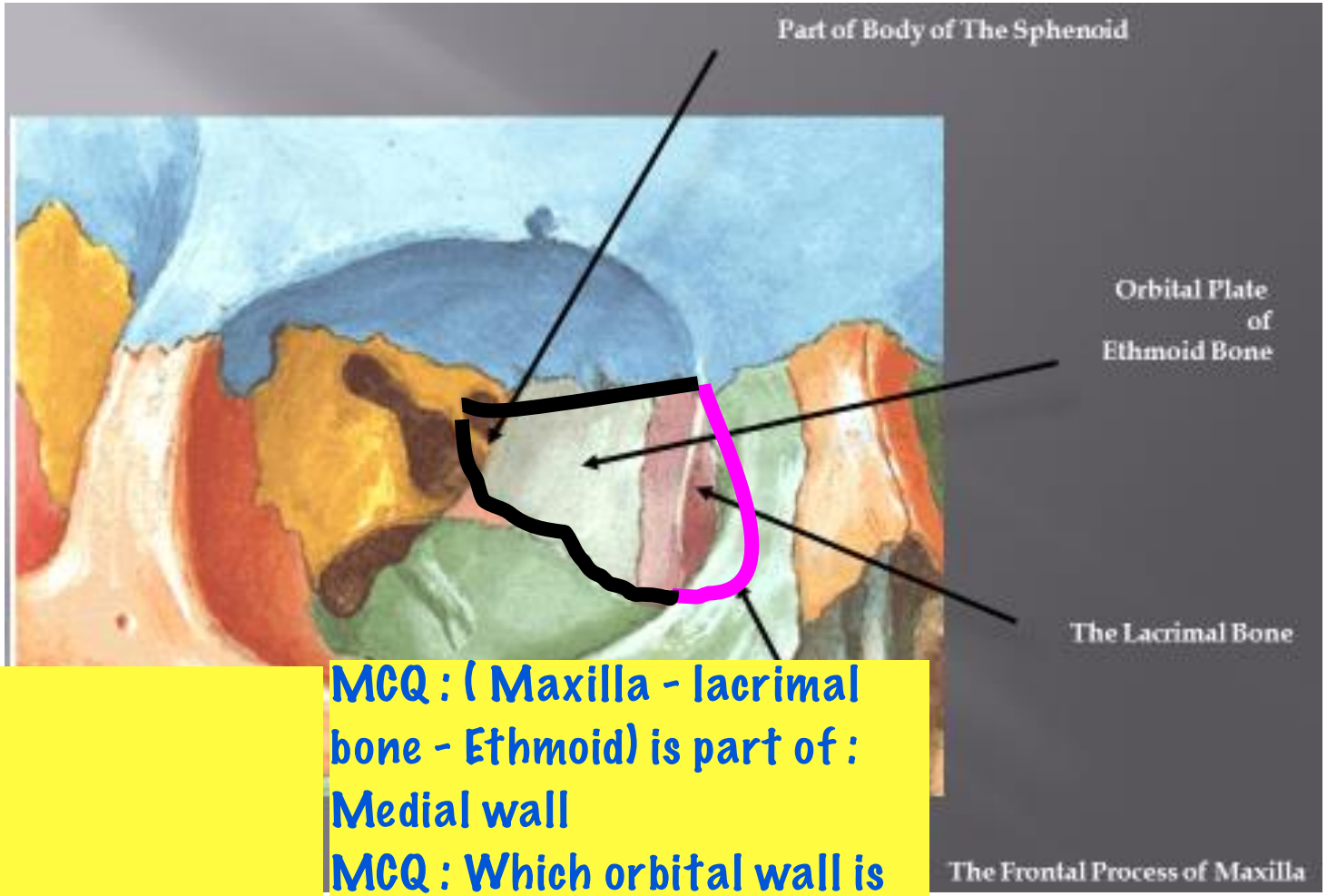
1. Zygomatic
2. Greater wing of sphenoid.



MCQ : Zygomatic bone is part of : Larteral wall & floor

Medial wall of the Orbit MCQ

1. Maxilla
2. Lacrimal bone
3. Ethmoid
4. Sphenoid ← Body



Sphenoid bone contribut : سؤال تجميعة مهم
- Lesser wing (Roof)
- Greater wing (Lateral wall)
- Body (Medial wall)

* Sphenoid bone does not contribute to the floor of the orbit.

MCQ : (Maxilla - lacrimal bone - Ethmoid) is part of : Medial wall

MCQ : Which orbital wall is NOT formed by the sphenoid bone? Floor

Contents of bony orbit

SAQ : Enumerate content of bony orbit ? وكافي تكتب اللي بالأحمر

SAQ : Enumerate cranial nerve (Ophthalmic nerves) in bony orbit ?

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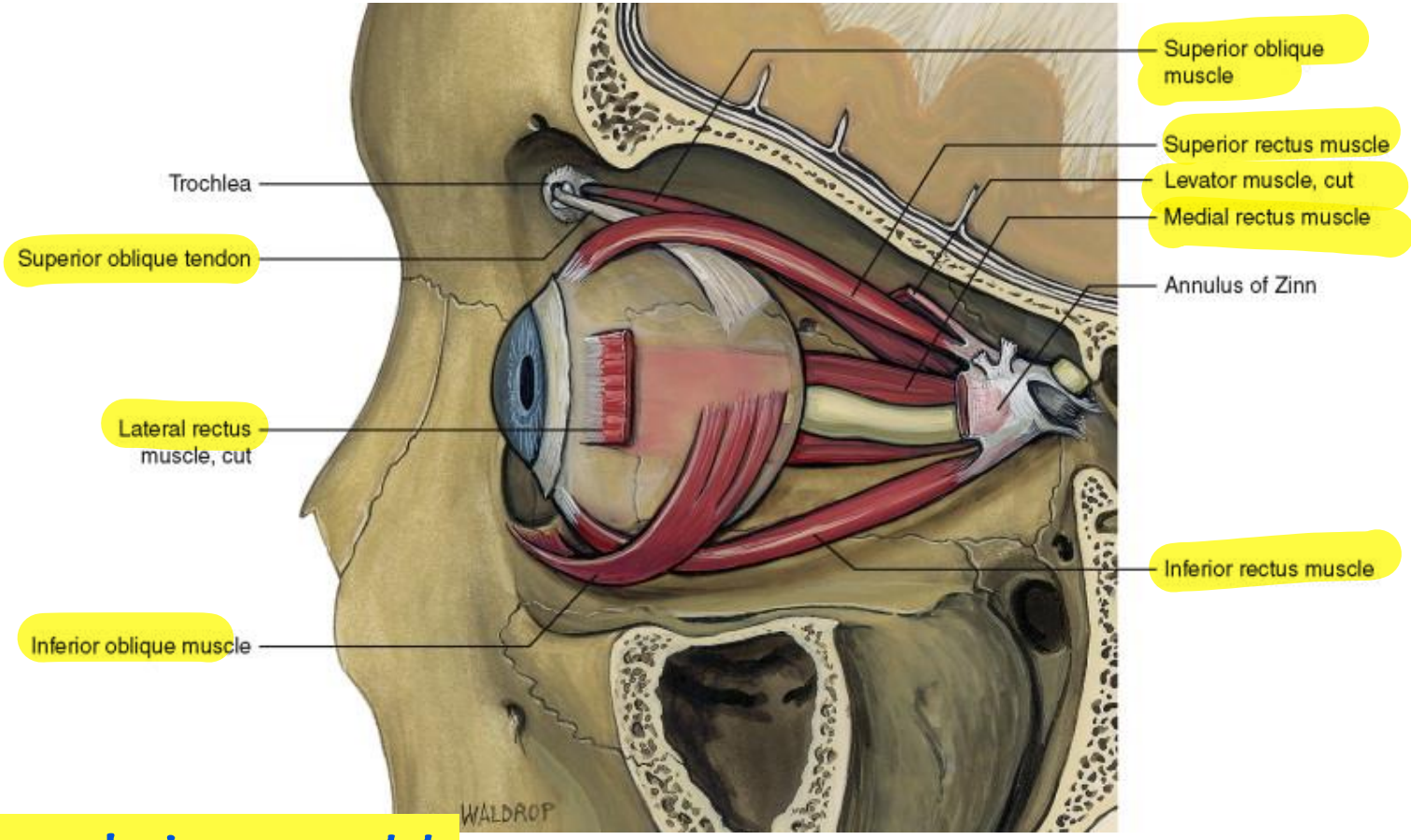
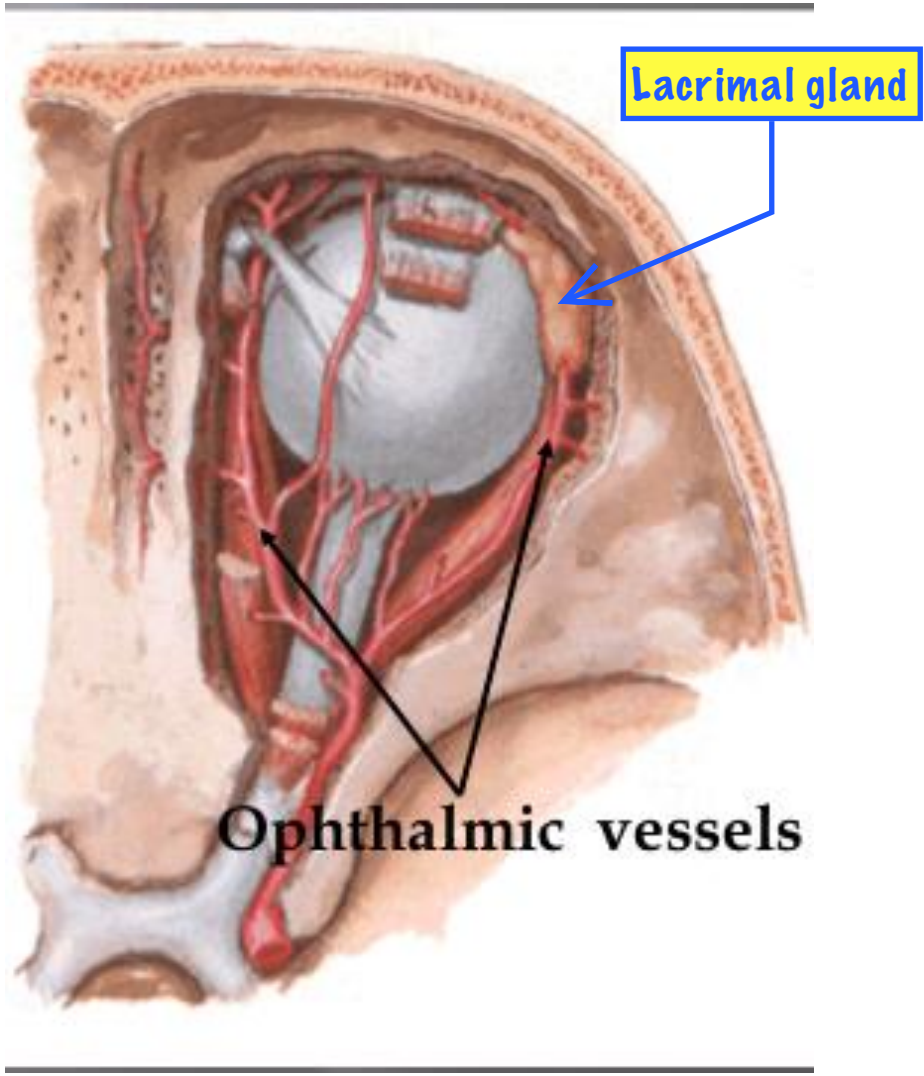
1. Eyeball
2. Fasciae: Orbital, Bulbar
3. Extraocular muscles (Levator Palpebrae Superioris, Superior, Inferior, Lateral and Medial Rectus muscles, Superior and Inferior Oblique Muscles)
4. Nerves: cranial nerves II, III, IV, V1, and VI SAQ

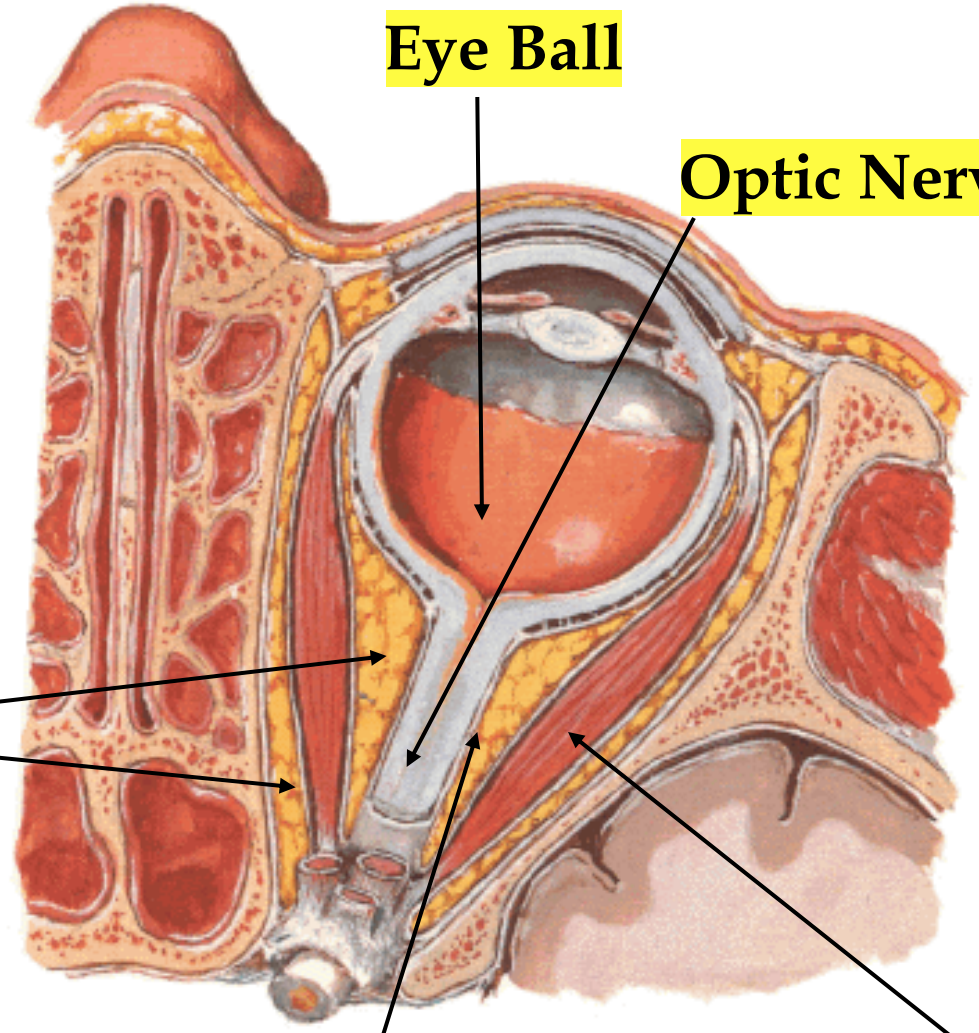


MCQ : Whih ms elevate upper eye lid ? Levator palpebrae superiris

* Eye opening is controlled by the Oculomotor nerve (CN III) via the Levator palpebrae superioris muscle .
* Eye closing is controlled by the Facial nerve (CN VII) via the Orbicularis oculi muscle.

5. Blood vessels ← Ophthalmic vessels
6. Suspensory ligament of the eyeball
7. Conjunctiva
8. Trochlea of superior oblique
9. Orbital septum
10. Ciliary ganglion and short ciliary nerves
11. Extraocular Fat
12. Lacrimal gland, Lacrimal sac & Nasolacrimal duct
13. Eyelids
14. Medial palpebral ligament and Lateral palpebral ligament
15. Medial and Lateral Check ligaments





Eye Ball

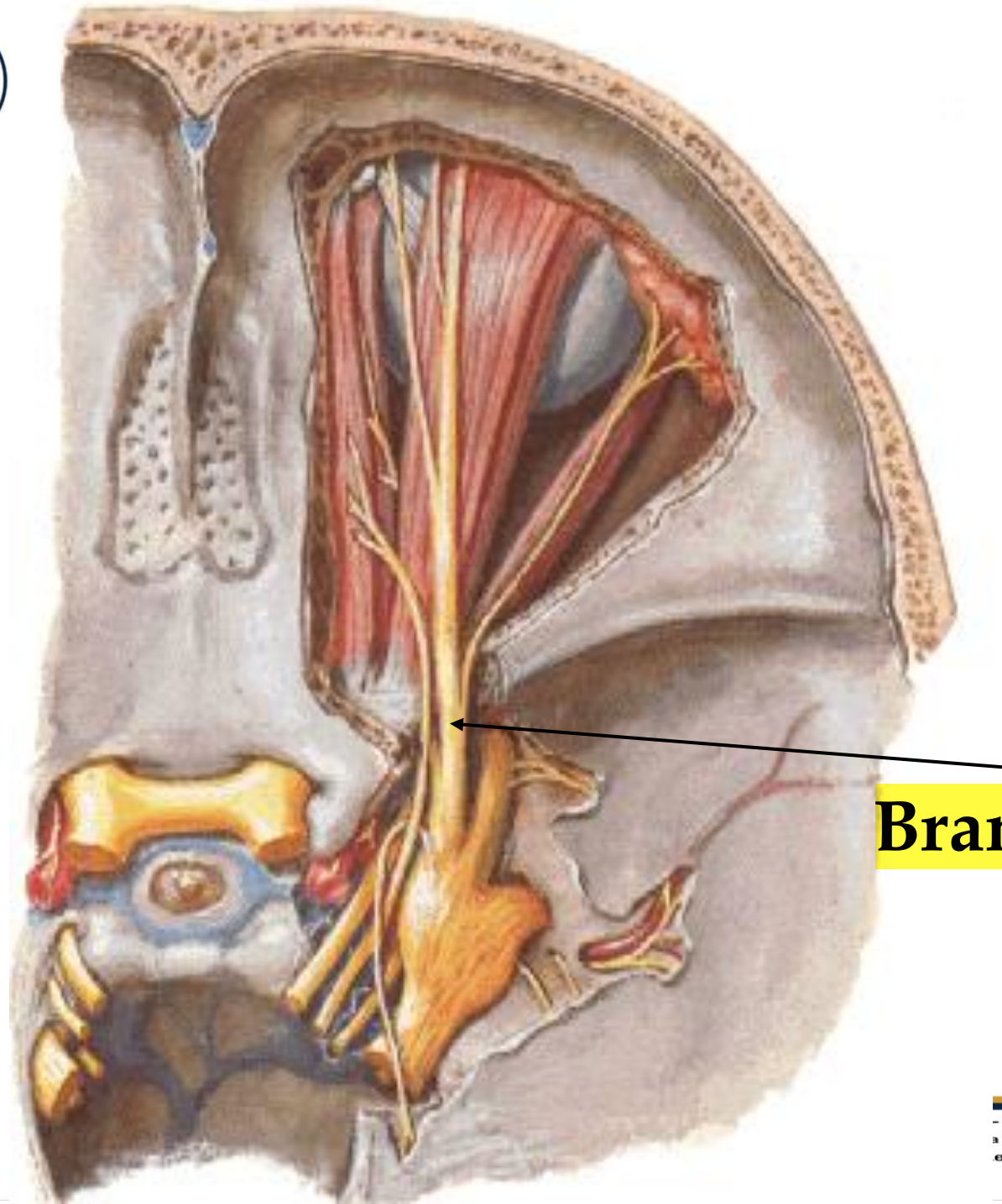
Optic Nerve

Fat

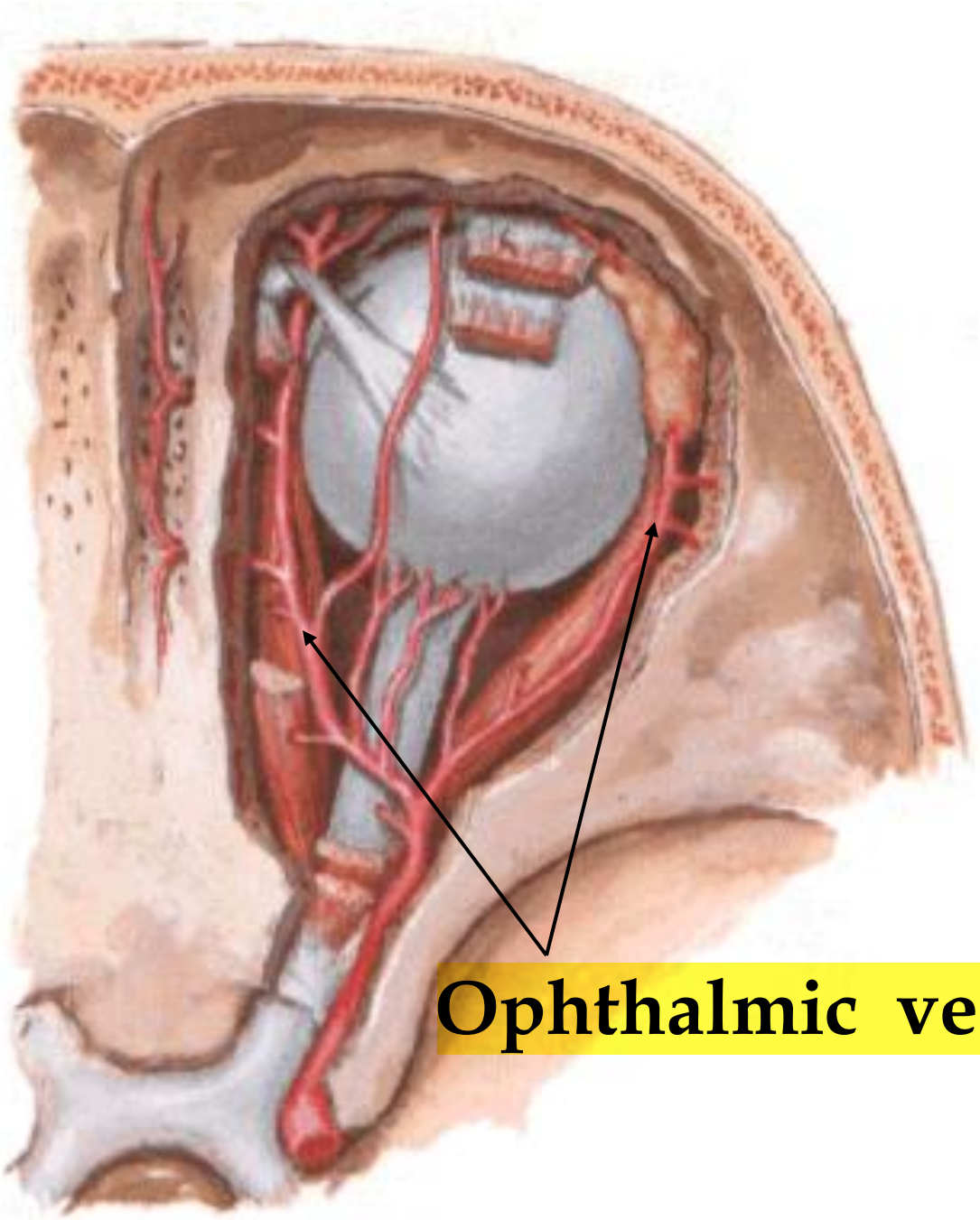
* Function : support of eye
* Abnormalities : Exophthalmos (Excess fat) , Enophthalmos (Loss of orbital fat)

Tenon's Fascia

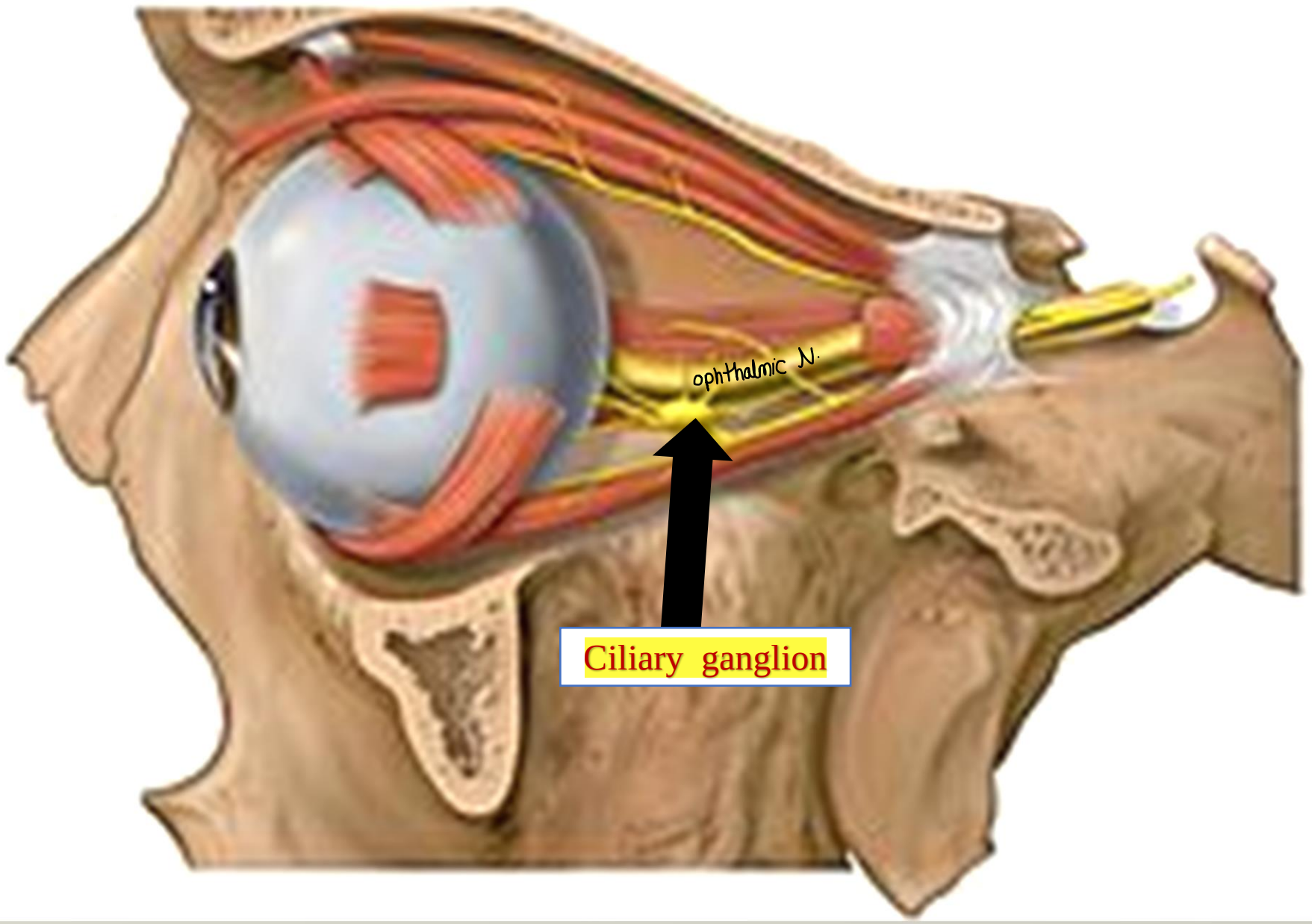
Muscles



Branches of ophthalmic nerve



Ophthalmic vessels


ophthalmic N.
Ciliary ganglion

Foramina of bony orbit

مهمة وغالبا بتيجي OSPE

SAQ : Enumerate content that pass through optic canal ?

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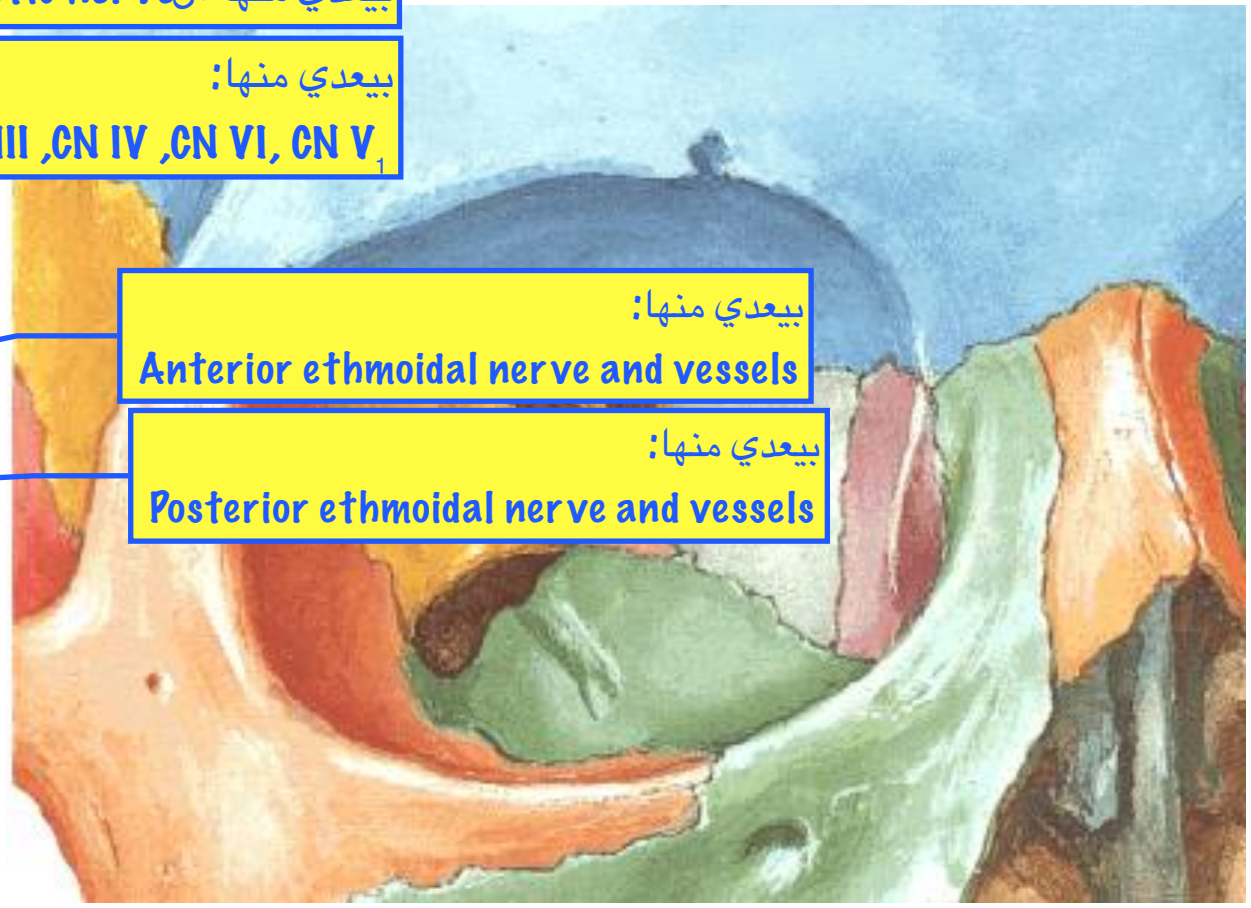
1. Optic canal
2. Superior orbital fissure
3. Inferior orbital fissure
4. Anterior ethmoidal foramen
5. Posterior ethmoidal foramen
6. Infraorbital foramen
7. Supraorbital foramen
8. Naso-lacrimal canal opening
9. Zygomatic orbital foramen

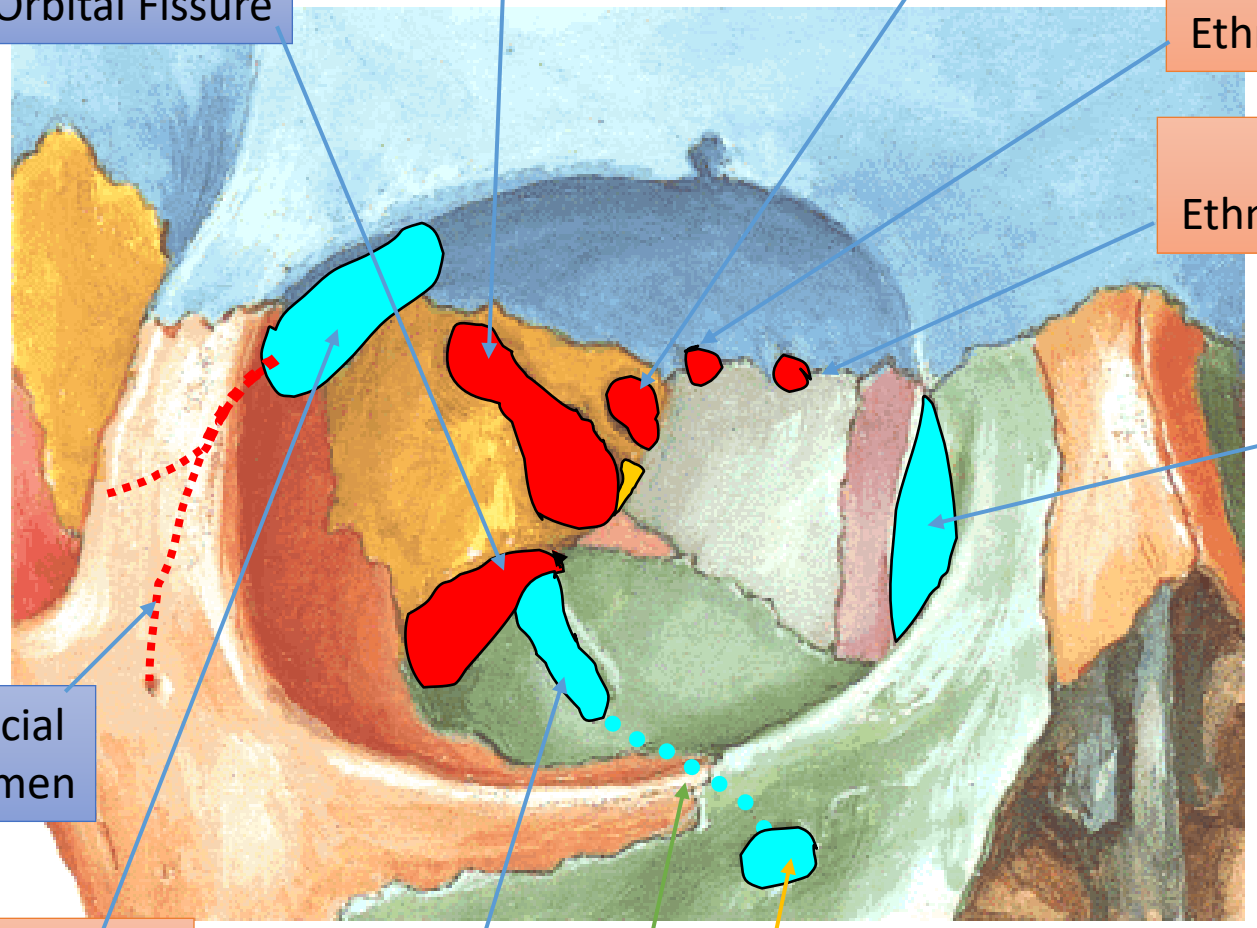
بيعدي منها الoptic nerve وال ophthalmic artery

بيعدي منها:
CN III ,CN IV ,CN VI, CN V_1



بيعدي منها:
Anterior ethmoidal nerve and vessels

بيعدي منها:
Posterior ethmoidal nerve and vessels


Superior Orbital Fissure
Inferior Orbital Fissure
Optic canal
Posterior Ethmoidal Foramen
Anterior Ethmoidal Foramen
Fossa for Lacrimal Sac
الكيس اللي بيجمع الدموع قبل ما تنزل للnose
Zygomatico-facial Foramen
Fossa for Lacrimal Gland
Infra-orbital Groove
Infra-orbital Canal
Infra-orbital Groove

Muscles of the orbit

Extra-ocular Muscles

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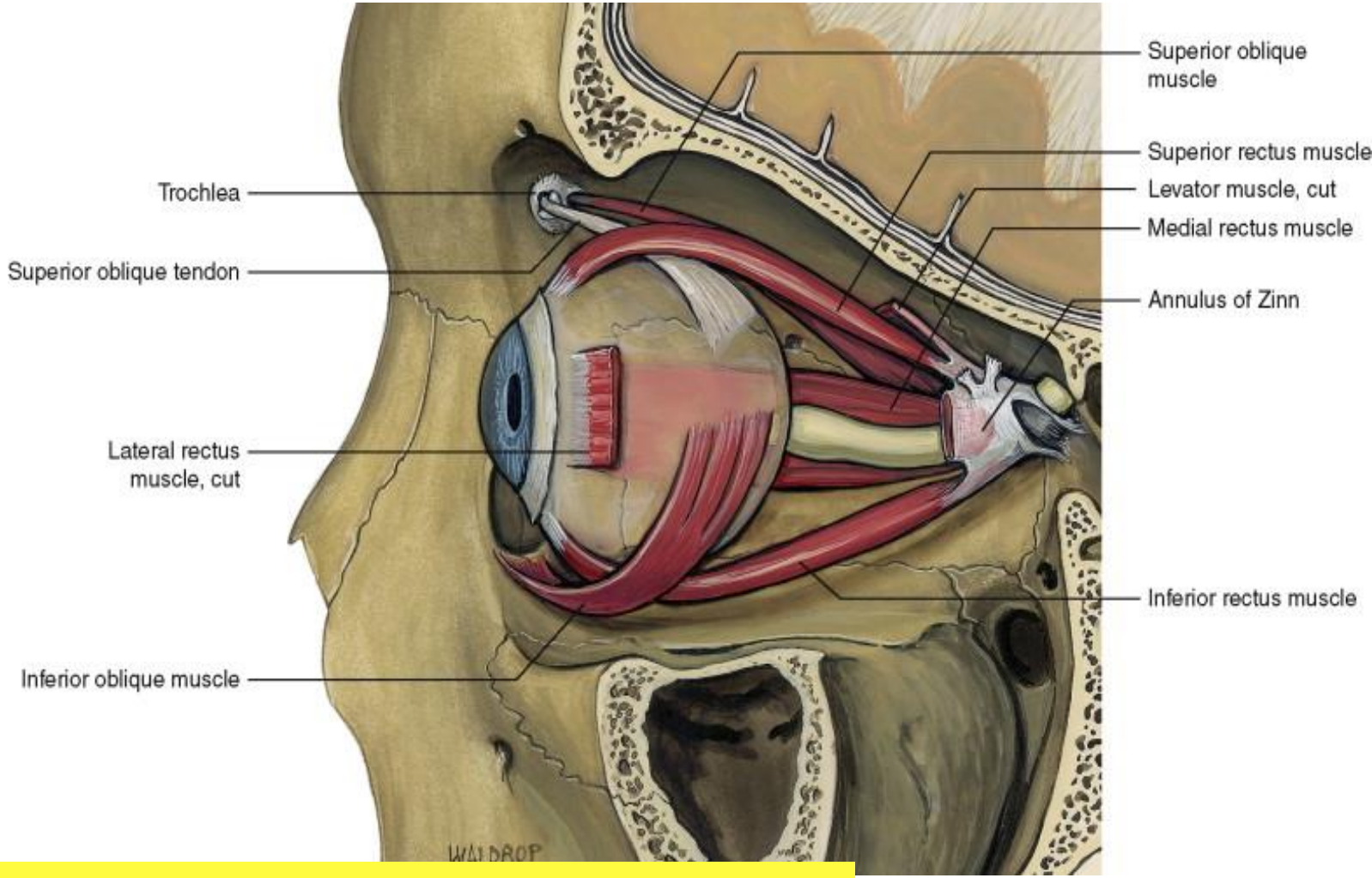
I. Recti muscles

1. Superior
2. Inferior
3. Medial
4. Lateral

All are supplied by Oculomotor n. except lateral rectus (Abducent n.) MCQ



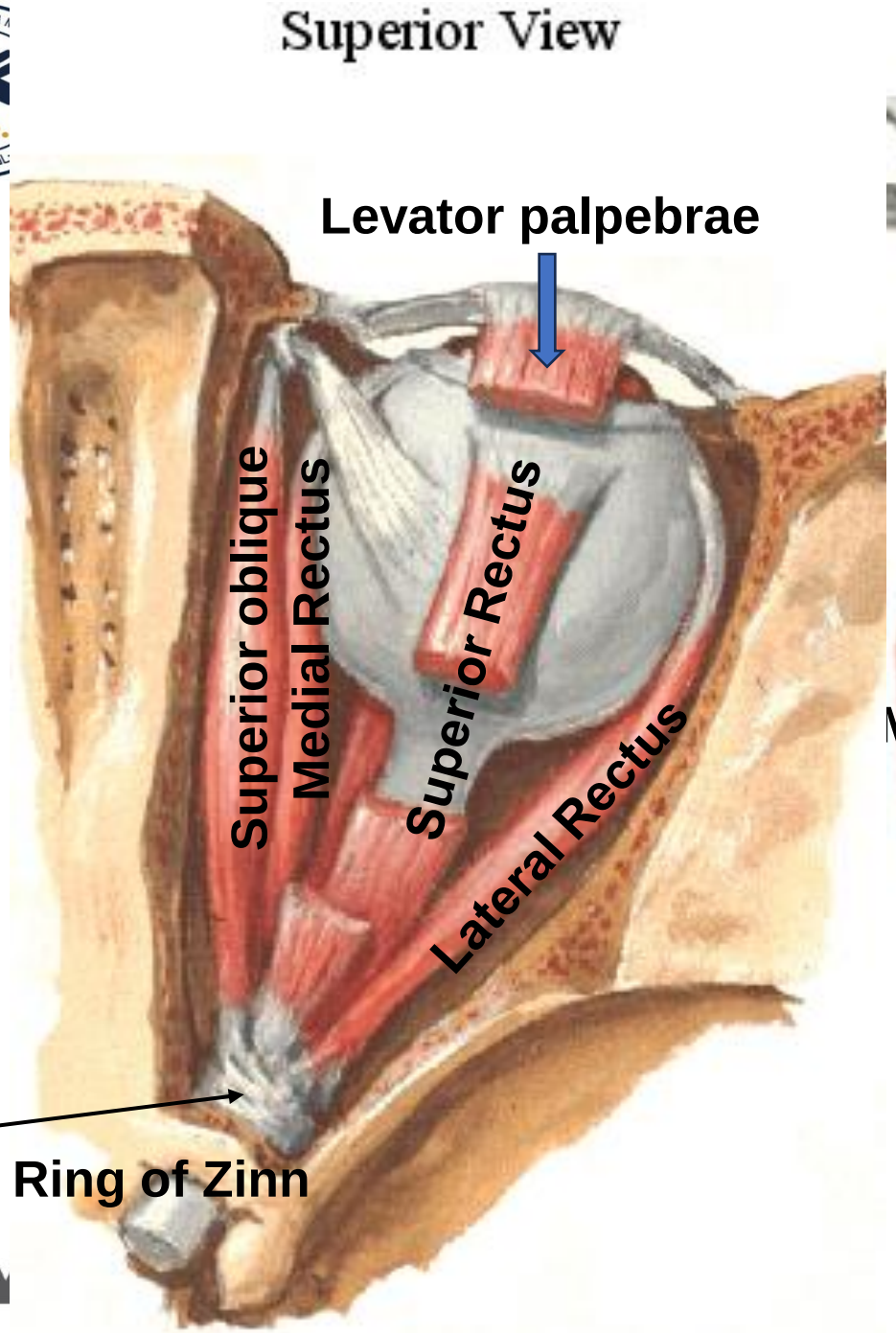
MCQ : The only rectus ms which is not supply by oculomotor is : Lateral rectus

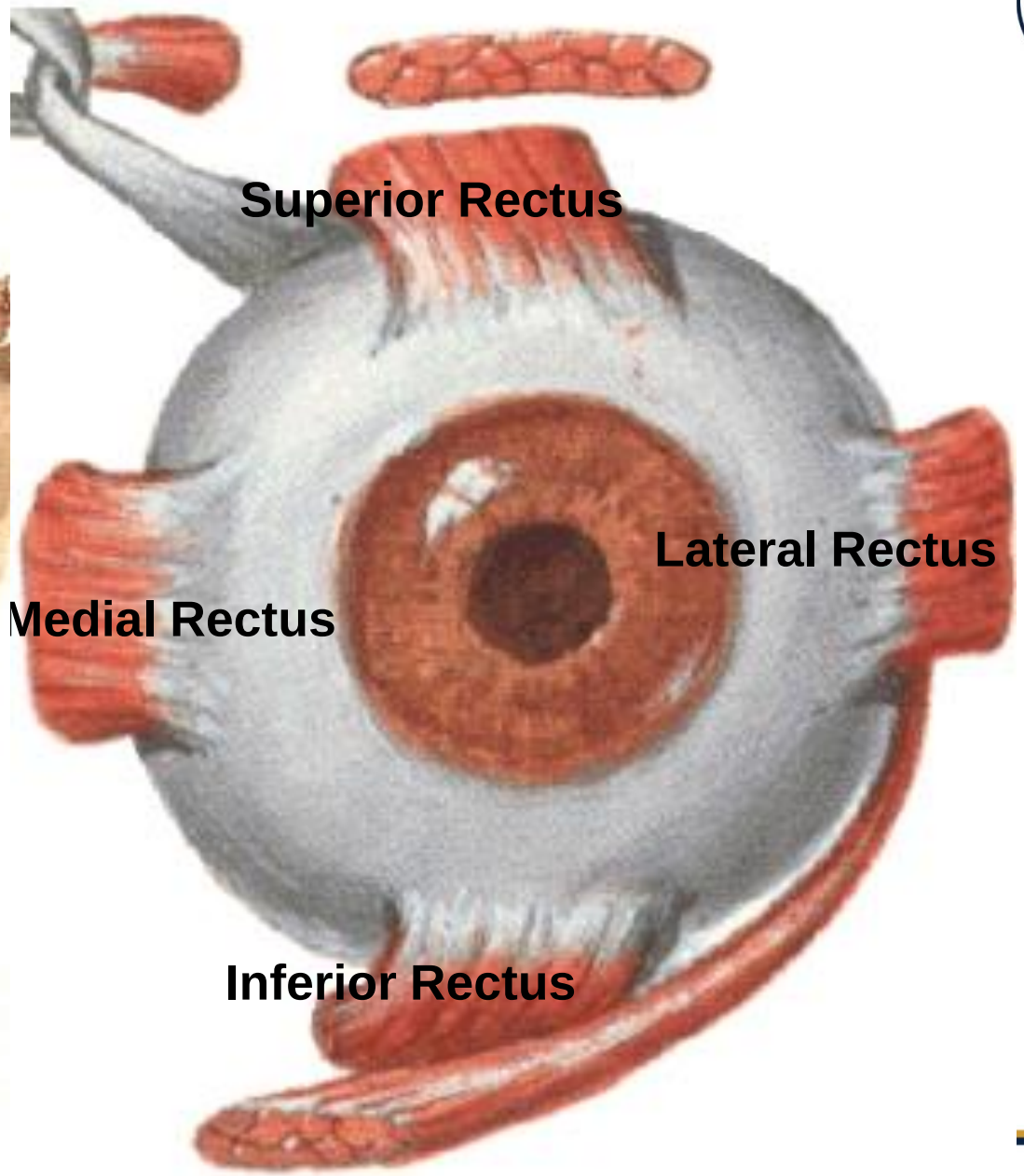
MCQ : Lateral rectus supplied by : CN VI

SAQ : Action of recti ms ?

مطلوب منا الmain action اللي بالأحمر بس وللي حابب يستزيد يعرف ان كلهم بيعملوا adduction ماعدا الlateral rectus

Muscle	Origin MCQ	Insertion (Sclera)	Nerve	Action
Superior	annulus of Zinn at the orbital apex	superior to the corneal limbus	oculomotor nerve	elevates, adducts, and rotates medially the eye
Inferior	annulus of Zinn	inferior to the corneal limbus	oculomotor nerve	depression and adduction
Medial	annulus of Zinn	medial to the corneal limbus	oculomotor nerve	adducts the eyeball
Lateral L6	annulus of Zinn	temporal to the corneal limbus	Abducent nerve	abducts the eyeball

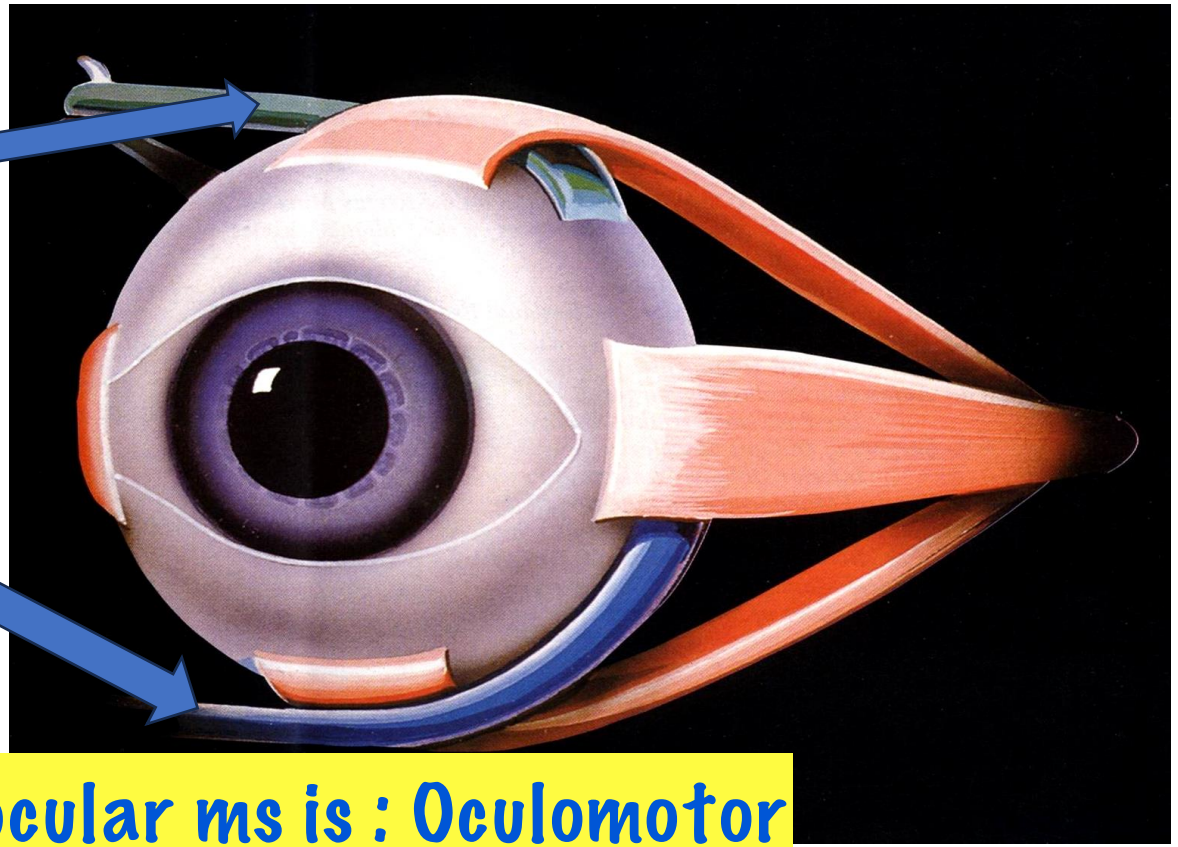

Superior View
Levator palpebrae
Superior oblique
Medial Rectus
Superior Rectus
Lateral Rectus
Annulus Ring of Zinn


Superior Rectus
Lateral Rectus
Medial Rectus
Inferior Rectus

I. Oblique muscles

Two oblique muscles:

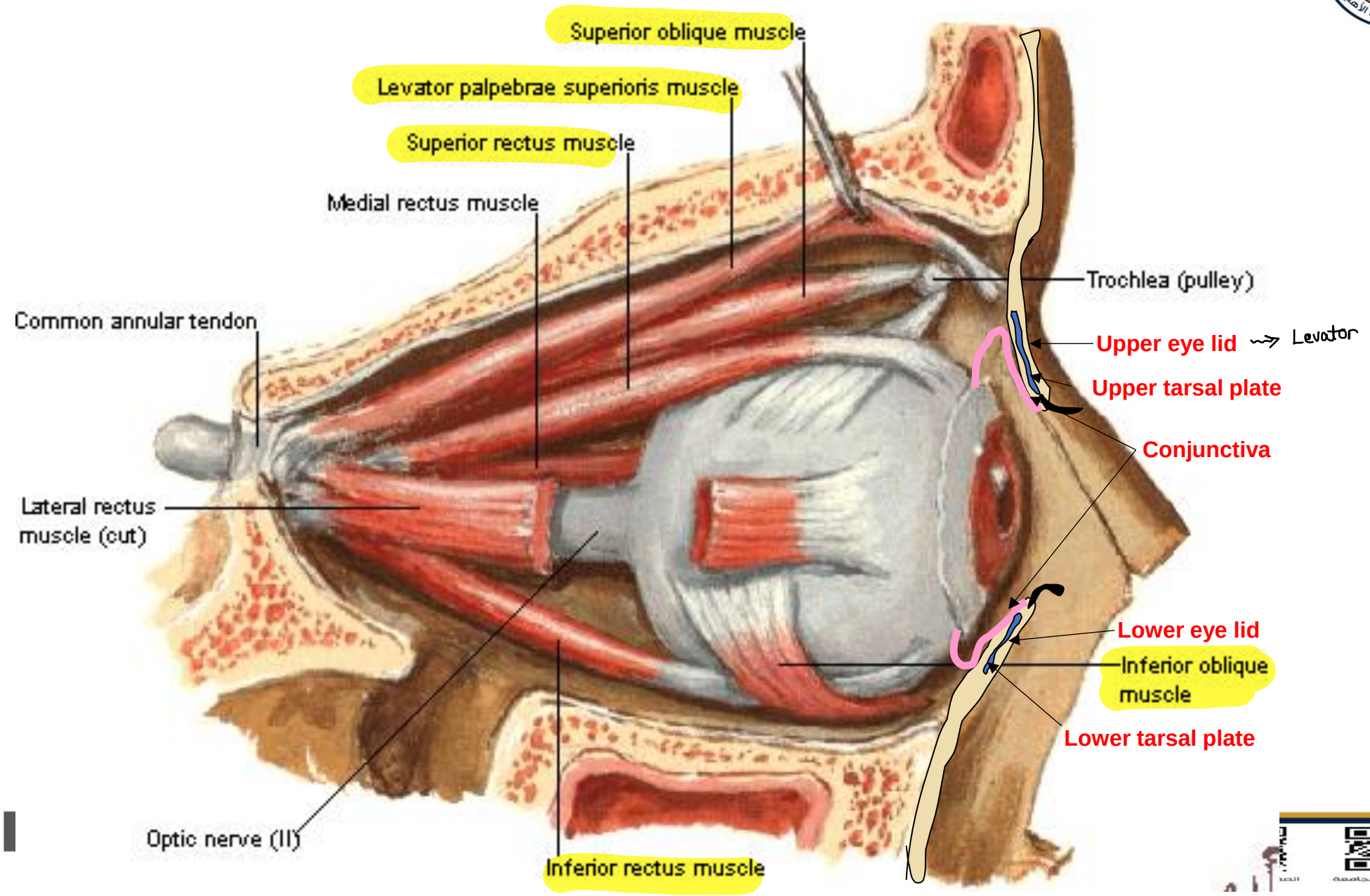
1. **Superior oblique** (**Trochlear** n.) SO 4
2. **Inferior oblique** (**oculomotor** n.).



MCQ : Principle nerve supply of extraocular ms is : Oculomotor

Muscle	Origin	Insertion (Sclera)	Nerve	Action MCQ
superior عضلة مايلة ،أحوالها مايلة ، فالإسم عكس الaction	annulus of Zinn	Outer posterior quadrant of the eyeball	trochlear nerve MCQ	intorsion, abduct and depress the eyeball
inferior	maxilla, lateral to the lacrimal groove	laterally onto the eyeball, deep to the lateral rectus.	oculomotor nerve	extorsion, elevation, abduction

Right Lateral View

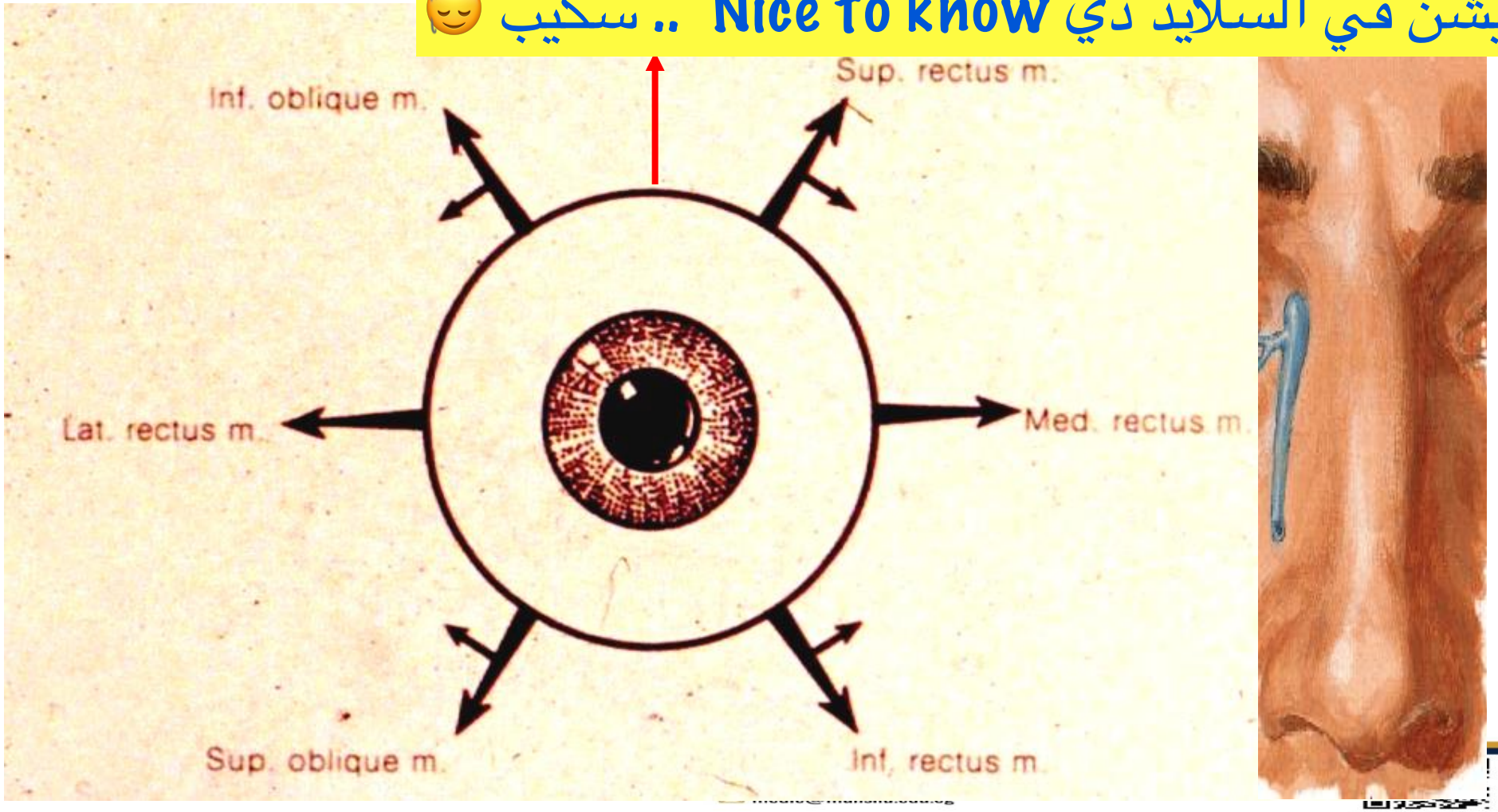


Inferior Oblique
Inferior Rectus
Superior Rect
Superior Oblique
Lateral Rectus

Medial Rectus

The Primary Position

الصور والانميشن في السلايد دي Nice to know .. سكيب 😌



Lateral rectus paralysis

Medial Squint MCQ

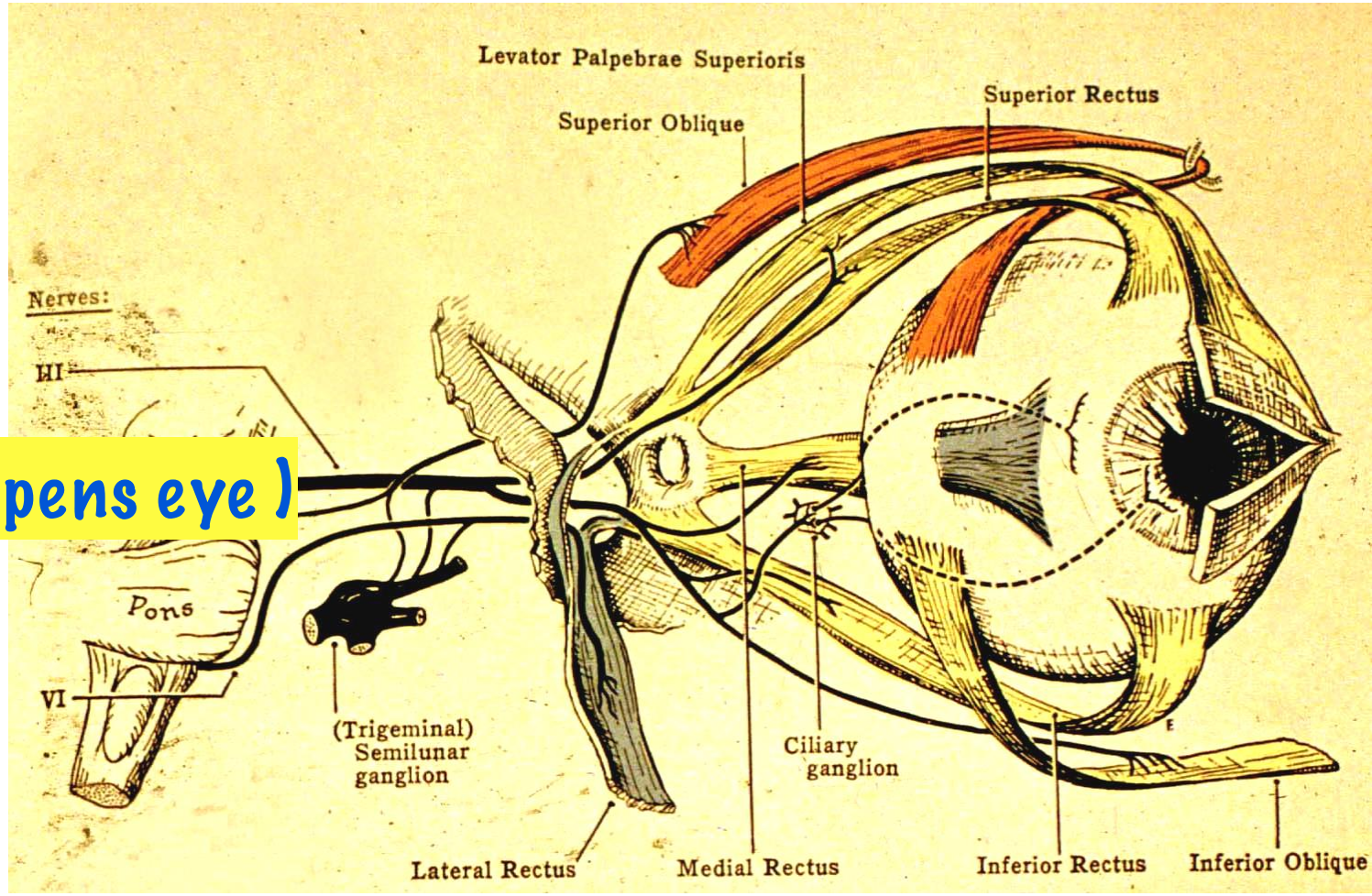
MCQ : Medial Sqint caused by paralysis of : Lateral rectus

MCQ : Lateral Sqint caused by paralysis of : Medial rectus

3. Levator Palpebrae Superioris

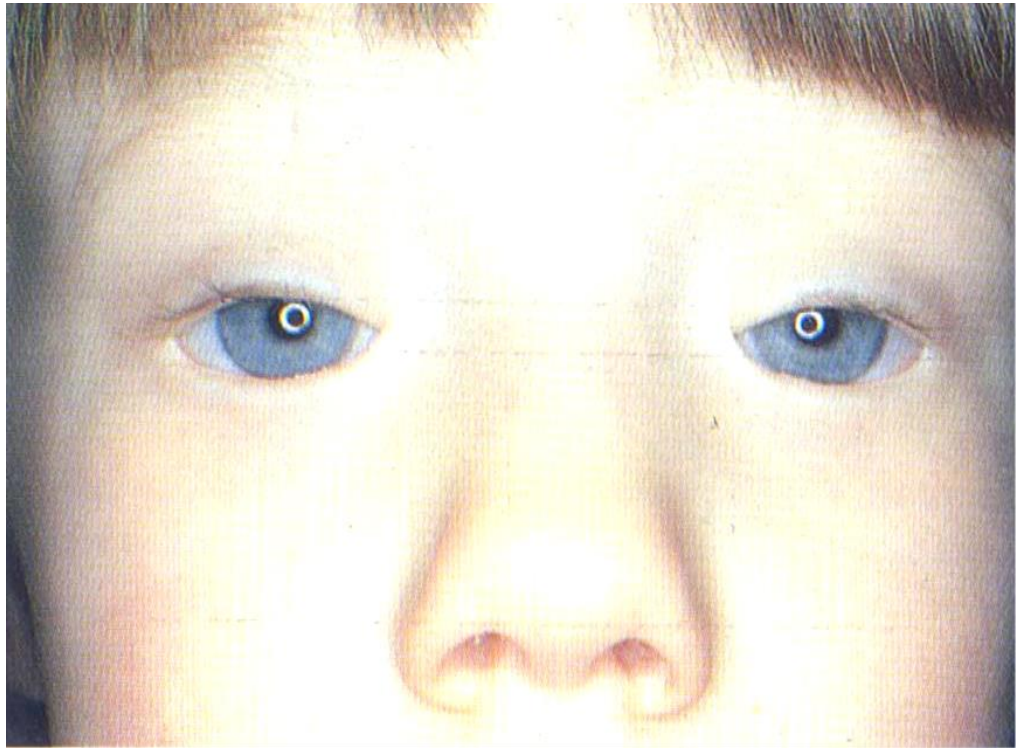
Action: raises the eyelid (Opens eye)

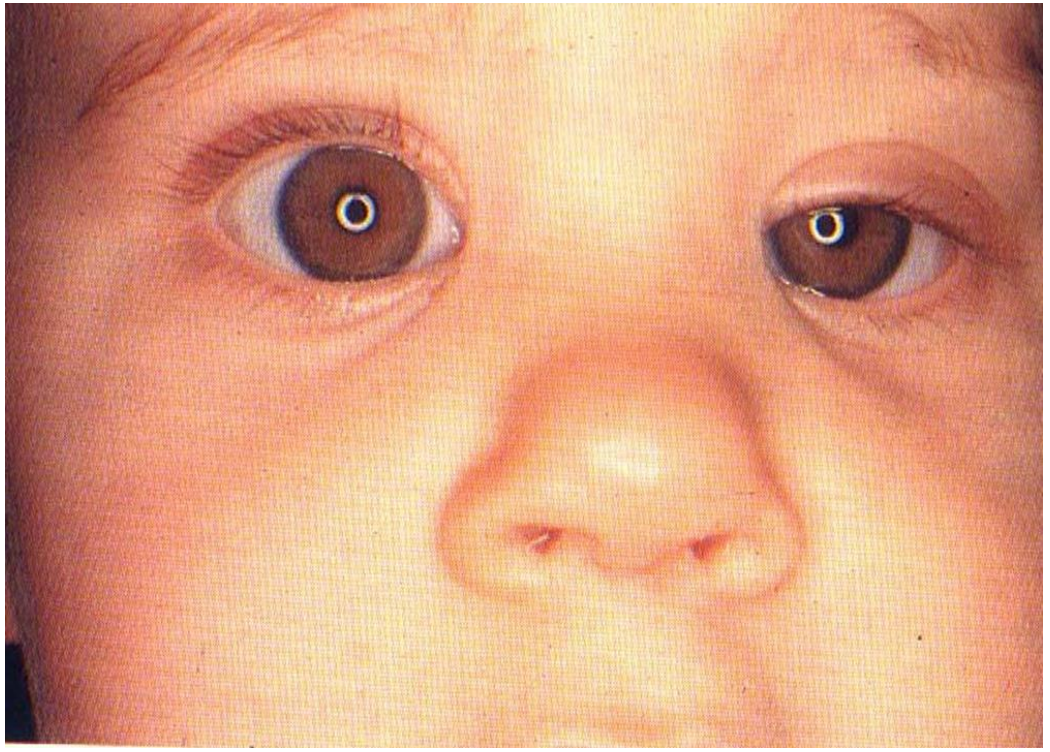
Nerve supply: Supplied by oculomotor nerve



Levator Palpebrae Superioris paralysis

Ptosis





MCQ : Potosis is caused by lesion in which nerve : Oculomotor

MCQ : Ptosis is caused by lesion in which ms : Levator Palpebrae Superioris

Exophthalmos

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Vessels of the orbit

Ophthalmic vessels

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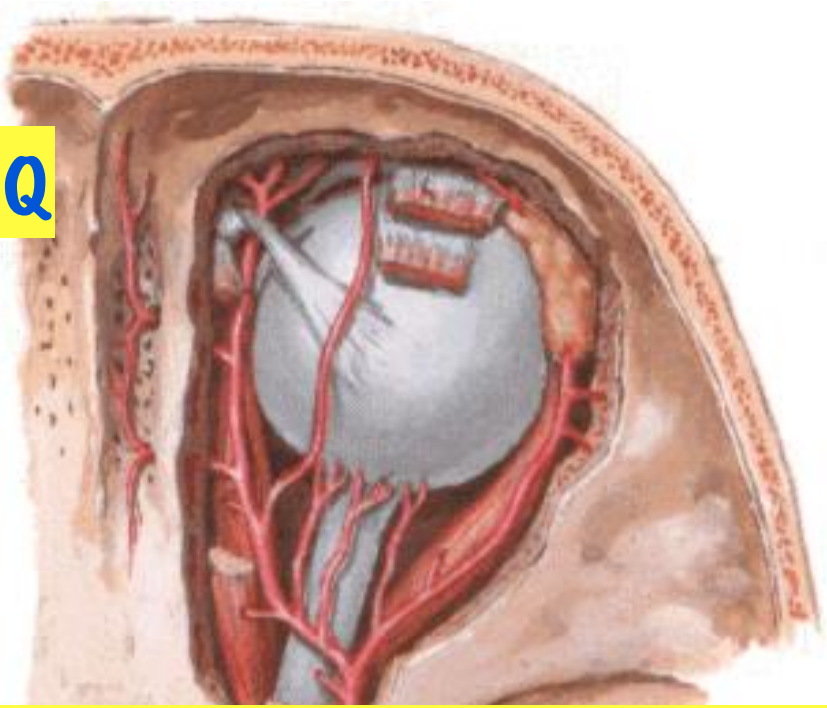
Ophthalmic Artery

Origin: internal carotid artery MCQ

Termination: supratrochlear & dorsal nasal MCQ

Branches:

1. Lacrimal
2. Frontal
3. Central artery of the retina MCQ
4. Zygomatic
5. Glandular
6. Supraorbital
7. Supratrochlear (terminal)
8. Dorsal nasal (terminal)



MCQ : Central artery of the retina originate from : Ophthalmic artery

MCQ : Which of the following is terminal branches of ophthalmic artery ? supratrochlear & dorsal nasal

MCQ : Ophthalmic artery originate from : internal carotid artery

Supratrochlear Artery (terminal branch)

Dorsal Nasal Artery (terminal branch)

Glandular Branches

Zygomatic Branches

Muscular Branches

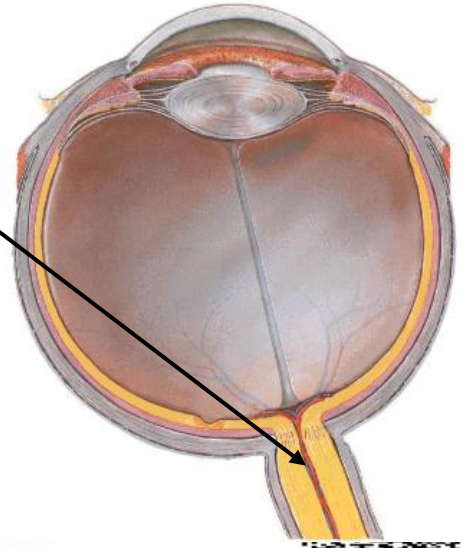
3- Muscular Branches

2- Lacrimal Artery

1- Central Artery of the retina

Ophthalmic Artery

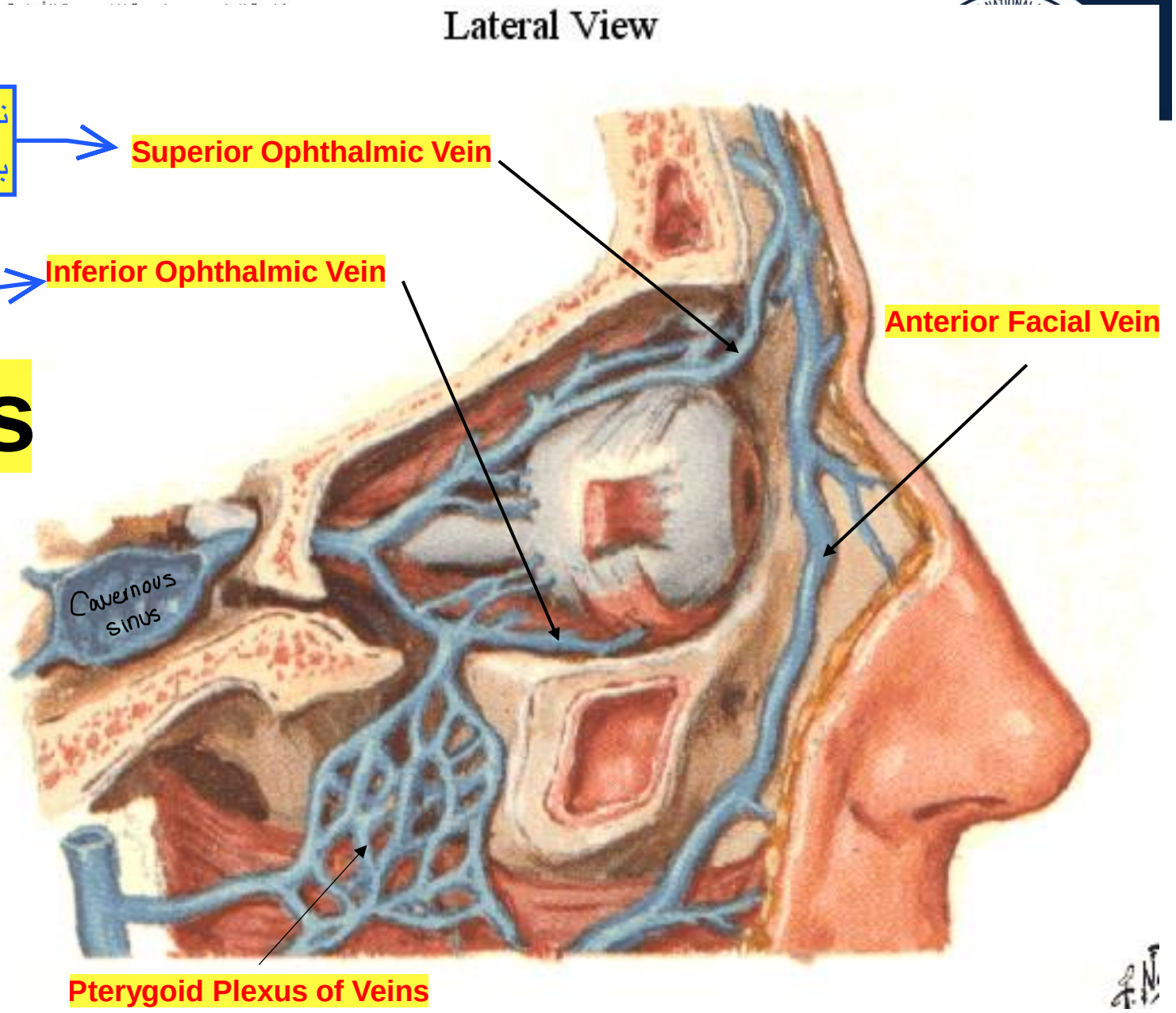
بيعدي مع الoptic nerve في ال optic canal



نعرف كمعلومة عامة انه connected بال anterior facial vein

ده connected بال Peterygoid plexus of veins

Ophthalmic Veins



Nerves of the orbit

SAQ : Enumerate (motor - sensory - parasympathetic) innervation of orbit ?

5 MCQ على السلايد الجاية

INNERVATION OF ORBIT MCQ + SAQ

1]=Motor nerves:- [all ms are supplied by 3rd except LR & SO]

Main nerve supply → 1)-3rd (**principal**) 2)-4th for **SO** 3)-6th for **LR**

2]=Sensory nerves:-

1)-General:- Ophthalmic division of trigeminal nerve

2)-Special [vision]:- Optic nerve.

3]=Para-sympathetic ganglion [autonomic nerve]:-

1)-Ciliary ganglion:- sphincter & ciliary muscles.

2)- S.P.G.:- lacrimal gland.

CN III, CN IV, CN VI, CN V_1 → Superior Orbital Fissure

CN II→ Optic Canal

تعديل :

LR supplied by CN 6

SO supplied by CN 4

Lacrimal Apparatus

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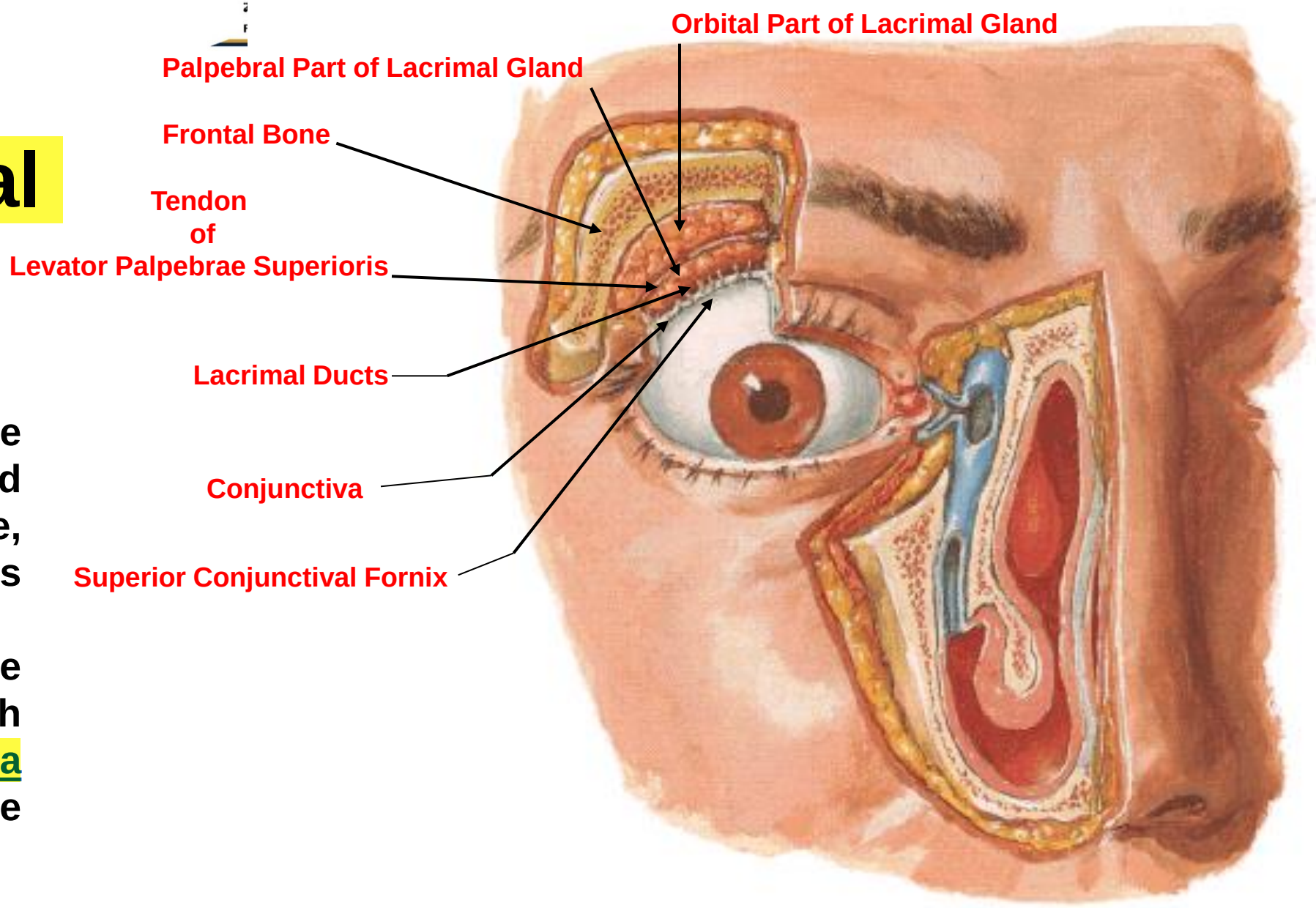
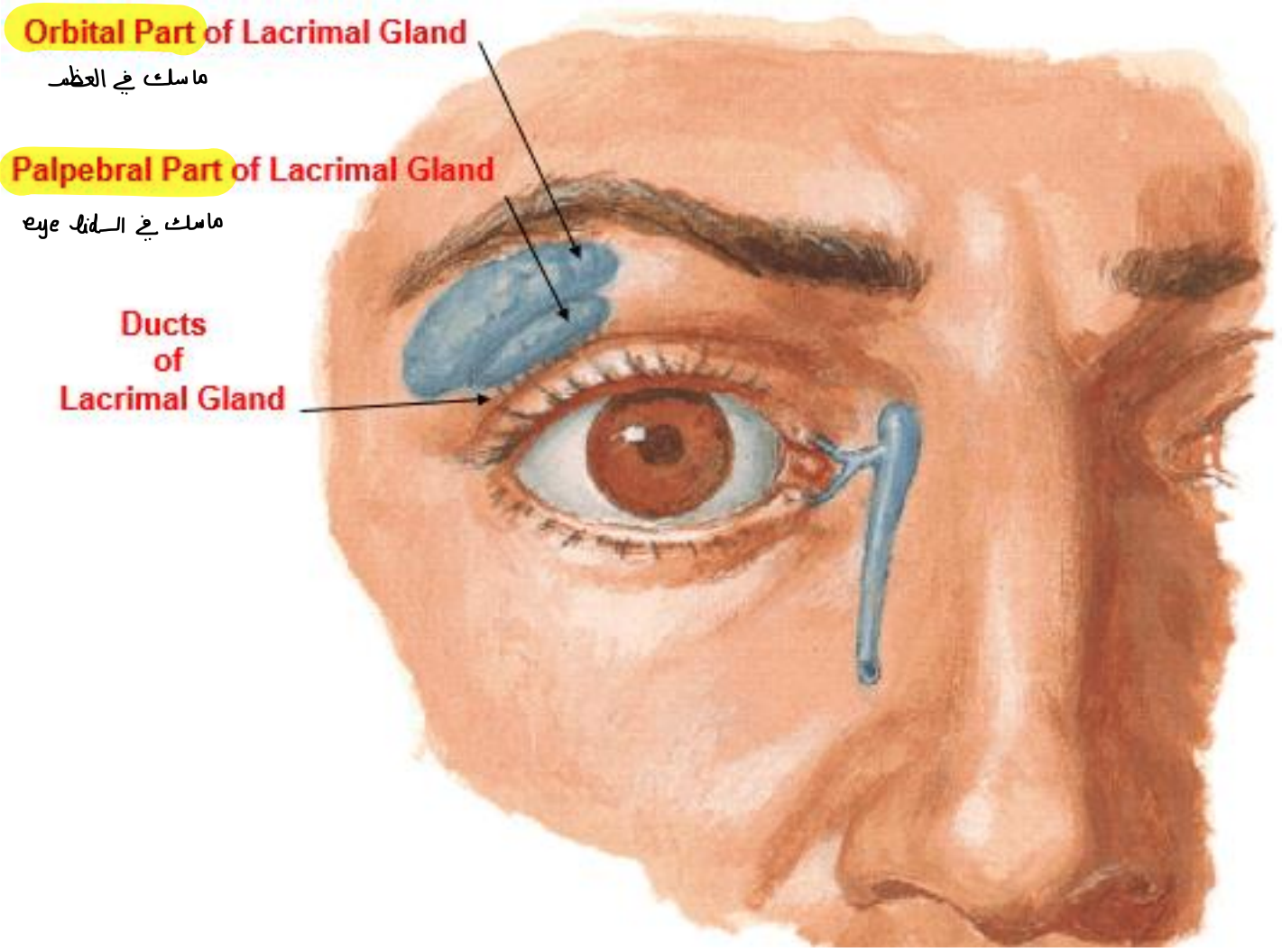
The Lacrimal Gland



- The lacrimal glands are paired almond-shaped glands, one for each eye, that secrete the aqueous layer of the tear film.
- They are situated in the upper, outer portion of each orbit, in the lacrimal fossa of the orbit formed by the frontal bone.

Parts

1. The orbital portion
2. The smaller palpebral portion



Pathway of Tears

للفهم فقط

Nice to know

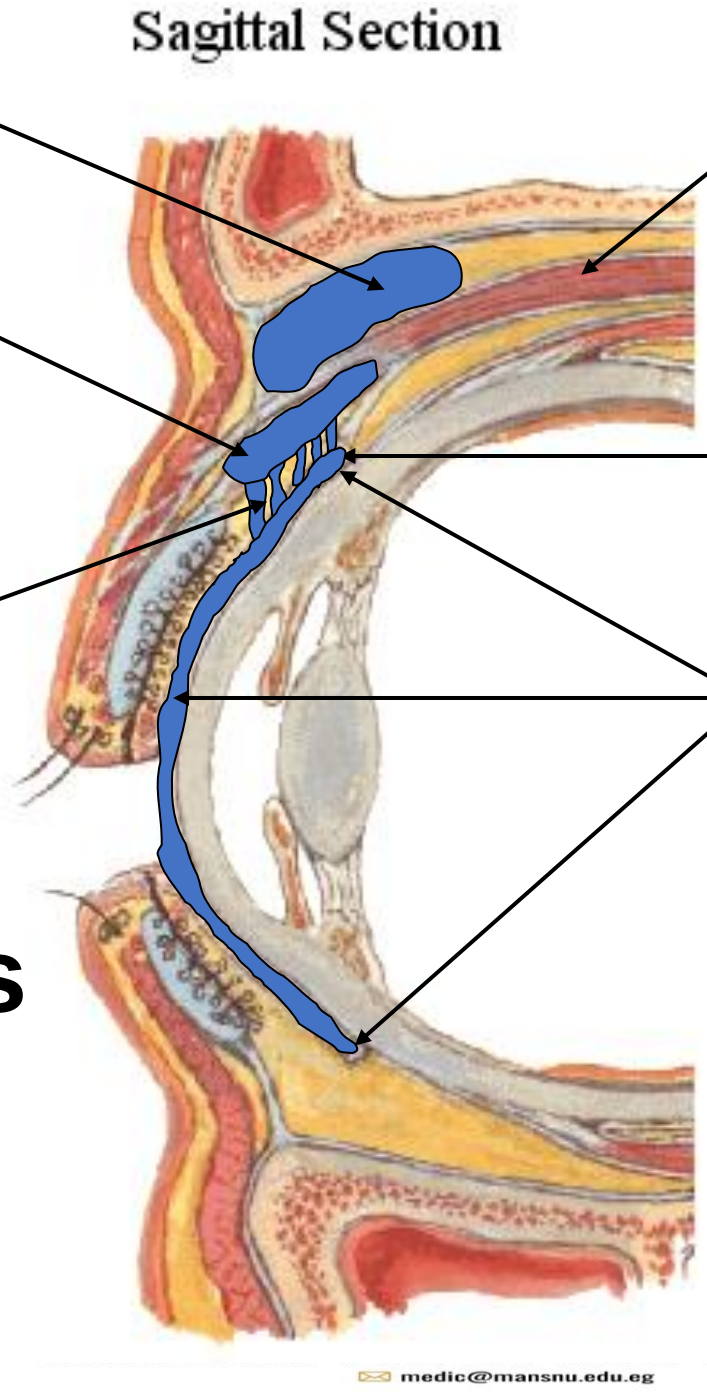
- Tears secreted collect in the

1. Fornix (conjunctiva of the upper lid)
2. Lacrimal puncta
3. Lacrimal sac
4. Nasolacrimal duct,

للفهم فقط

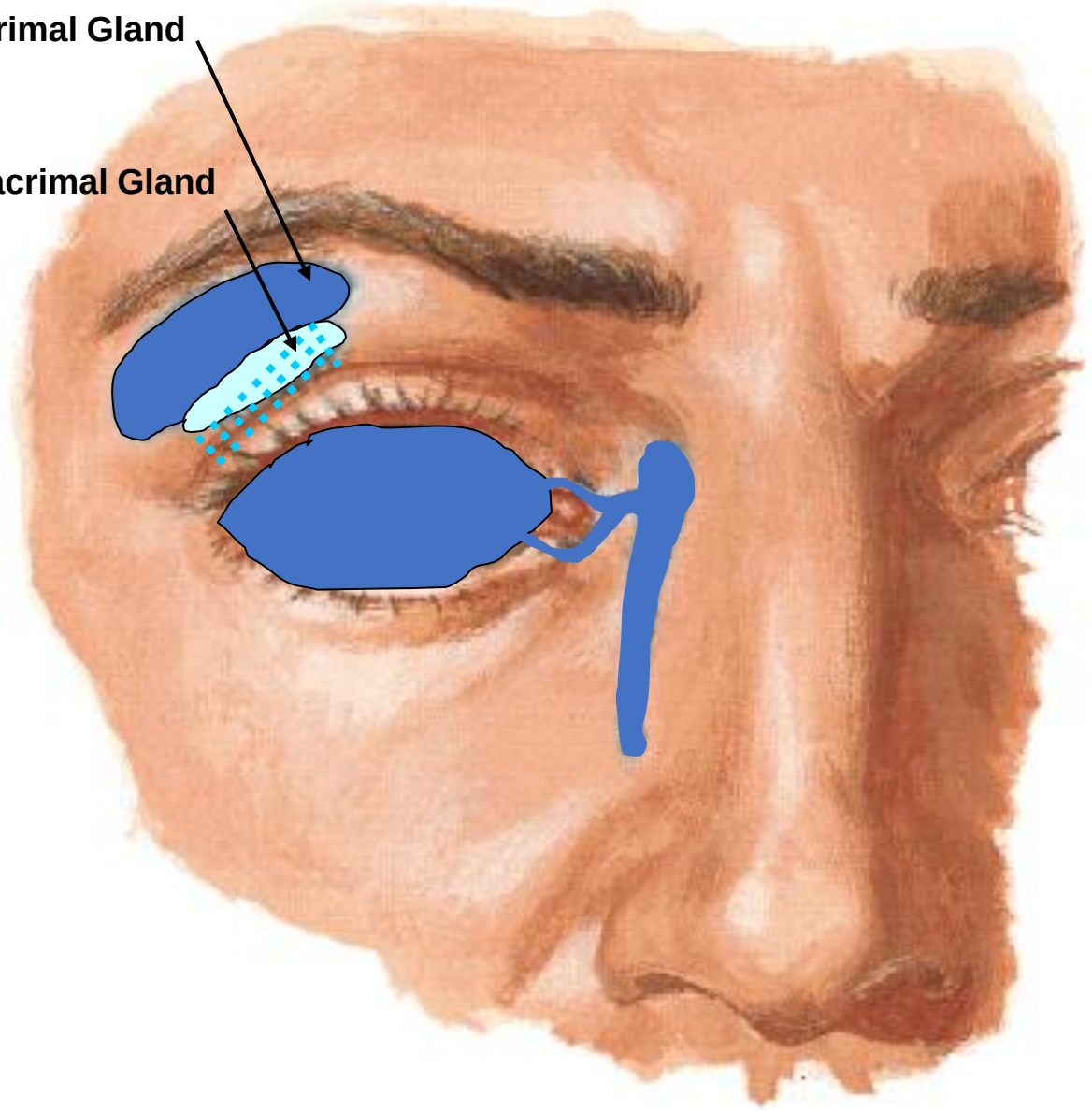
Nice to know

Pathway of Tears



للفهم فقط

Nice to know



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أهم حاجة في أي gland

Parasympathetic supply of the Lacrimal Gland

- **Facial nerve** through **lacrimal branch of ophthalmic nerve**

Structure of the eye ball

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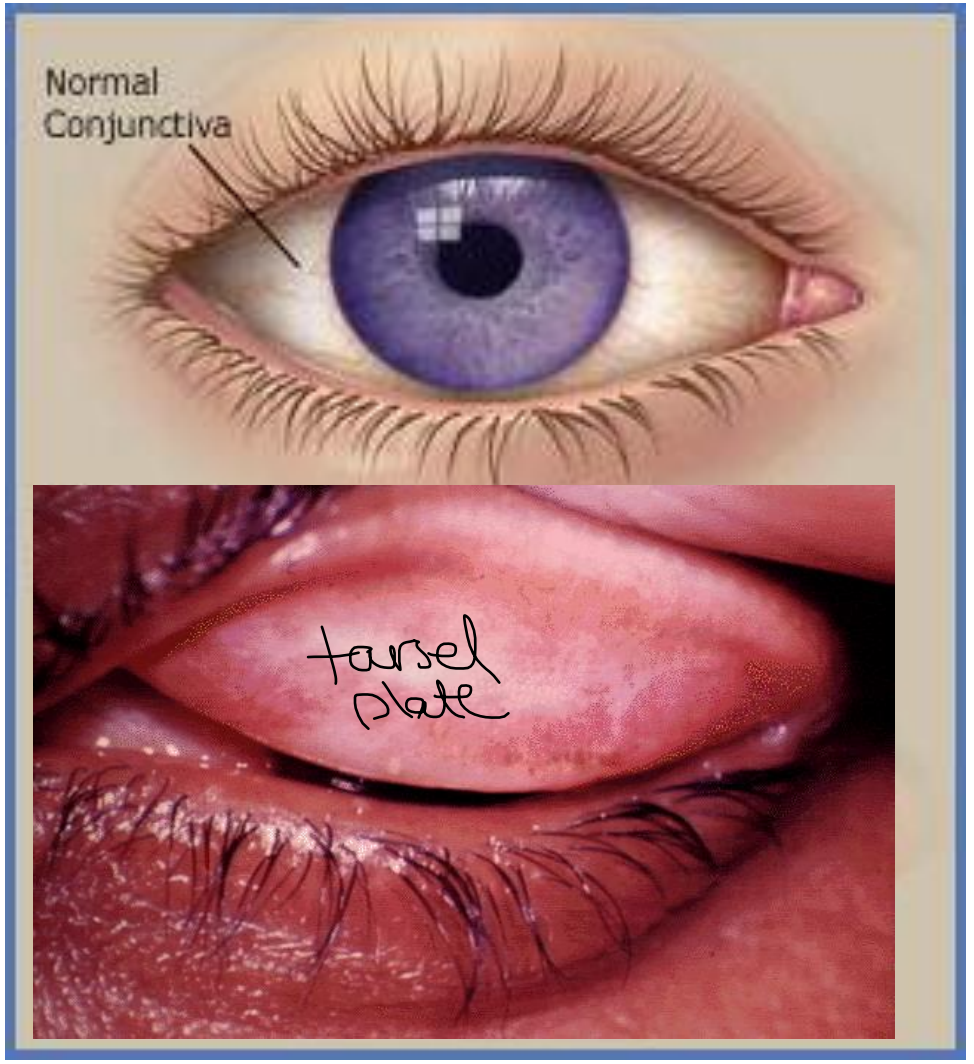
External structures of the eye: conjunctiva

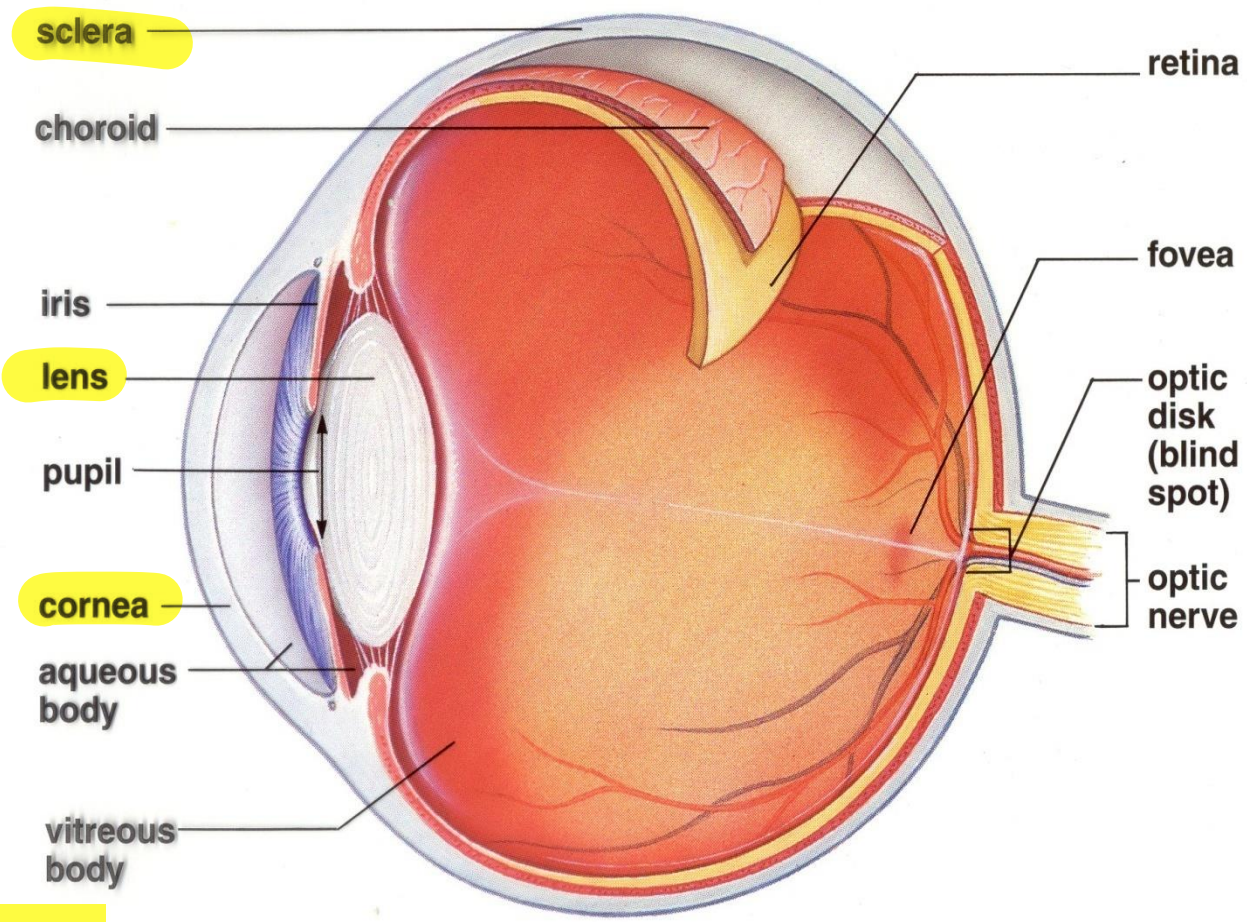
The **conjunctiva** is the lining on the underside of each eyelid and the mucous membrane over the eyeball, providing a protective covering for the exposed surface.



The coats of the eye MCQ

Three layers:

- The outer: inelastic coat, transparent cornea and opaque sclera. MCQ
- The middle, vascular coat, The Uvea: choroid, ciliary body and iris.
- The inner, nervous coat: Retina.

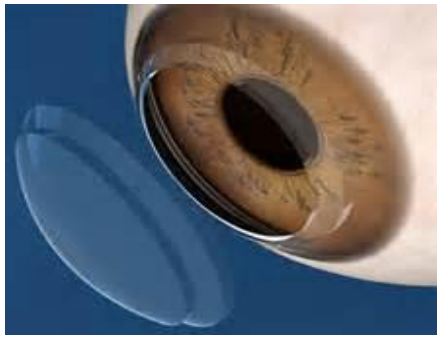


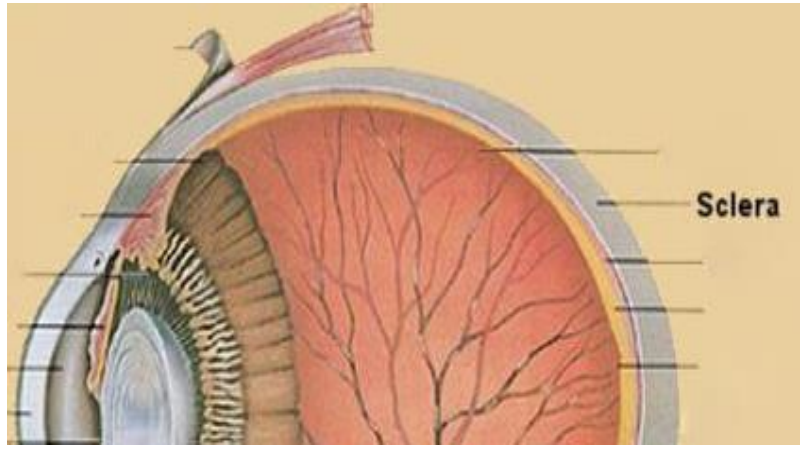
MCQ : Cornea & sclera are : inelastic coat

Outer layer of the eye:

The outer layer of the eye has two parts:

1. **Sclera** is the **white** of the eye.
2. **Cornea** is the **transparent** outer surface. ***(clear lens in front of eye)***

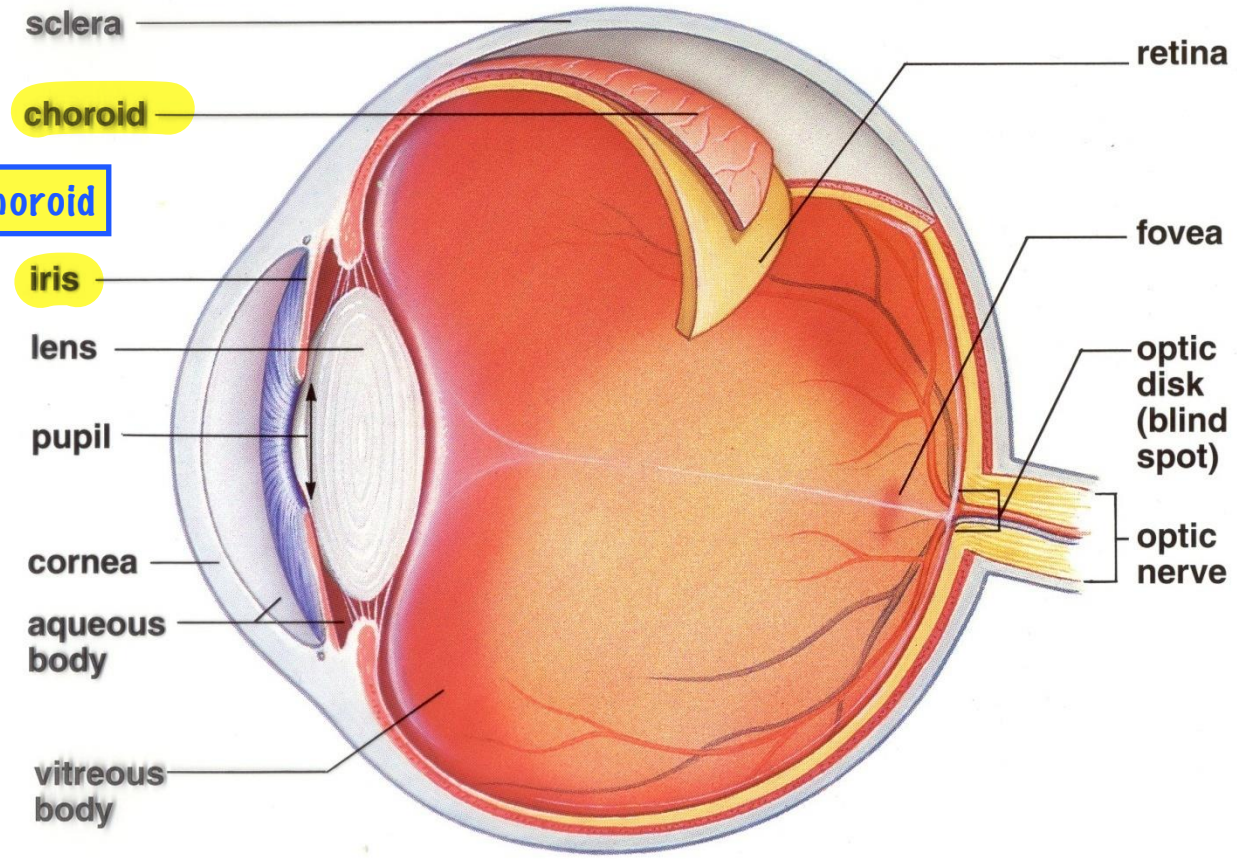




Middle layer of the eye:

The middle layer of the eyeball,

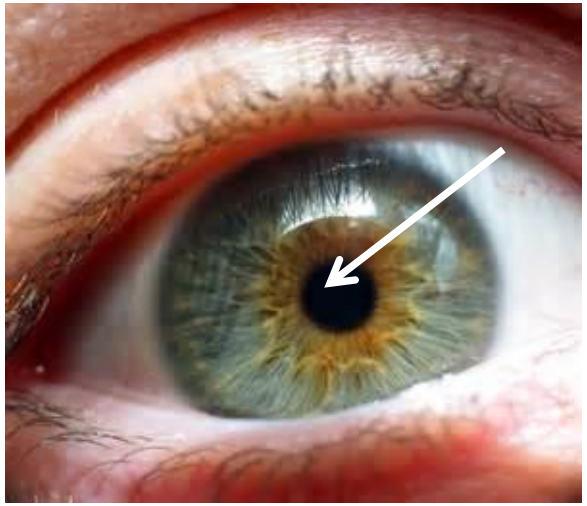
1. Iris
2. Ciliary body ← Continuous with choroid
3. Choroid



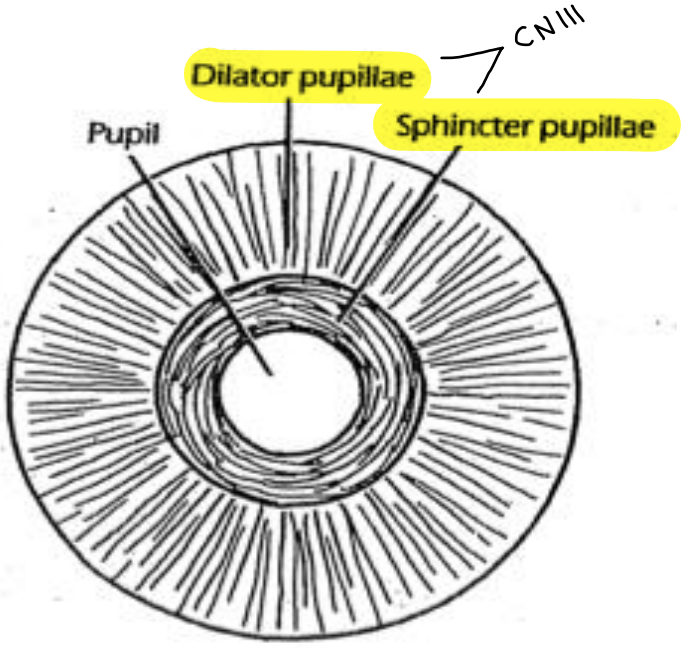
Middle layer of the eye:

IRIS *(colored part)*

- **colored** part of eye
- controls light entering the eye

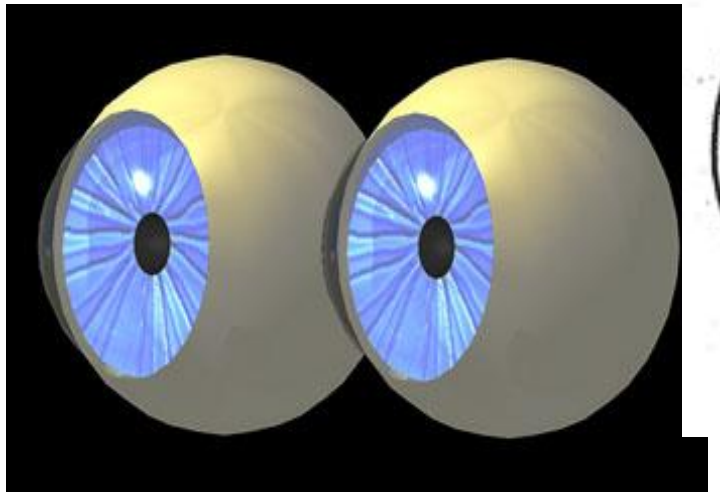


Pupil size is controlled by iris muscles



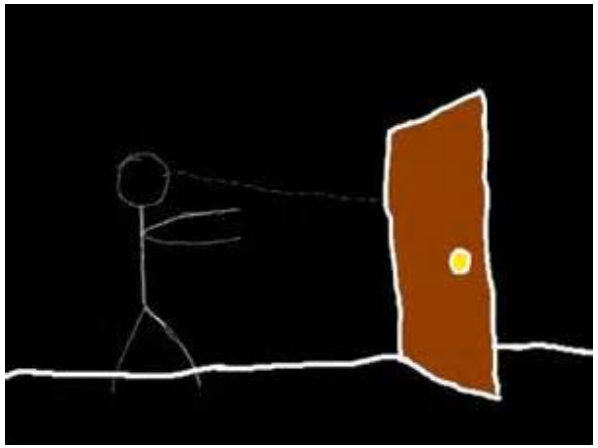
PUPIL *(black hole)*

- black **hole** in iris
- where light enters



THE EYE: PUPIL

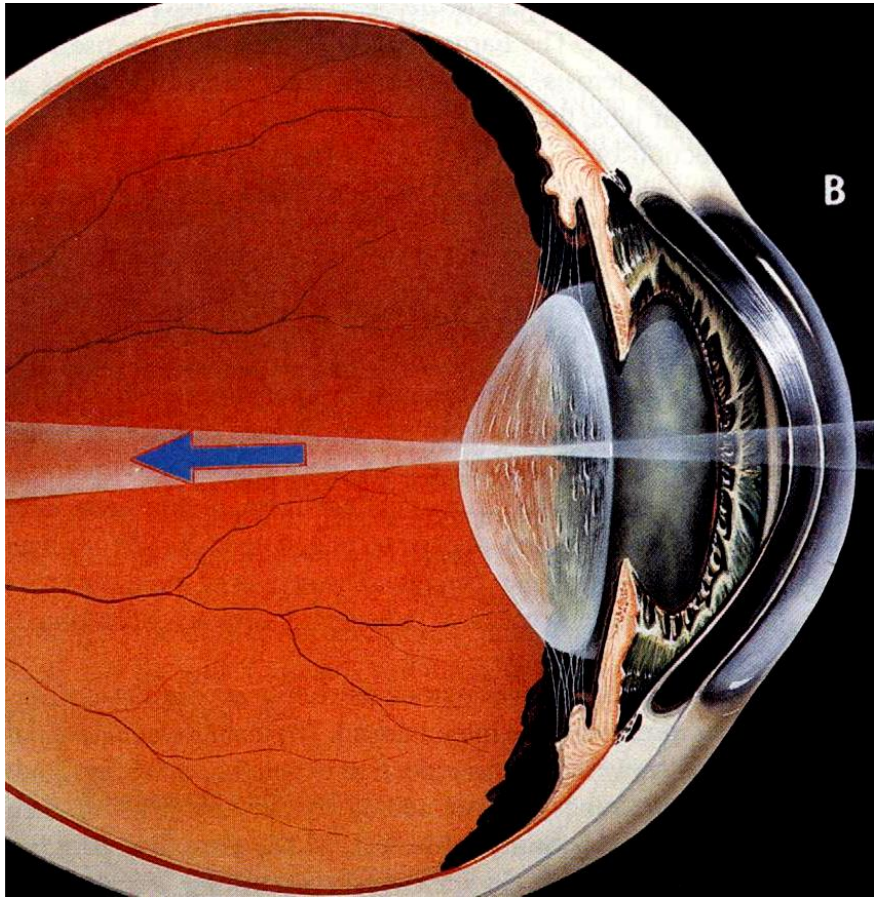
the pupils get larger in dark places allowing more light to enter the eye



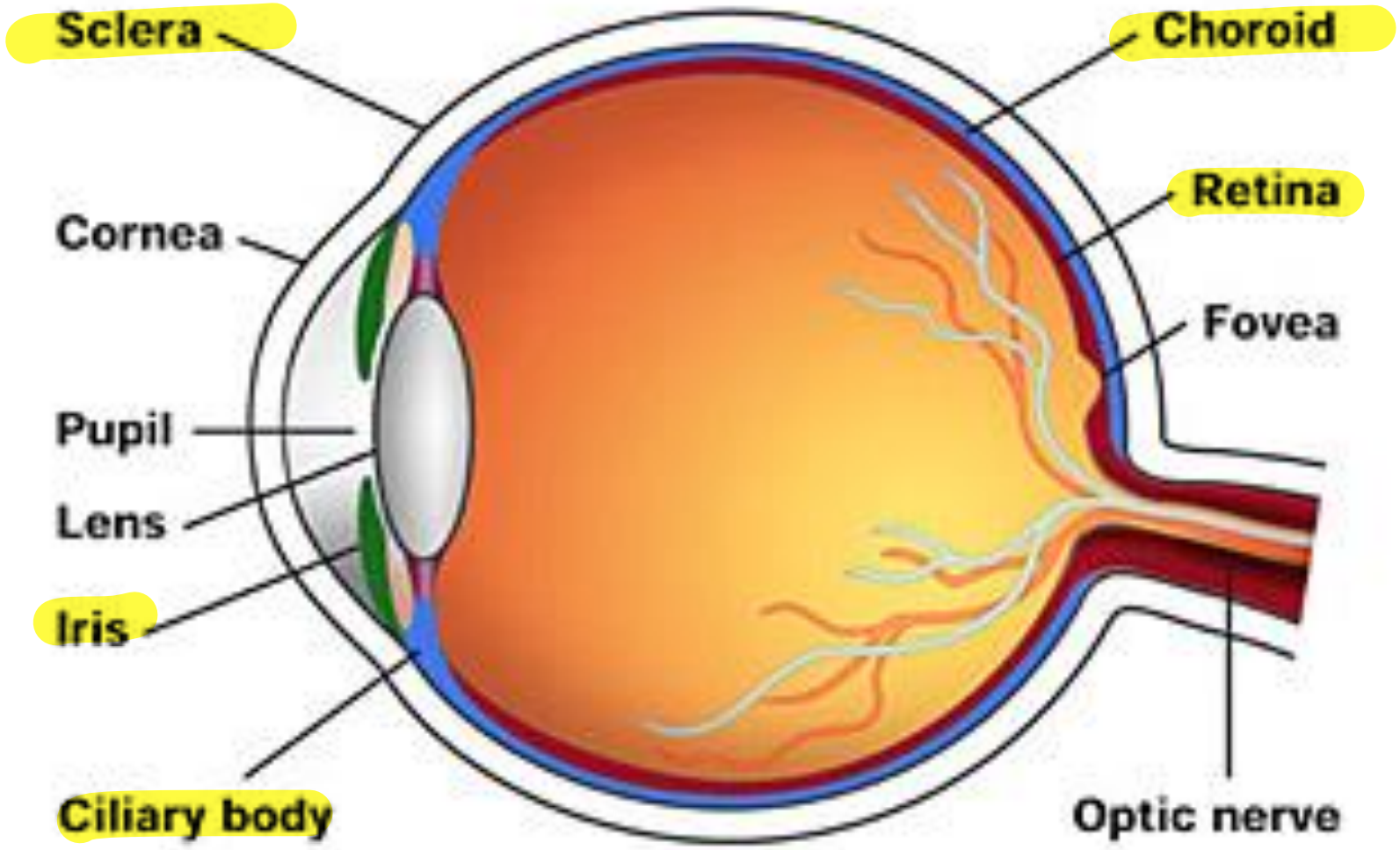
the pupils get smaller in light places allowing less light to enter the eye

Lens

- **Lies behind pupil**
- The crystalline lens is the only structure continuously growing throughout the life.
- Changeable refractive media.
- Allows us to see objects near and far

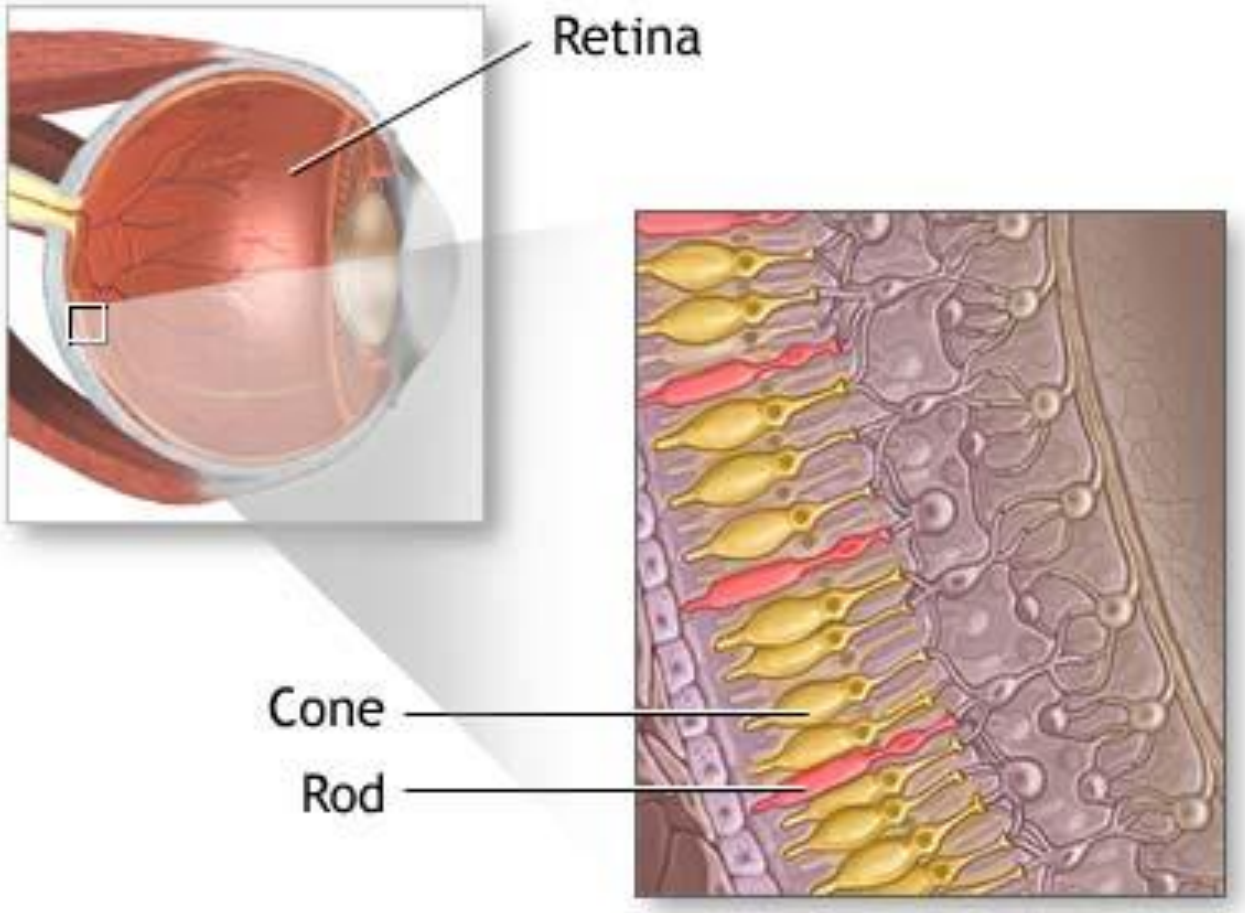


OSPE : Identify ?



Inner layer of the eye:

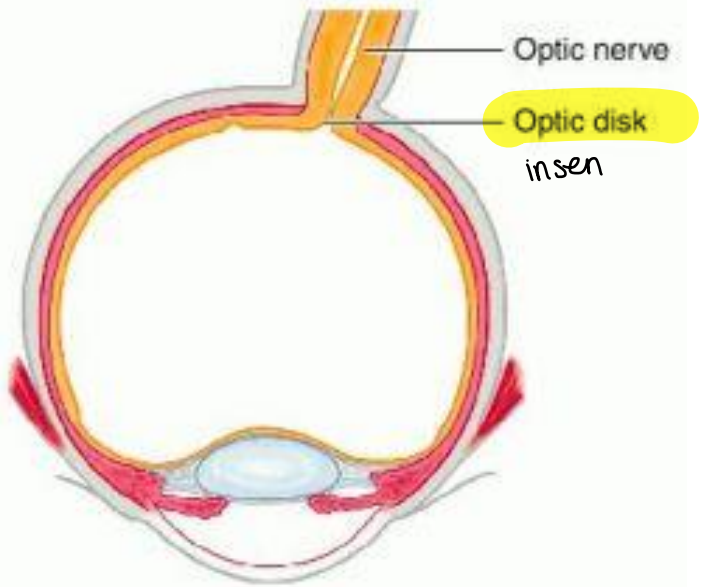
- The innermost layer of the eye is the **retina**, which is full of photoreceptive cells called **rods and cones**.
- The **rods** are sensitive to **dim light** and are used for **night vision.**
- The **cones** are sensitive to **bright light** and used for **color vision**.

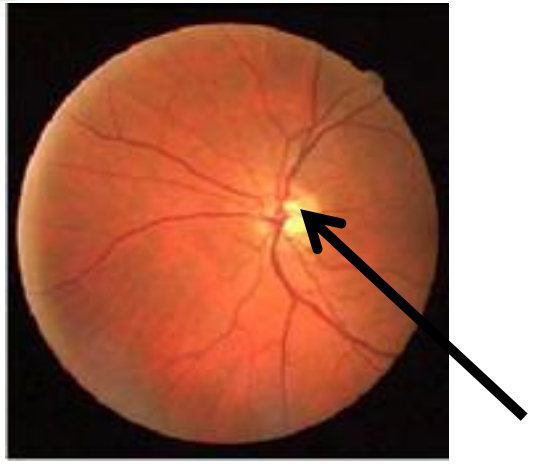


MCQ : Which cells are responsible for color vision? Cons

Inner layer of the eye:

Nerve fibers from the retina all converge to form the **optic nerve** at a spot on the inner layer known as the optic disc. The optic nerve goes directly to the vision center of the brain. There are no rods or cones in the area of the optic disk, so it is insensitive to light and a **blind spot** is created.



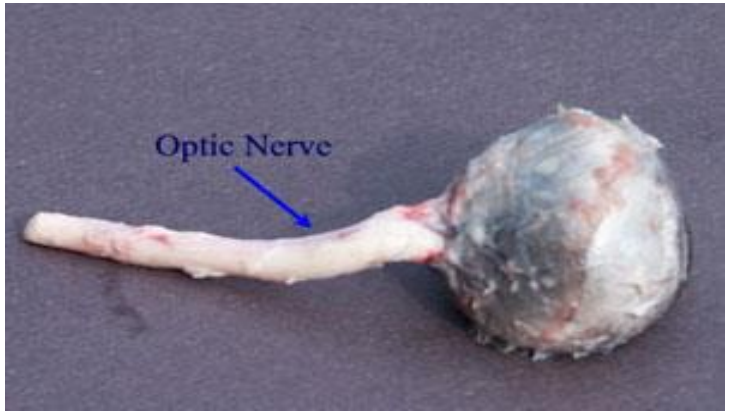


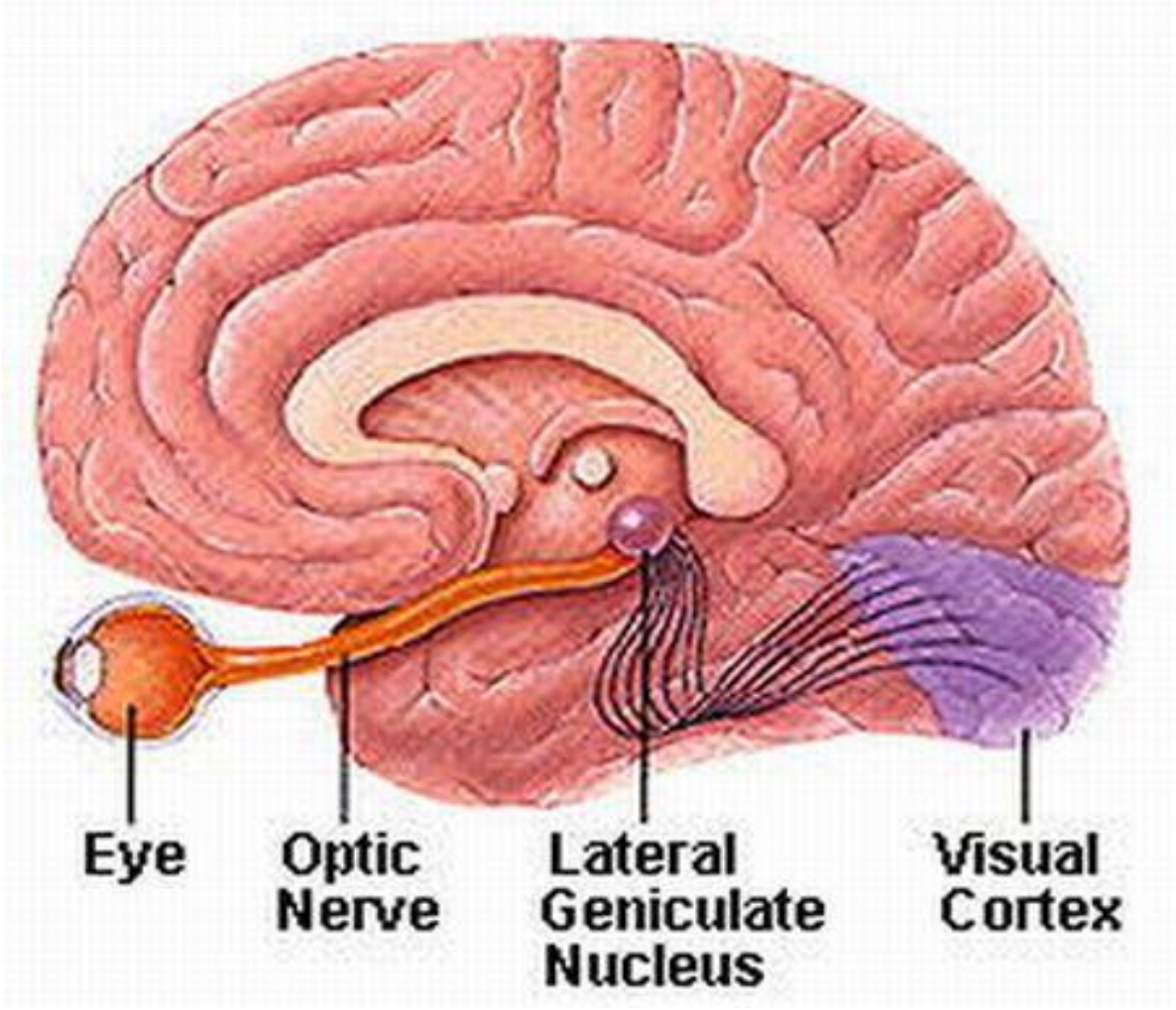
MCQ : Blind spot corresponde to : optic disc

Optic Nerve

OPTIC NERVE

- Transmits electrical impulses from retina to the brain
- Brain takes inverted image and flips it so we can see





Quiz

1. Lateral squint and ptosis of left eye is caused by lesion of which cranial nerve?

A. Left 3rd
B. Left 6th
C. Right 3rd
D. Right 6th
E. Left 4th

Answer: A

تعديل : الإجابة B

Quiz

2. Medial squint of left eye is caused by lesion of which cranial nerve?

A. Left 3rd
B. Left 6th
C. Right 3rd
D. Right 6th
E. Left 4th

Answer: B

References for further readings

- Oxford Handbook of Clinical Medicine (3rd edition).
- Gray's anatomy for students
- The Clinical Practice Of Neurological and Neurosurgical Nursing Fourth Edition.


الحمد لله
Thank You
Thank You