

The Orbital Region

Preparation:- Dr. Adnan H. M.

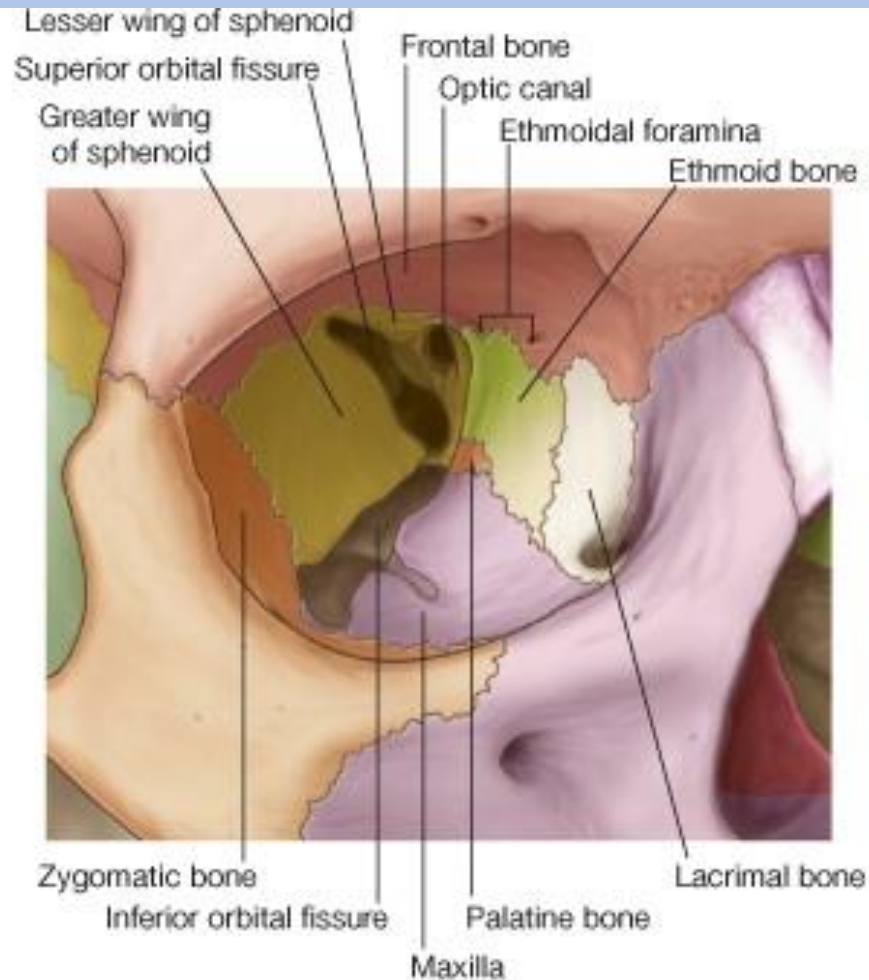
Presentation:- Dr. *Anas Alhamed & tayf M. A.*

College of Medicine.

University of Anbar.

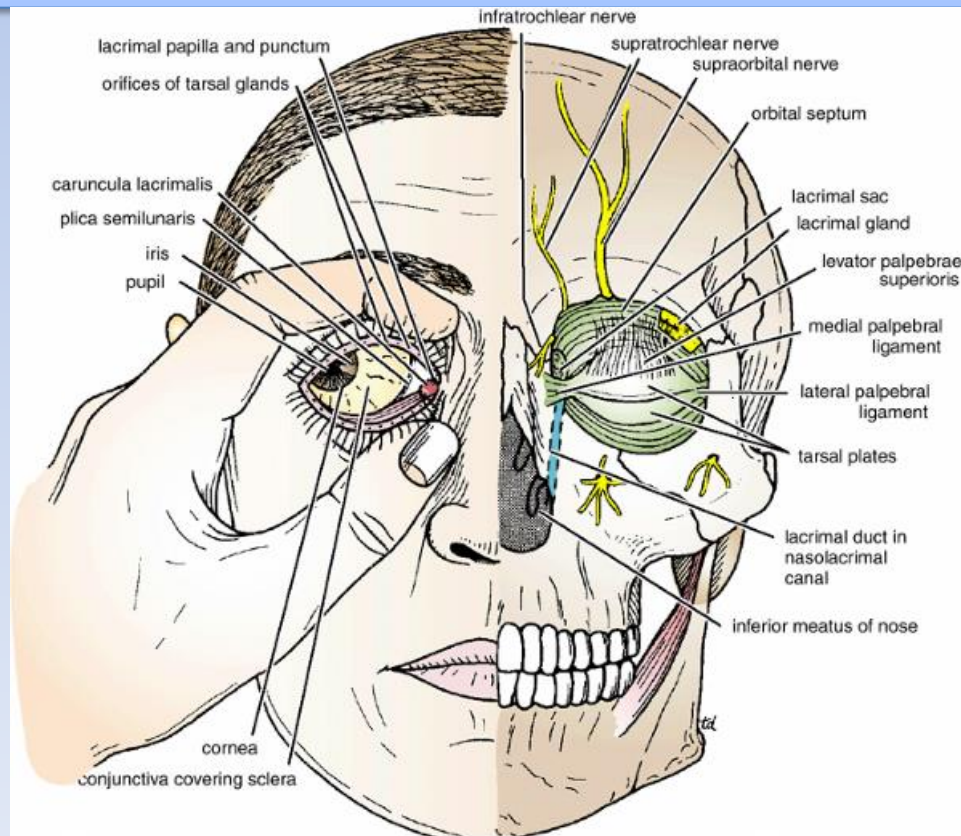
The Orbital Region

- The orbits are a pair of bony cavities that contain the eyeballs; their associated muscles, nerves, vessels, and fat; and most of the lacrimal apparatus.
- The orbital opening is guarded by two thin, movable folds, the **eyelids**.



Eyelids

- The **eyelids protect the eye** from injury and excessive light by their closure.
- The upper eyelid is larger and more mobile than the lower, and they meet each other at the **medial** and **lateral angles**.
- The **palpebral fissure** is the elliptical opening between the eyelids and is the entrance into the **conjunctival sac**.
- The superficial surface of the eyelids is covered by skin, and the deep surface is covered by a mucous membrane, called the **conjunctiva**.

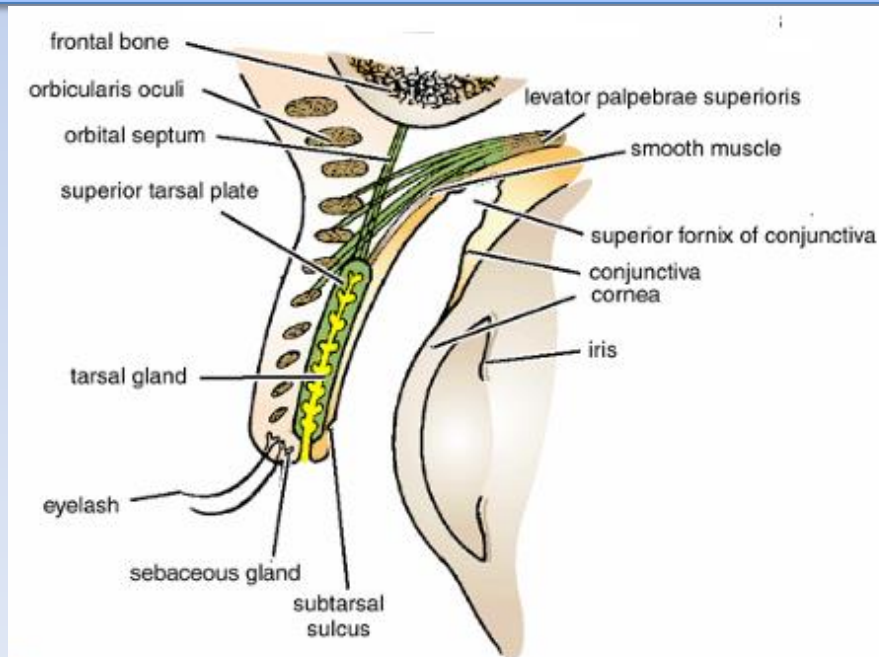


Eyelashes

- 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.

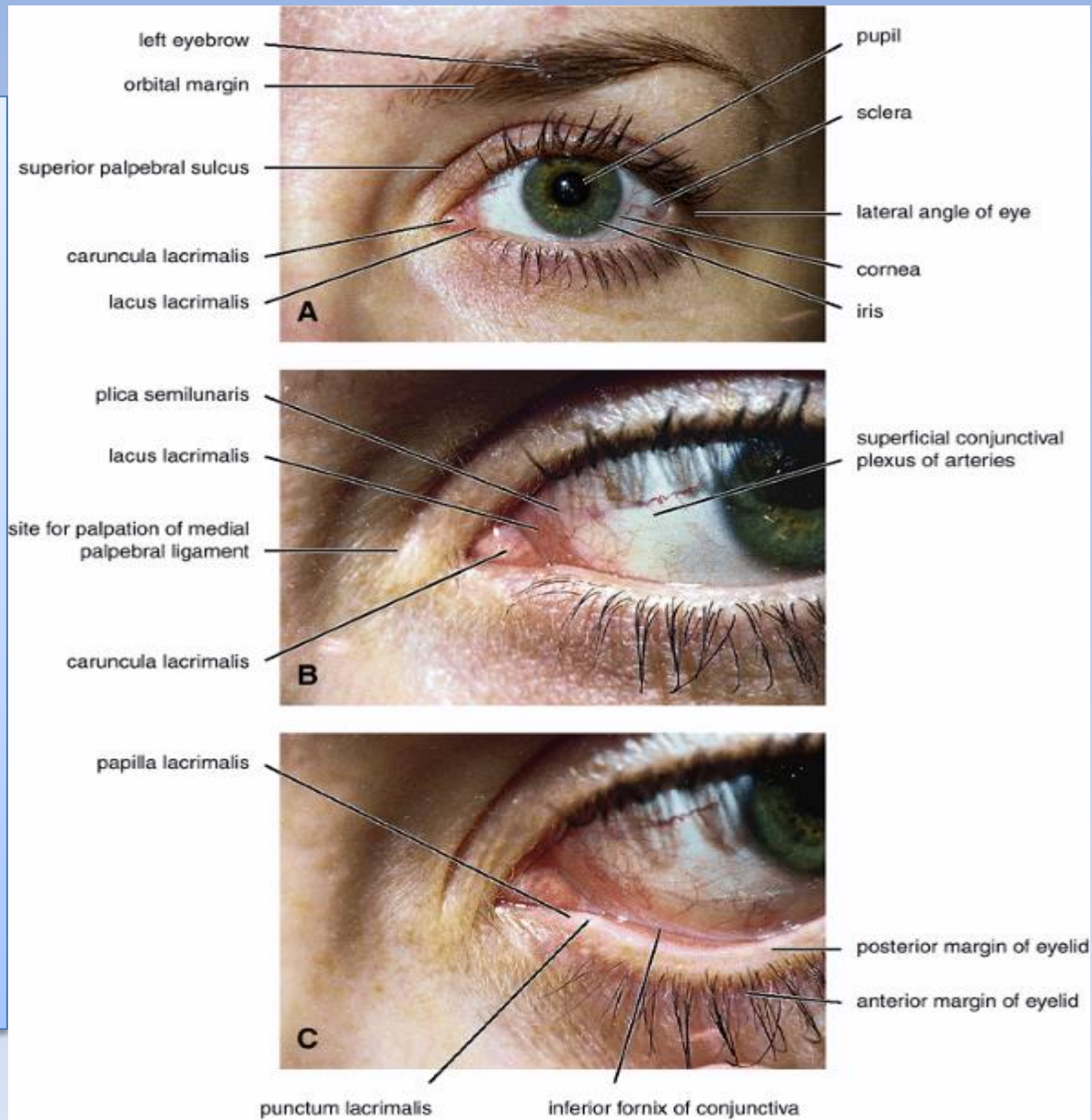
Gland of the Eyelids

- 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.
- **This oily material prevents** the overflow of tears and helps make the closed eyelids airtight.



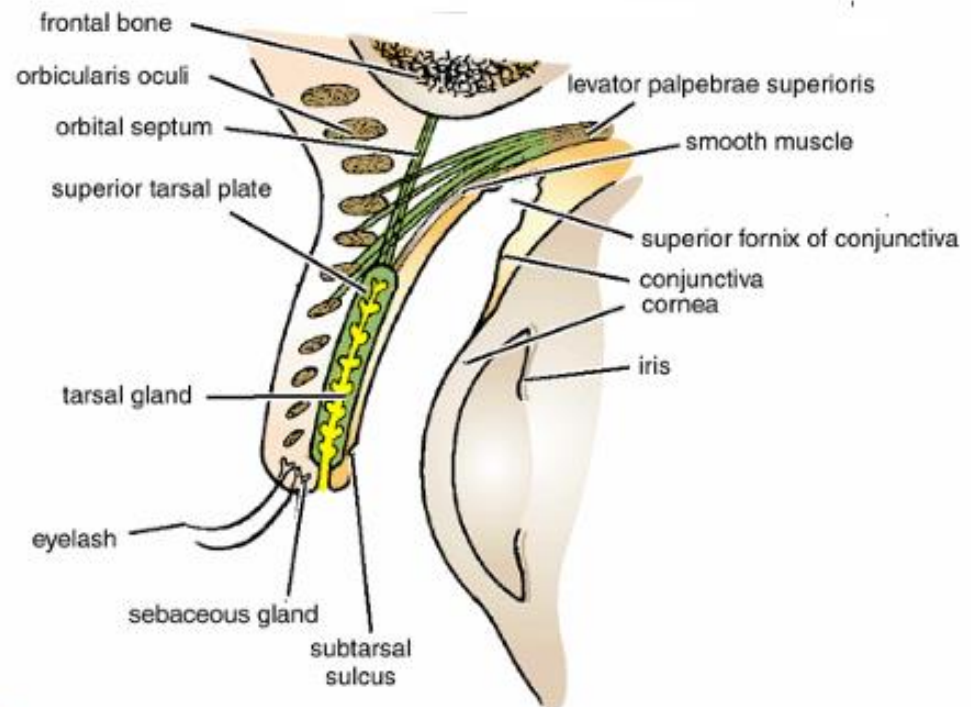
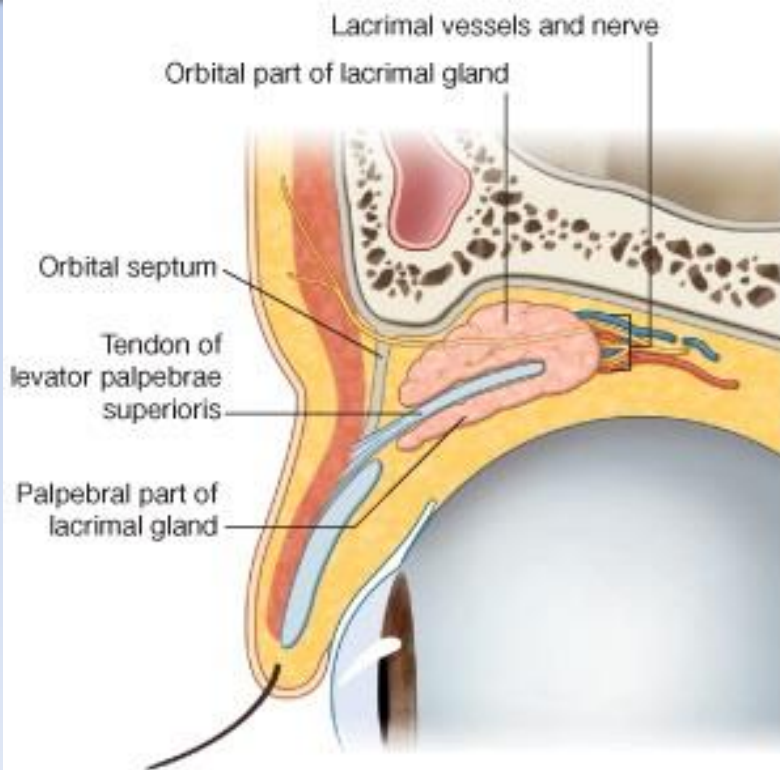
Medial Angle of the Eye

- The medial angle is separated from the eyeball by a small space, the **lacus lacrimalis**, in the center of which is a small, reddish yellow elevation, the **caruncula lacrimalis**.
- A reddish semilunar fold, called the **plica semilunaris**, lies on the lateral side of the caruncle.
- 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 lacrimale**.



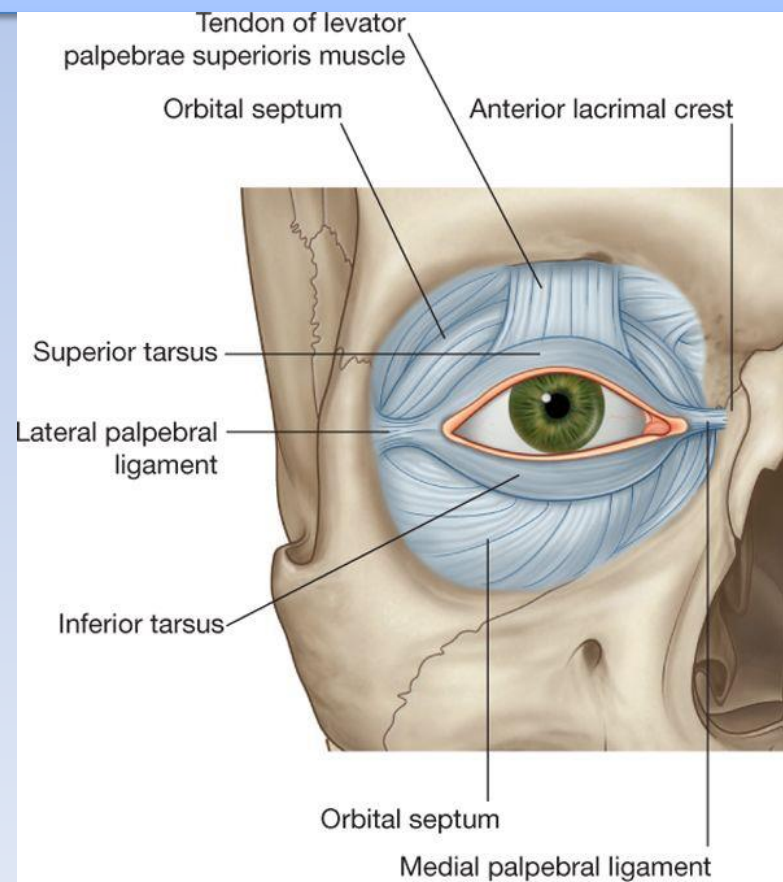
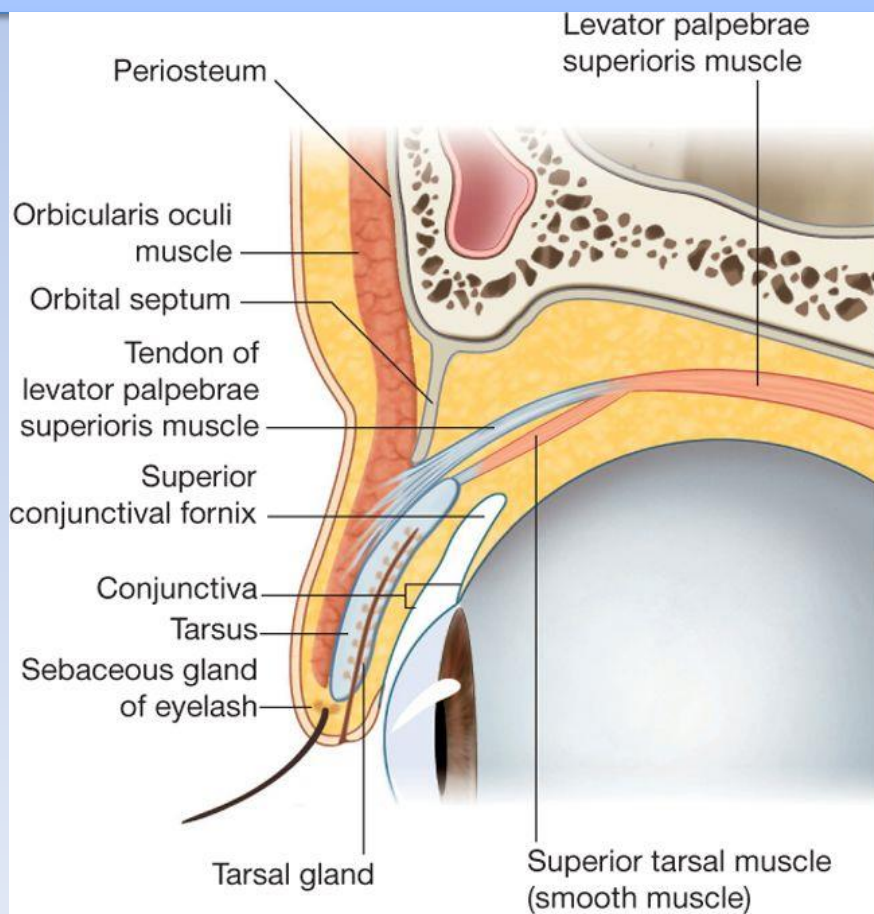
conjunctiva

- The **conjunctiva** is a thin mucous membrane that lines the eyelids and is reflected at the superior and inferior fornixes onto the anterior surface of the eyeball.
- Its epithelium is continuous with that of the cornea.
- The upper lateral part of the **superior fornix is pierced by the ducts of the lacrimal gland.**
- The conjunctiva thus forms a potential space, the **conjunctival sac**, which is open at the palpebral fissure.
- 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.



framework of the eyelids

- It 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 lateral ends of the plates are attached by a band, the **lateral palpebral ligament**, to a bony tubercle just within the orbital margin.
- The medial ends of the plates are attached by a band, the **medial palpebral ligament**, to the crest of the lacrimal bone. The tarsal glands are embedded in the posterior surface of the tarsal plates.

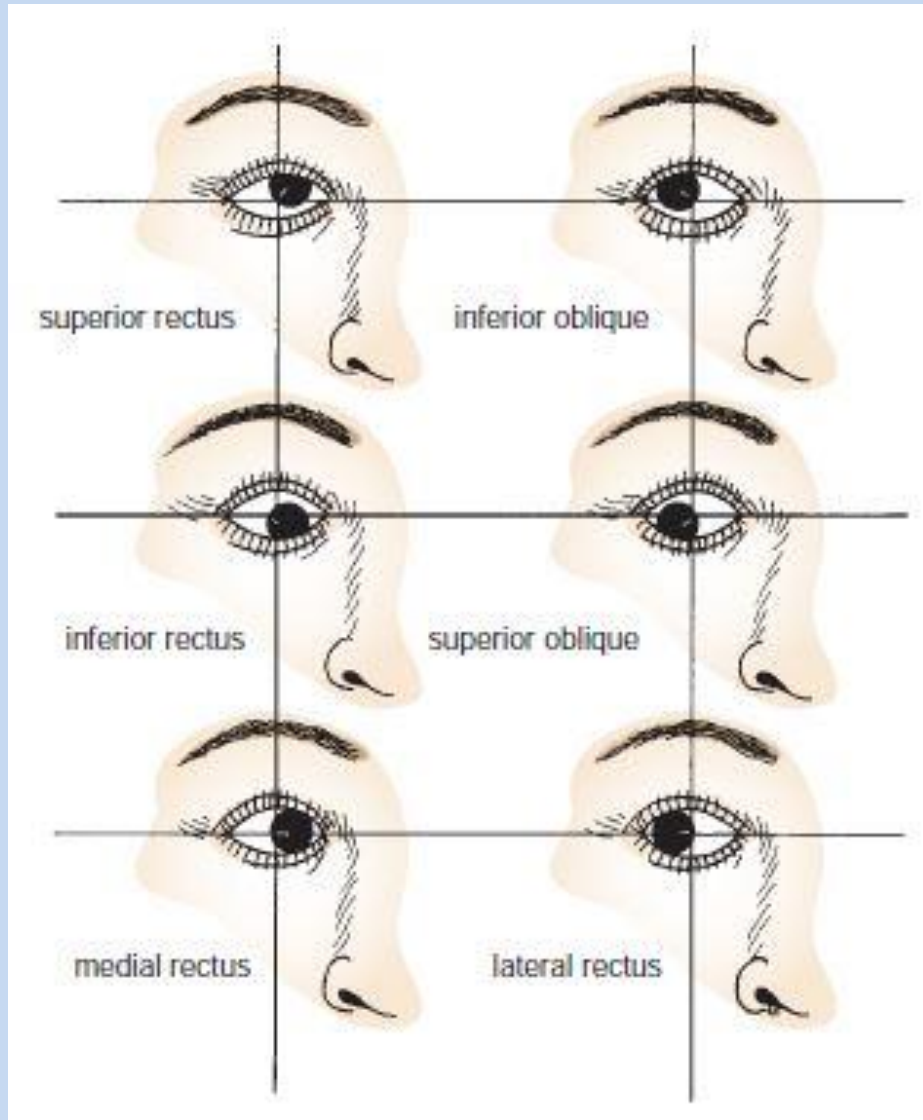


Muscles of the Eye and Eyelid

Muscle	Origin	Insertion	Nerve Supply	Action
Extrinsic Muscles of Eyeball (Striated Skeletal Muscle)				
Superior rectus	Tendinous ring on posterior wall of orbital cavity	Superior surface of eyeball just posterior to corneoscleral junction	Oculomotor nerve (third cranial nerve)	Raises cornea upward and medially
Inferior rectus	Tendinous ring on posterior wall of orbital cavity	Inferior surface of eyeball just posterior to corneoscleral junction	Oculomotor nerve (third cranial nerve)	Depresses cornea downward and medially
Medial rectus	Tendinous ring on posterior wall of orbital cavity	Medial surface of eyeball just posterior to corneoscleral junction	Oculomotor nerve (third cranial nerve)	Rotates eyeball so that cornea looks medially
Lateral rectus	Tendinous ring on posterior wall of orbital cavity	Lateral surface of eyeball just posterior to corneoscleral junction	Abducent nerve (sixth cranial nerve)	Rotates eyeball so that cornea looks laterally
Superior oblique	Posterior wall of orbital cavity	Passes through pulley and is attached to superior surface of eyeball beneath superior rectus	Trochlear nerve (fourth cranial nerve)	Rotates eyeball so that cornea looks downward and laterally
Inferior oblique	Floor of orbital cavity	Lateral surface of eyeball deep to lateral rectus	Oculomotor nerve (third cranial nerve)	Rotates eyeball so that cornea looks upward and laterally

Muscles of the Eye and Eyelid

Muscle	Origin	Insertion	Nerve Supply	Action
Intrinsic Muscles of Eyeball				
Sphincter pupillae of iris			Parasympathetic via oculomotor nerve	Constricts pupil
Dilator pupillae of iris			Sympathetic	Dilates pupil
Ciliary muscle			Parasympathetic via oculomotor nerve	Controls shape of lens; in accommodation, makes lens more globular
Muscles of Eyelids				
Orbicularis oculi				
Levator palpebrae superioris	Back of orbital cavity	Anterior surface and upper margin of superior tarsal plate	Striated muscle oculomotor nerve, smooth muscle sympathetic	Raises upper lid



Muscles of the Eye

Extrinsic Muscles of Eyeball (Skeletal Muscle):

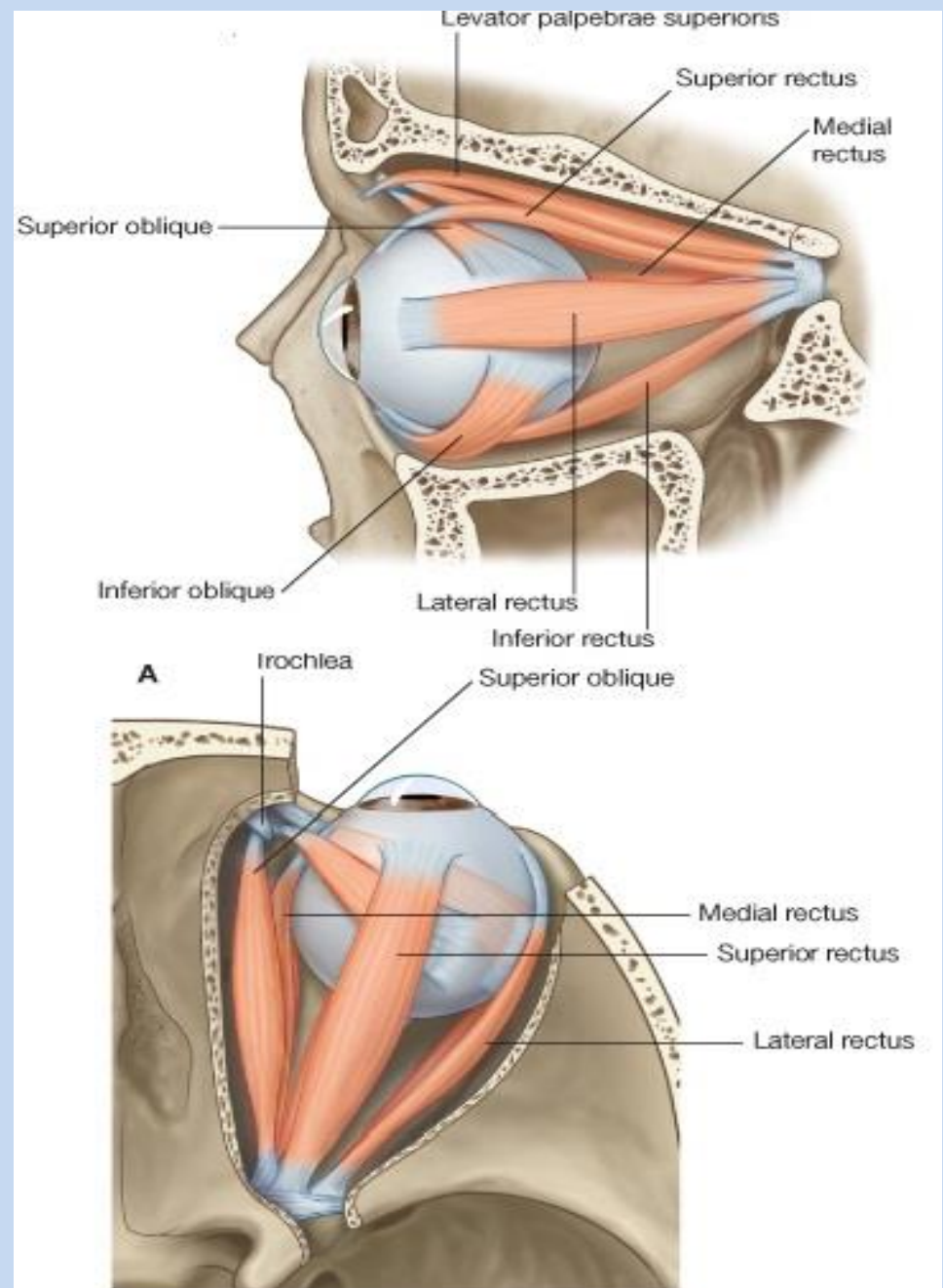
- Superior rectus.
- Inferior rectus.
- Medial rectus.
- Lateral rectus.
- Superior oblique.
- Inferior oblique.

Intrinsic Muscles of Eyeball (Smooth Muscle):

- Sphincter pupillae of iris.
- Dilator pupillae of iris.
- Ciliary muscle.

Muscles of Eyelids:

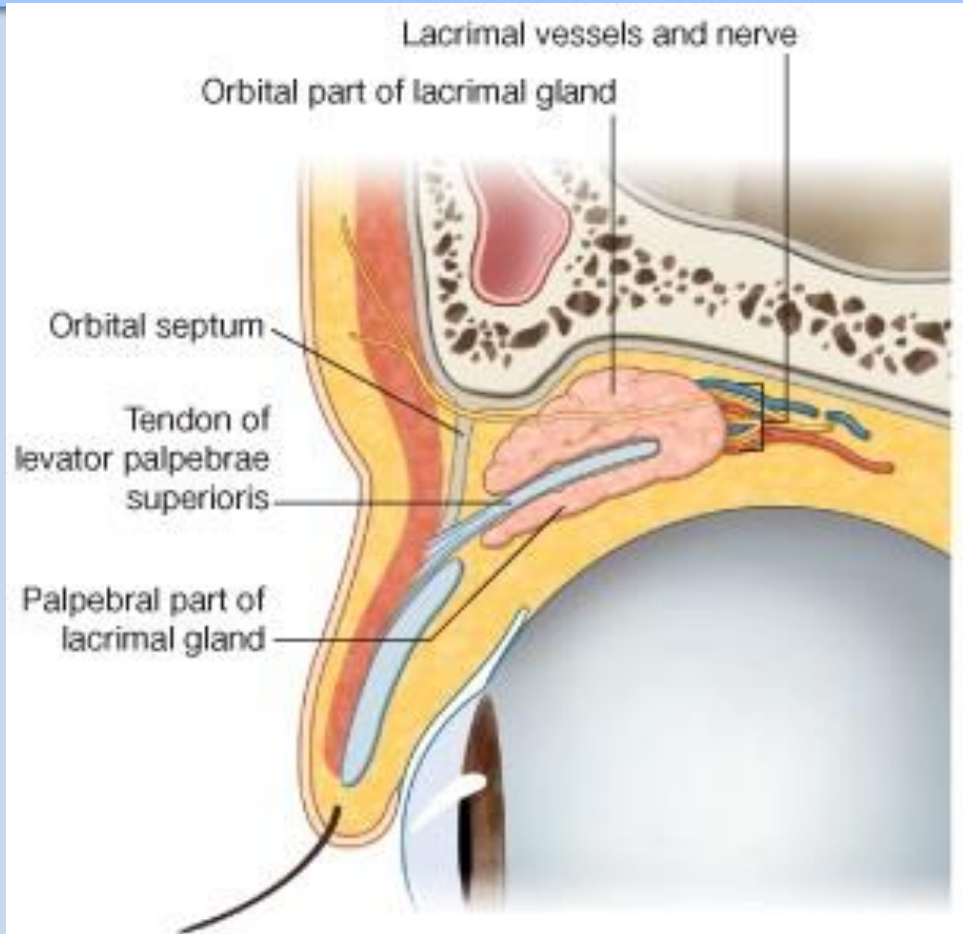
- Orbicularis oculi .
- Levator palpebrae superioris.



Lacrimal Apparatus

Lacrimal Gland

- The **Lacrimal Gland** consists of a large **orbital part** and a small **palpebral part**, which are continuous with each other around the lateral edge of the aponeurosis of the levator palpebrae superioris.
- 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**.



Innervation of Lacrimal Gland

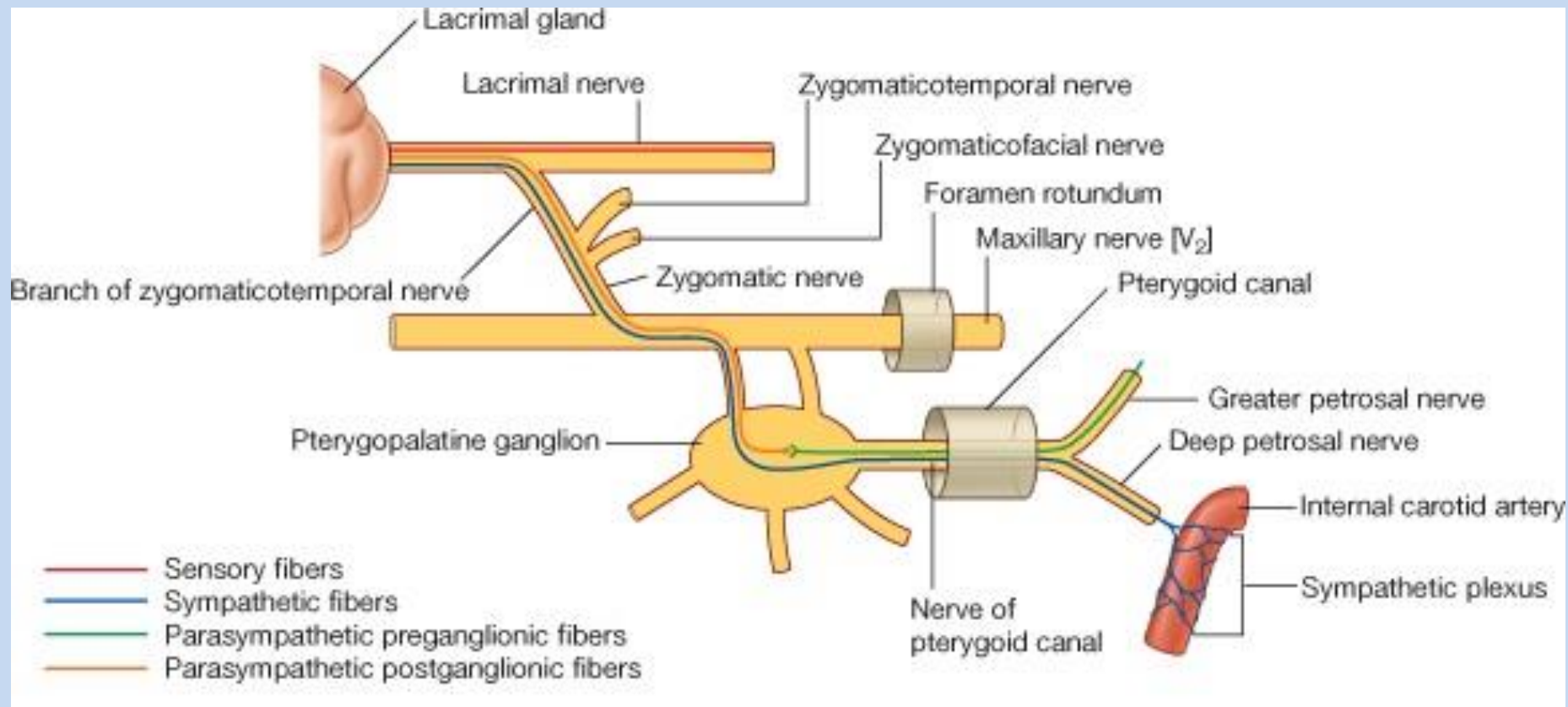
parasympathetic nerve

- The **parasympathetic secretomotor nerve** supply is derived from the lacrimal nucleus of the facial nerve.
- The preganglionic fibers reach the pterygopalatine ganglion (sphenopalatine ganglion) via great petrosal branch of the facial nerve and via the nerve of the pterygoid canal.
- The postganglionic fibers leave the ganglion and join the maxillary nerve. They then pass into its zygomatic branch and the zygomaticotemporal nerve.
- They reach the lacrimal gland within the lacrimal nerve.

sympathetic postganglionic nerve

- The **sympathetic postganglionic nerve** supply is from the internal carotid plexus and travels in the deep petrosal nerve, the nerve of the pterygoid canal, the maxillary nerve, the zygomatic nerve, the zygomaticotemporal nerve, and finally the lacrimal nerve

Innervation of Lacrimal Gland

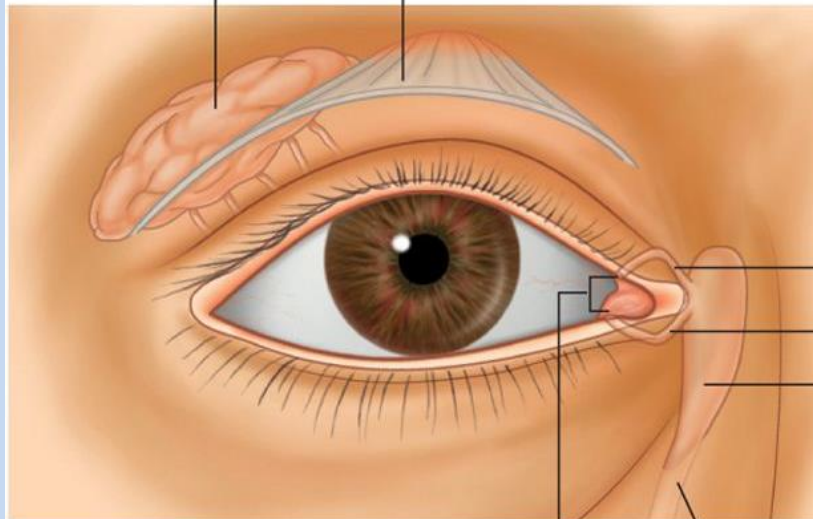


Lacrimal Ducts

- The tears circulate across the cornea and accumulate in the **lacus lacrimalis**. From here, the tears enter the **canaliculi lacrimales** through the **puncta lacrimales**.
- The canaliculi lacrimales pass medially and open into the **lacrimal sac**, which lies in the lacrimal groove behind the medial palpebral ligament and is the upper blind end of the nasolacrimal duct.
- The **nasolacrimal duct** is about 1.3 cm long and emerges from the lower end of the lacrimal sac.
- The duct descends downward, backward, and laterally in a bony canal and opens into the inferior meatus of the nose.
- The opening is guarded by a fold of mucous membrane known as the **lacrimal fold**. This prevents air from being forced up the duct into the lacrimal sac on blowing the nose.

Tendon of levator palpebrae superioris muscle

Lacrimal gland



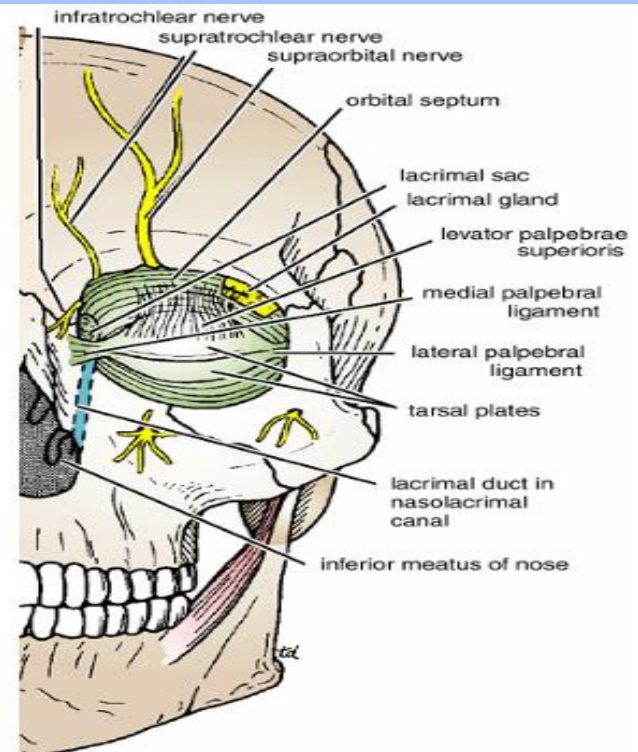
Medial

Lacrimal
canaliculi

Lacrimal
sac

Puncta

Nasolacrimal duct



infratrochlear nerve

supratrochlear nerve

supraorbital nerve

orbital septum

lacrimal sac

lacrimal gland

levator palpebrae
superioris

medial palpebral
ligament

lateral palpebral
ligament

tarsal plates

lacrimal duct in
nasolacrimal
canal

inferior meatus of nose

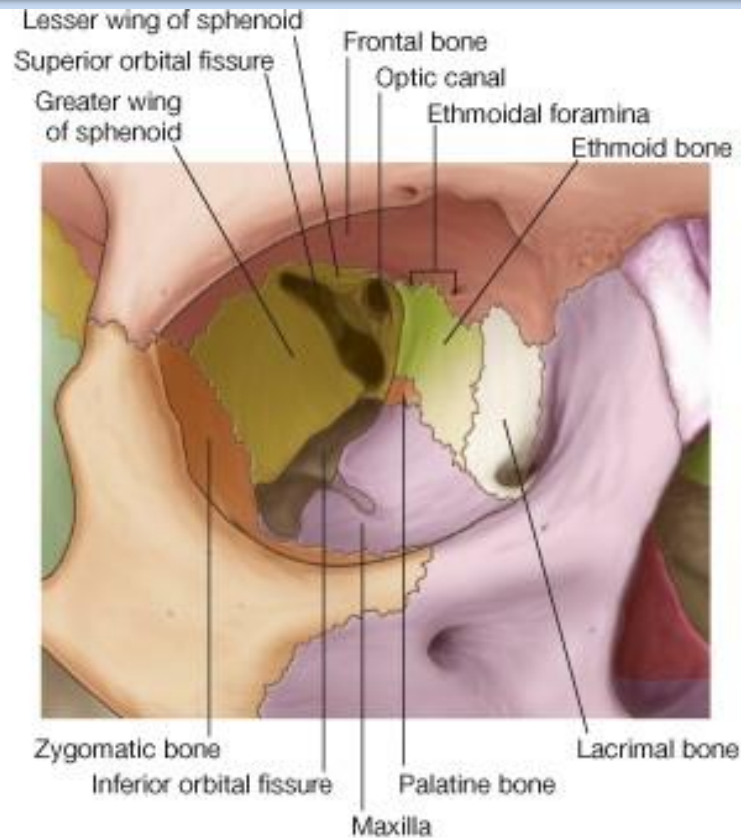
The Orbit

The Orbit

- The orbit is a pyramidal cavity with its base in front and its apex behind.

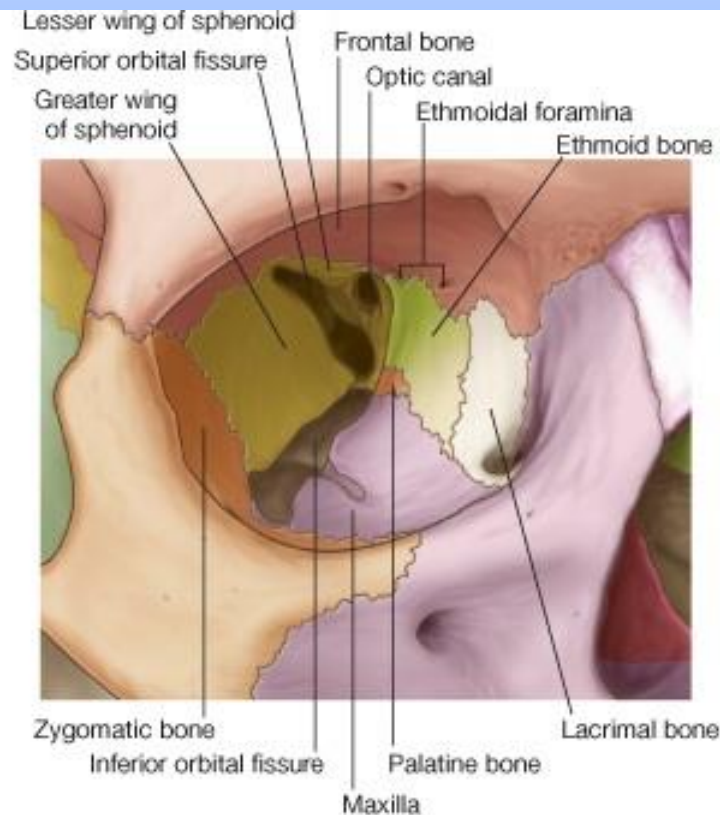
The orbital margin

- It is formed above by the frontal bone.
- The lateral margin is formed by the processes of the frontal and zygomatic bones.
- The inferior margin is formed by the zygomatic bone and the maxilla.
- the medial margin is formed by the processes of the maxilla and the frontal bone.



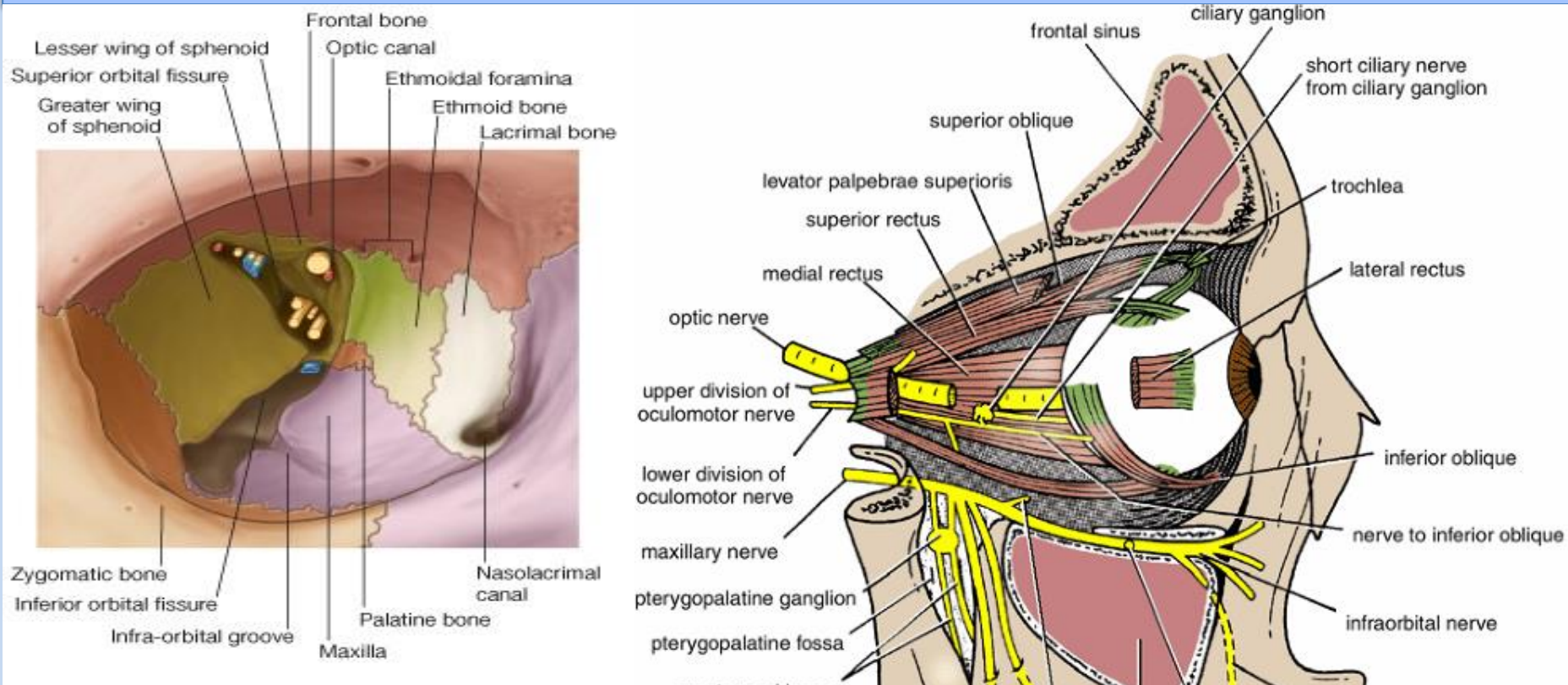
The orbital walls

- **Roof:** Formed by the orbital plate of the frontal bone, which separates the orbital cavity from the anterior cranial fossa and the frontal lobe of the cerebral hemisphere
- **Lateral wall:** Formed by the zygomatic bone and the greater wing of the sphenoid.
- **Floor:** Formed by the orbital plate of the maxilla, which separates the orbital cavity from the maxillary sinus
- **Medial wall:** Formed from before backward by the frontal process of the maxilla, the lacrimal bone, the orbital plate of the ethmoid (which separates the orbital cavity from the ethmoid sinuses), and the body of the sphenoid

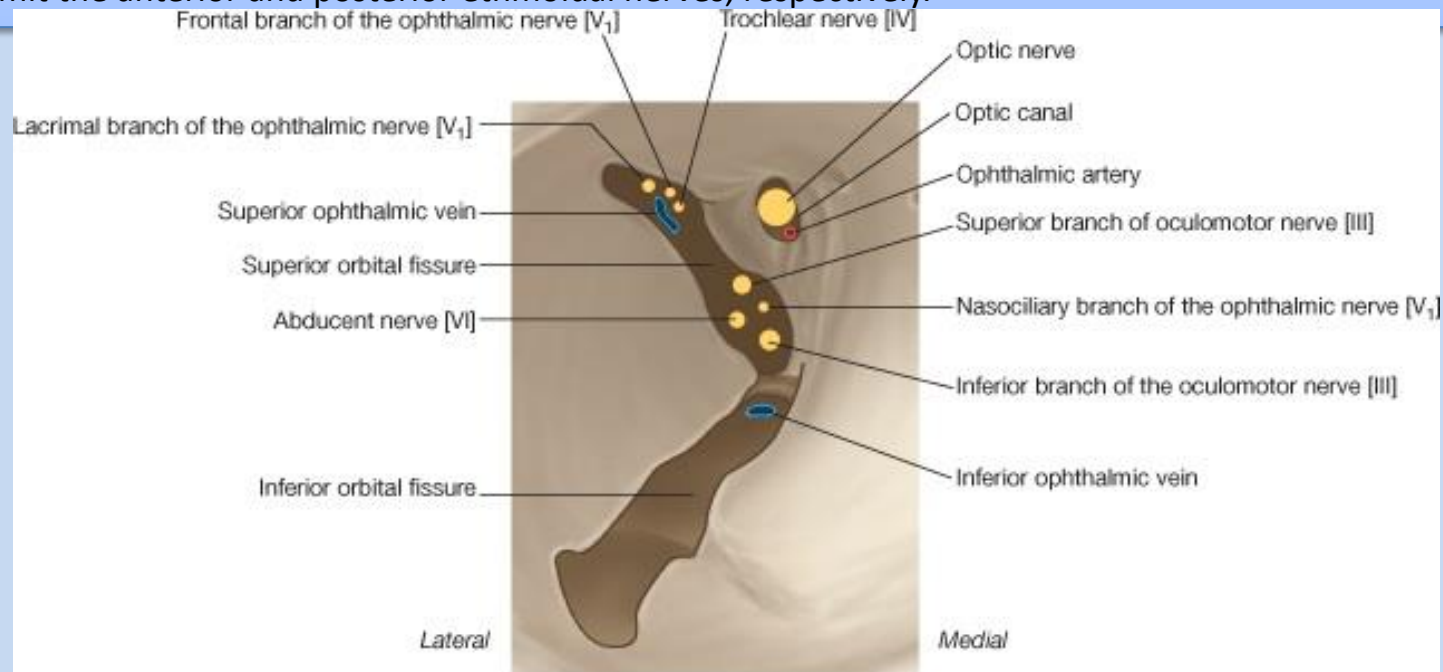


Openings Into the Orbital Cavity

- **Orbital opening:** Lies anteriorly, about one-sixth of the eye is exposed; the remainder is protected by the walls of the orbit.
- **Supraorbital notch (Foramen):** The supraorbital notch is situated on the superior orbital margin. It transmits the supraorbital nerve and blood vessels.
- **Infraorbital groove and canal:** Situated on the floor of the orbit in the orbital plate of the maxilla; they transmit the infraorbital nerve (a continuation of the maxillary 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.



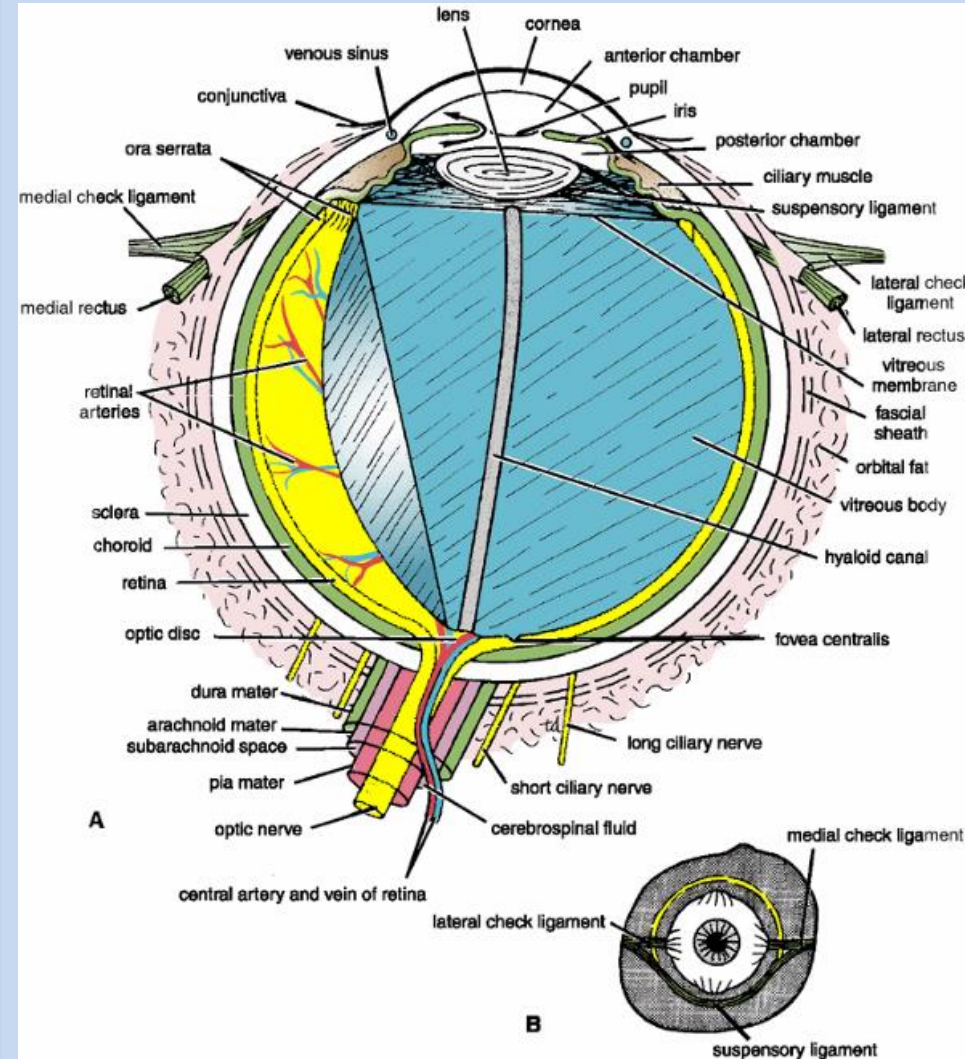
- **Inferior orbital fissure:** Located posteriorly between the maxilla and the greater wing of the sphenoid; it communicates with the pterygopalatine fossa. It transmits the maxillary nerve and its zygomatic branch, the inferior ophthalmic vein, and sympathetic nerves.
- **Superior orbital fissure:** Located posteriorly between the greater and lesser wings of the sphenoid; it communicates with the middle cranial fossa. It transmits the lacrimal nerve, the frontal nerve, the trochlear nerve, the oculomotor nerve (upper and lower divisions), the abducent nerve, the nasociliary nerve, and the superior ophthalmic vein.
- **Optic canal:** Located posteriorly in the lesser wing of the sphenoid; it communicates with the middle cranial fossa. It transmits the optic nerve and the ophthalmic artery.
- The **zygomaticotemporal** and the **zygomaticuofacial foramina** are two small openings in the lateral wall that transmit the zygomaticotemporal and zygomaticuofacial nerves, respectively. These nerves are sensory to the skin of the face.
- The **anterior** and **posterior ethmoidal foramina** are located on the medial wall in the ethmoidal bone. They transmit the anterior and posterior ethmoidal nerves, respectively.



Nerves of the Orbit

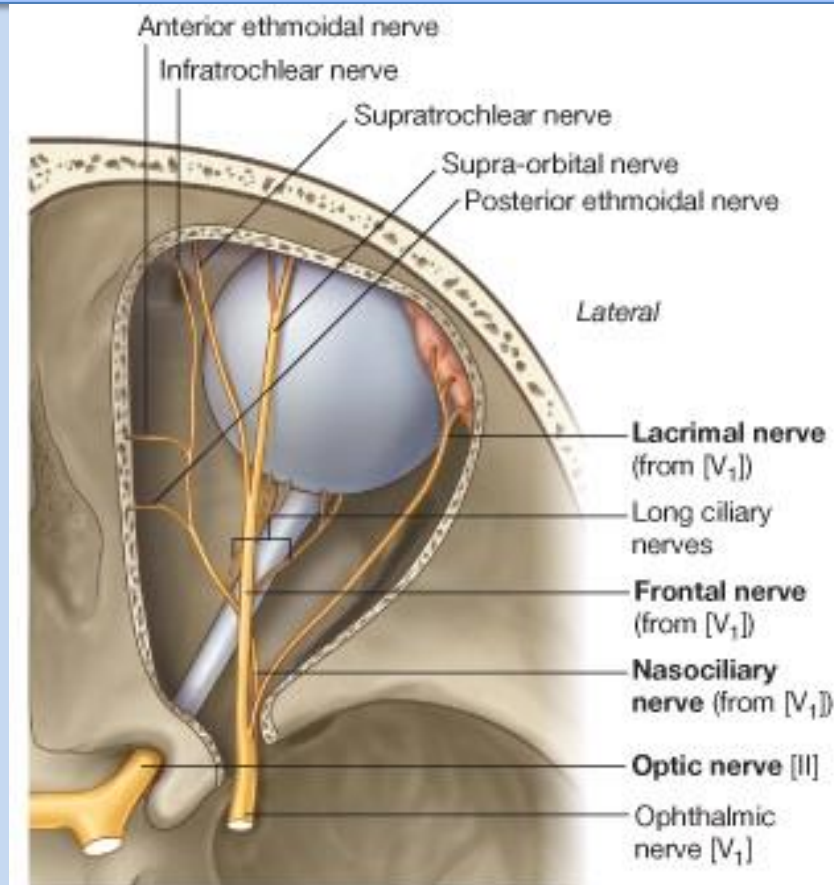
Optic Nerve

- The optic nerve enters the orbit from the middle cranial fossa by passing through the optic canal.
- It is accompanied by the ophthalmic artery. The nerve is surrounded by sheaths of pia mater, arachnoid mater, and dura mater.
- It runs forward and laterally within the cone of the recti muscles and pierces the sclera at a point medial to the posterior pole of the eyeball.
- Here, the meninges fuse with the sclera so that the subarachnoid space with its contained cerebrospinal fluid extends forward from the middle cranial fossa, around the optic nerve, and through the optic canal, as far as the eyeball.
- A rise in pressure of the cerebrospinal fluid within the cranial cavity is transmitted to the back of the eyeball.



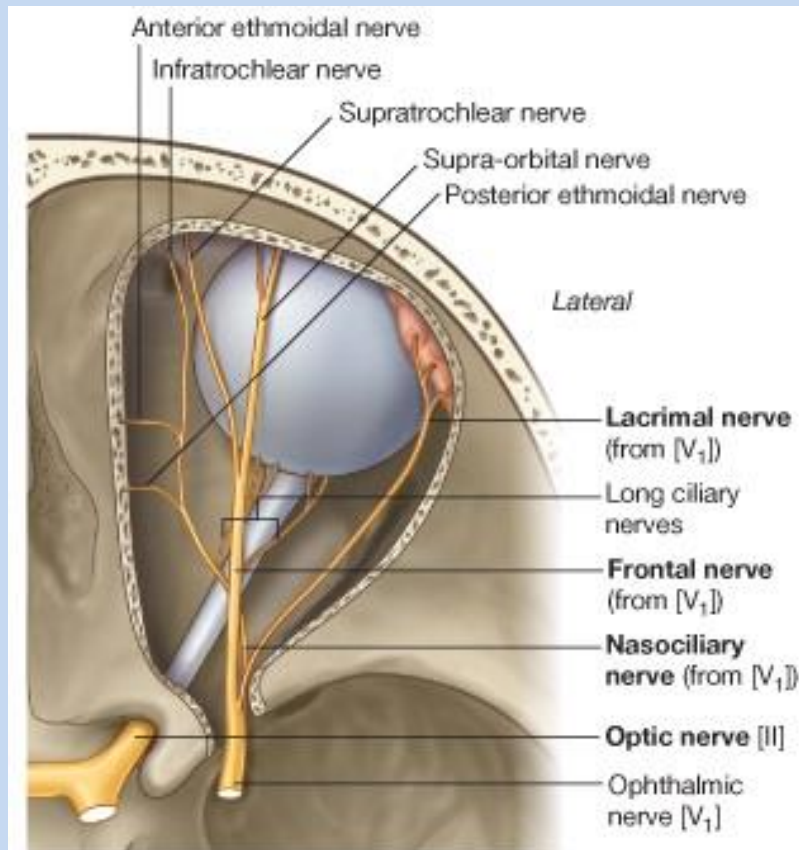
Lacrimal Nerve

- The lacrimal nerve arises from the ophthalmic division of the trigeminal nerve.
- It enters the orbit through the upper part of the superior orbital fissure and passes forward along the upper border of the lateral rectus muscle.
- It is joined by a branch of the zygomaticotemporal nerve, which later leaves it to enter the lacrimal gland (parasympathetic secretomotor fibers).
- The lacrimal nerve ends by supplying the skin of the lateral part of the upper lid.



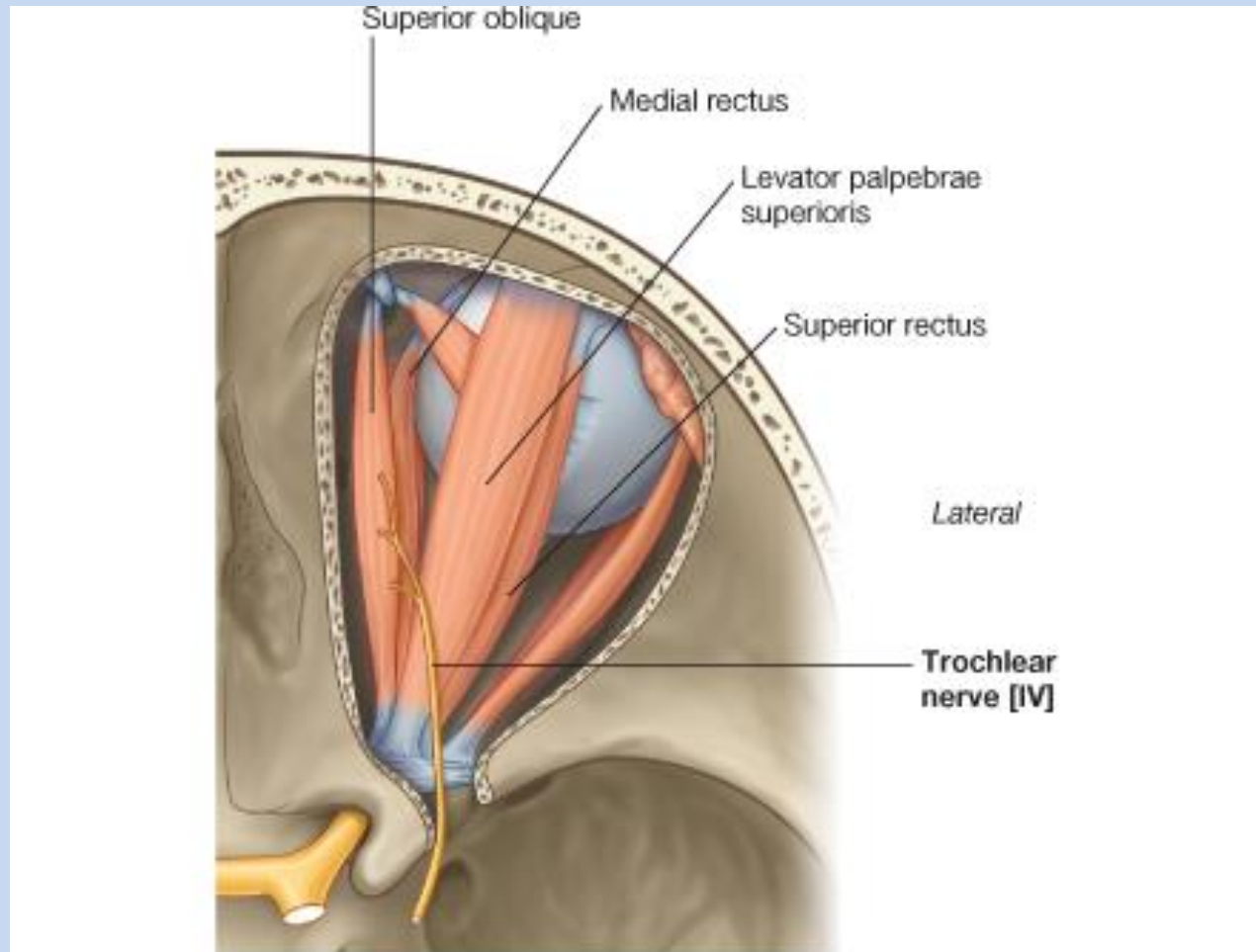
Frontal Nerve

- The frontal nerve arises from the ophthalmic division of the trigeminal nerve.
- It enters the orbit through the upper part of the superior orbital fissure and passes forward on the upper surface of the levator palpebrae superioris beneath the roof of the orbit.
- It divides into the **supratrochlear** and **supraorbital nerves** that wind around the upper margin of the orbital cavity to supply the skin of the forehead; the supraorbital nerve also supplies the mucous membrane of the frontal air sinus.



Trochlear Nerve

- The trochlear nerve enters the orbit through the upper part of the superior orbital fissure .
- It runs forward and supplies the superior oblique muscle.



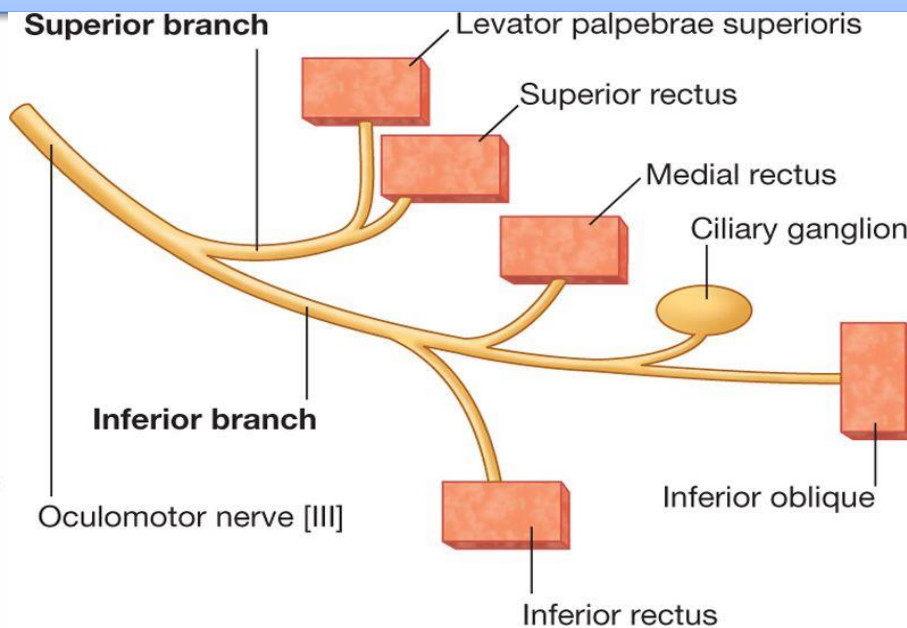
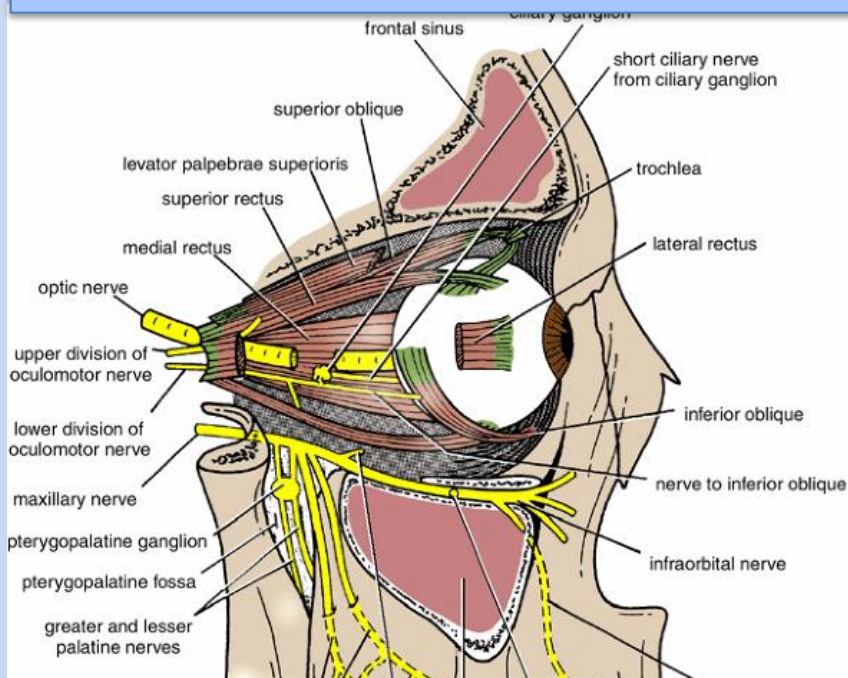
Oculomotor Nerve

The superior ramus of the oculomotor nerve

- It enters the orbit through the lower part of the superior orbital fissure.
- It supplies the superior rectus muscle, then pierces it, and supplies the levator palpebrae superioris muscle.

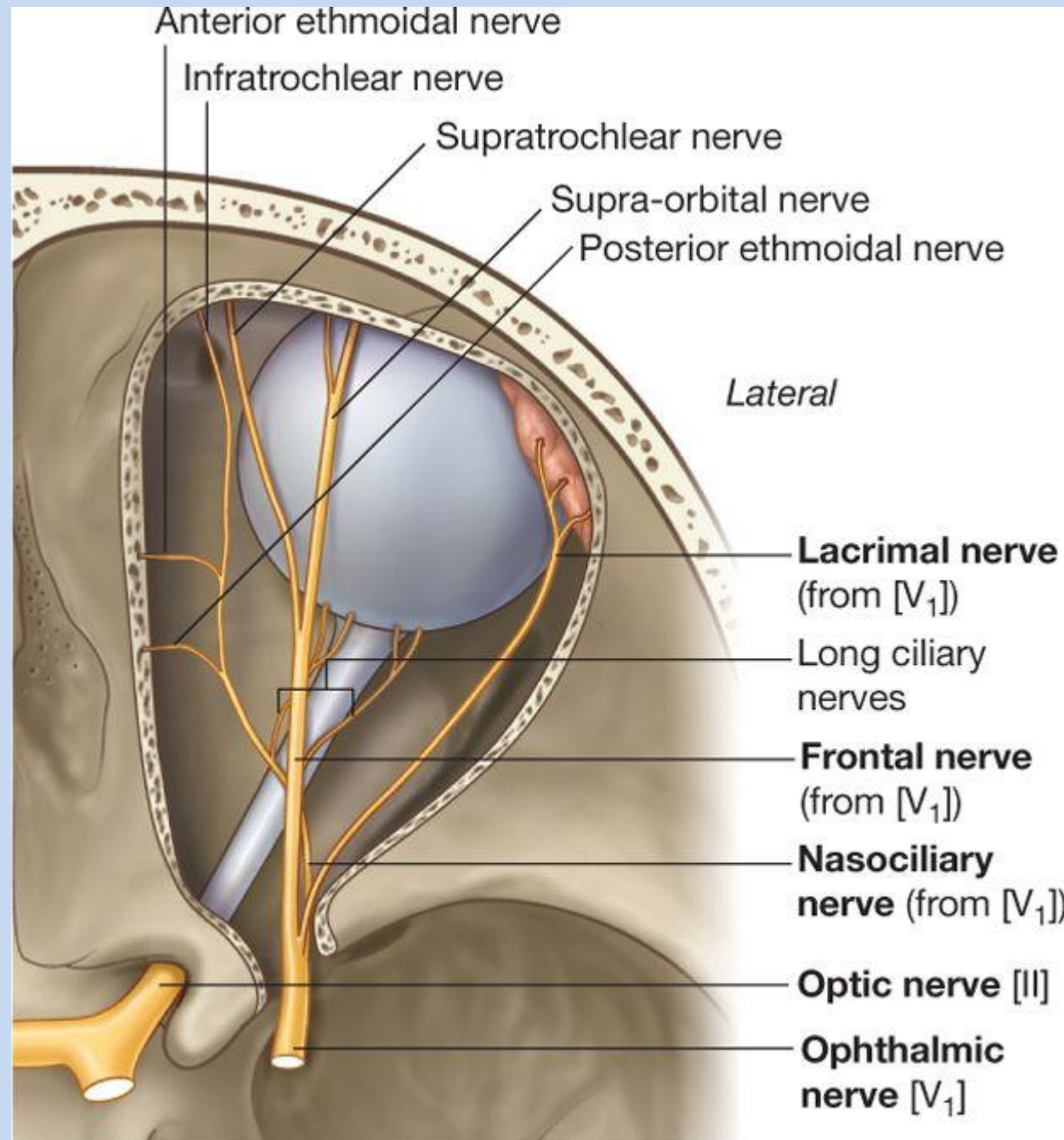
The inferior ramus of the oculomotor nerve

- It enters the orbit in a similar manner and supplies the inferior rectus, the medial rectus, and the inferior oblique muscles.
- The nerve to the inferior oblique gives off a branch that passes to the ciliary ganglion and **carries parasympathetic fibers to the sphincter pupillae and the ciliary muscle.**



Nasociliary Nerve

- The **nasociliary** nerve arises from the ophthalmic division of the trigeminal nerve.
- It enters the orbit through the lower part of the superior orbital fissure.
- It crosses above the optic nerve, runs forward along the upper margin of the medial rectus muscle, and ends by dividing into the **anterior ethmoidal** and **infratrochlear nerves**.



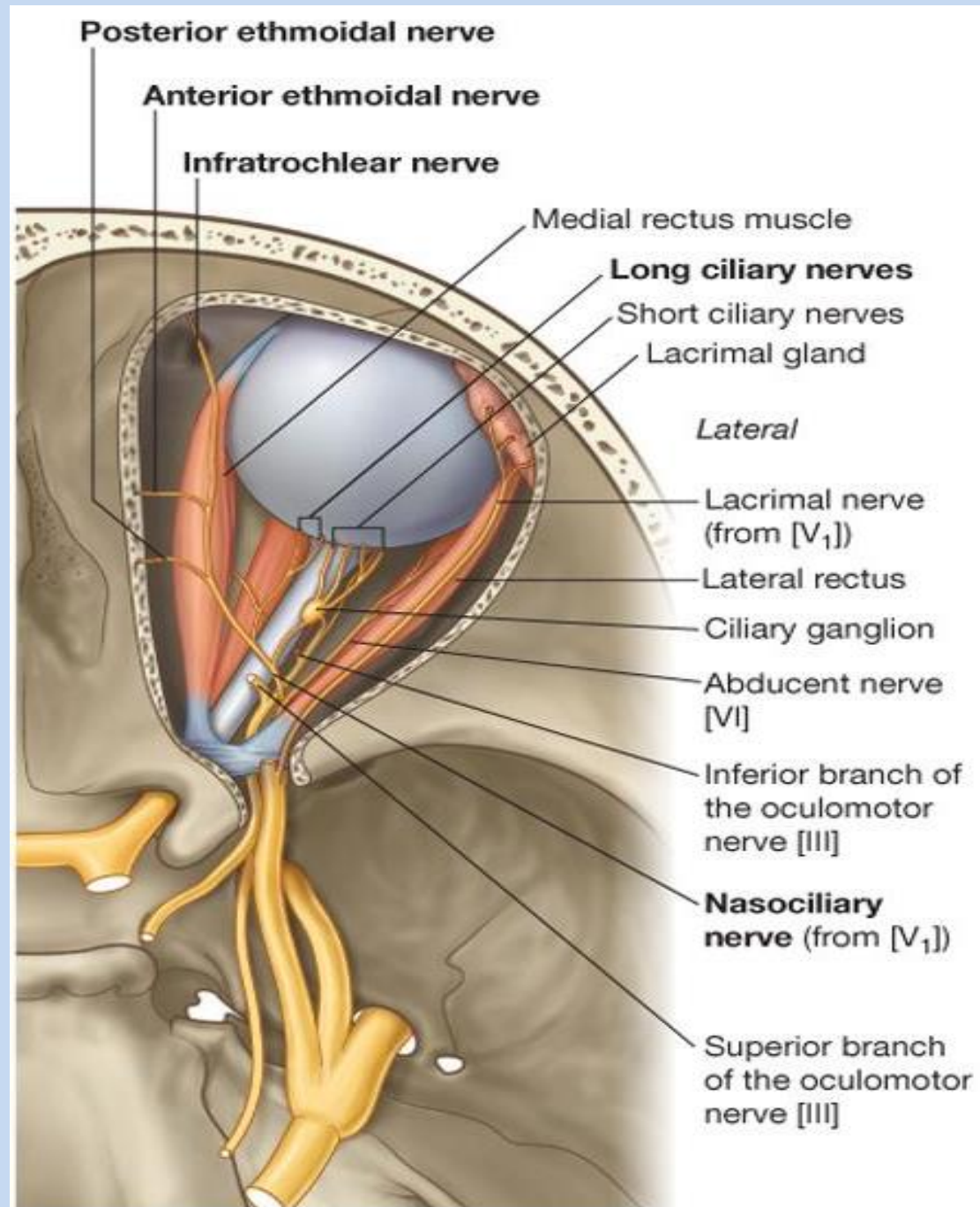
Branches of the Nasociliary Nerve

The **communicating branch** to the ciliary ganglion is a sensory nerve.

- The sensory fibers from the eyeball pass to the ciliary ganglion via the **short ciliary nerves**, pass through the ganglion without interruption, and then join the nasociliary nerve by means of the communicating branch.

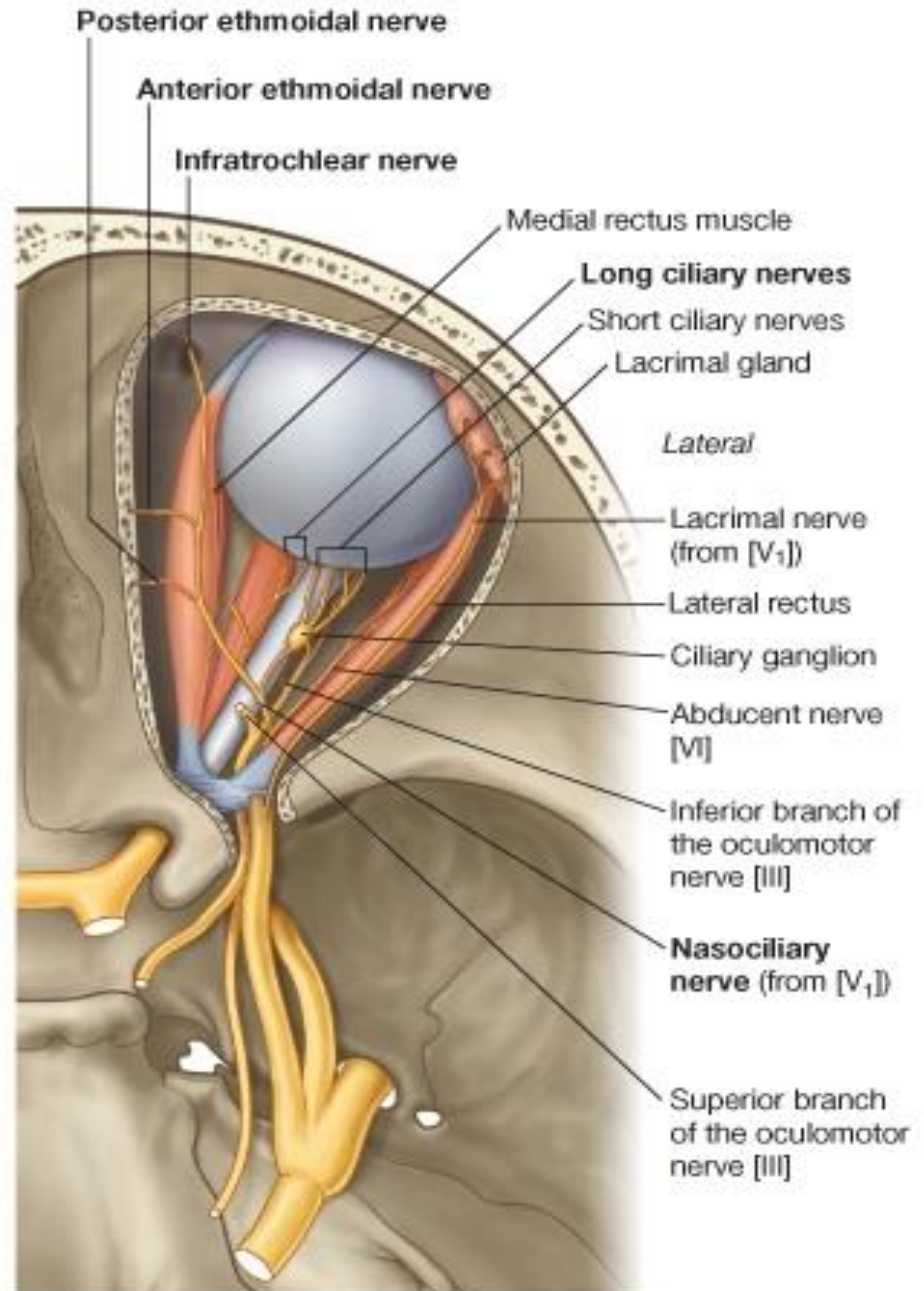
The **long ciliary nerves**, two or three in number, arise from the nasociliary nerve as it crosses the optic nerve.

- They contain sympathetic fibers for the dilator pupillae muscle.
- The nerves pass forward with the short ciliary nerves and pierce the sclera of the eyeball.
- They continue forward between the sclera and the choroid to reach the iris.



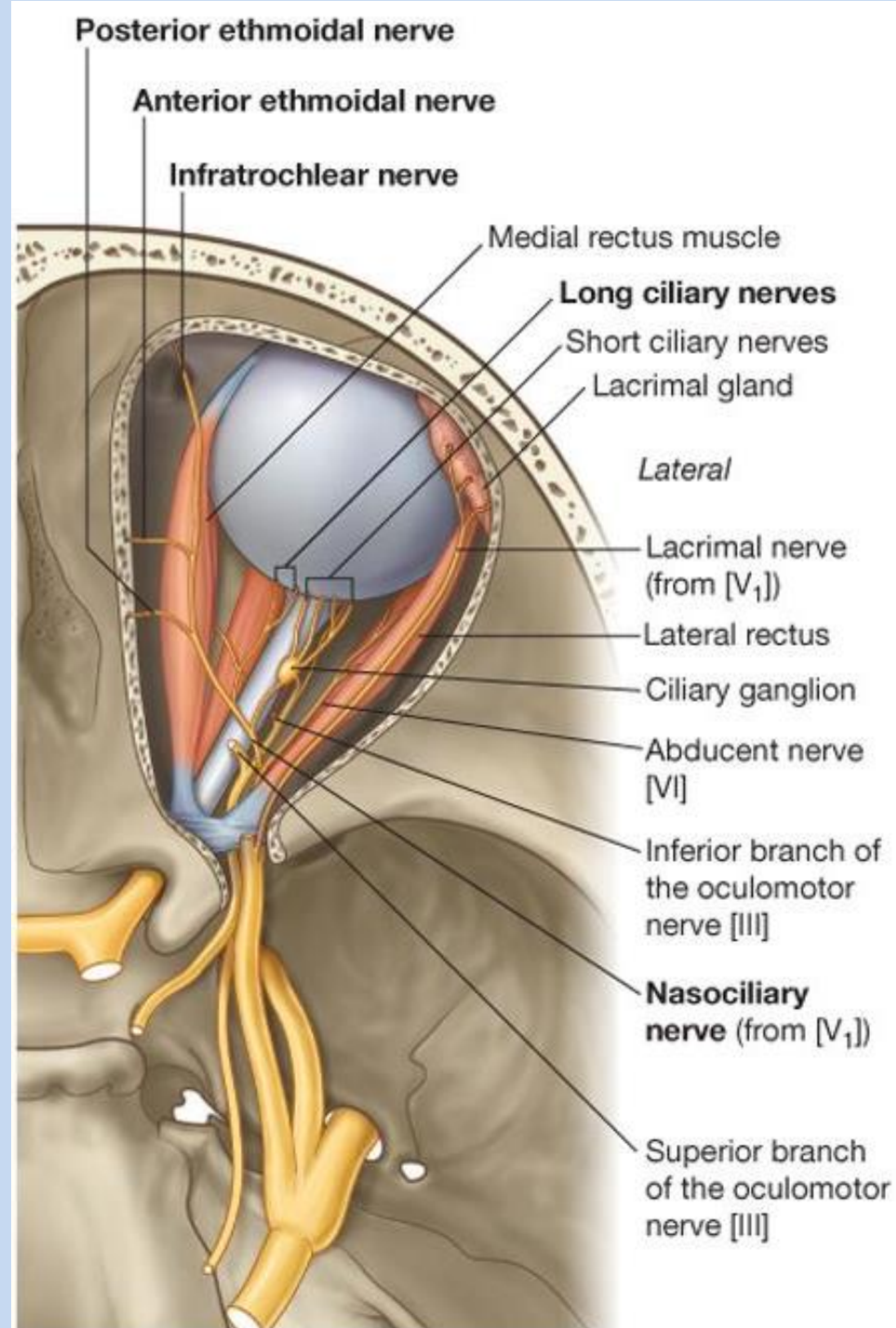
Branches of the Nasociliary Nerve

- The **posterior ethmoidal nerve** supplies the ethmoidal and sphenoidal air sinuses.
- The **infratrochlear nerve** passes forward below the pulley of the superior oblique muscle and supplies the skin of the medial part of the upper eyelid and the adjacent part of the nose.
- The **anterior ethmoidal nerve** passes through the anterior ethmoidal foramen and enters the anterior cranial fossa on the upper surface of the cribriform plate of the ethmoid. It enters the nasal cavity through a slitlike opening alongside the crista galli. After supplying an area of mucous membrane, it appears on the face as the **external nasal branch** at the lower border of the nasal bone, and supplies the skin of the nose down as far as the tip.



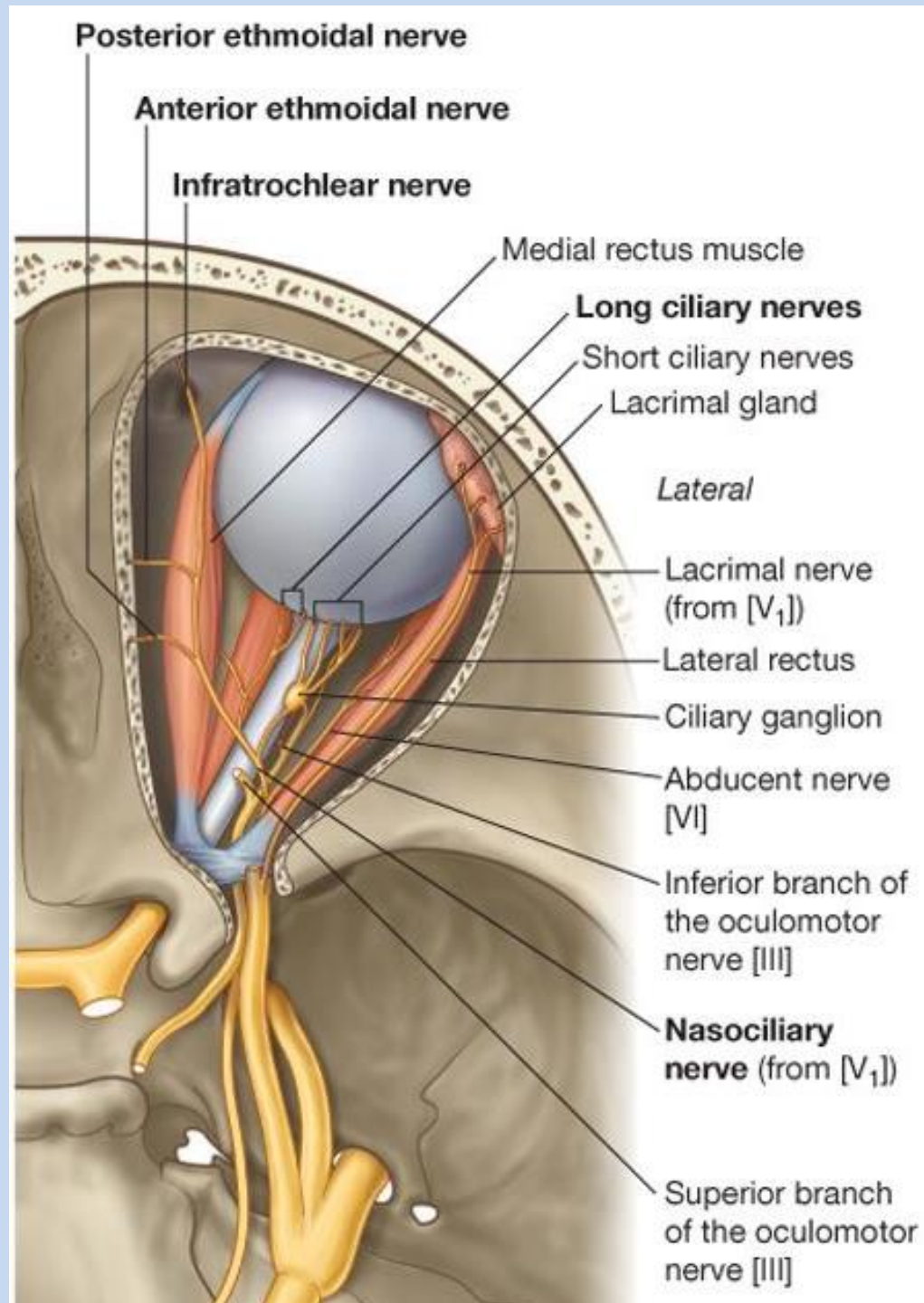
Abducent Nerve

- The **abducent** nerve enters the orbit through the lower part of the superior orbital fissure.
- It supplies the lateral rectus muscle.

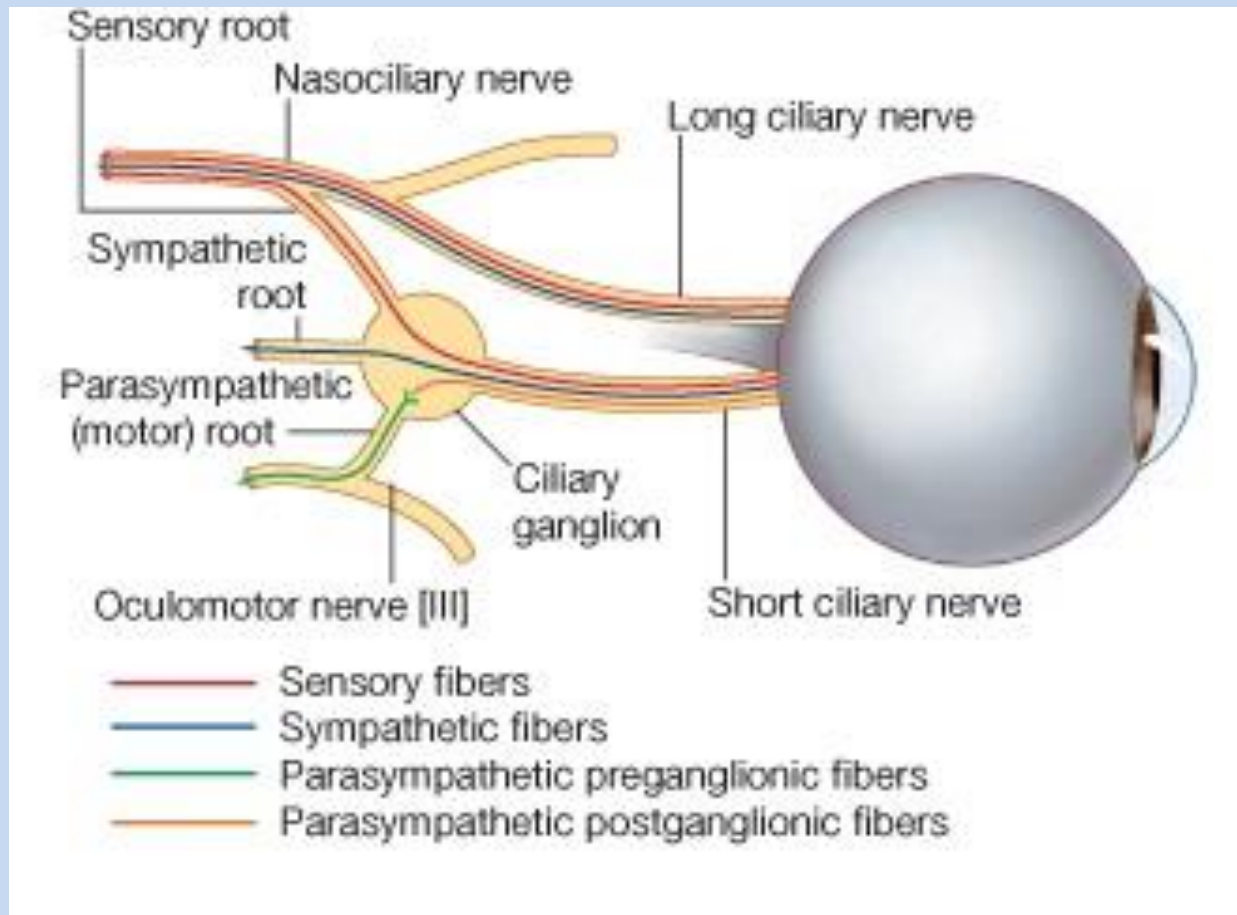


Ciliary Ganglion

- The **ciliary ganglion** is a parasympathetic ganglion about the size of a **pinhead** and situated in the posterior part of the orbit.
- It **receives its preganglionic parasympathetic fibers from the oculomotor nerve via the nerve to the inferior oblique.**
- The postganglionic fibers leave the ganglion in the **short ciliary nerves**, which enter the back of the eyeball and supply the **sphincter pupillae** and the **ciliary muscle.**
- A number of sympathetic fibers pass from the internal carotid plexus into the orbit and run through the ganglion without interruption.



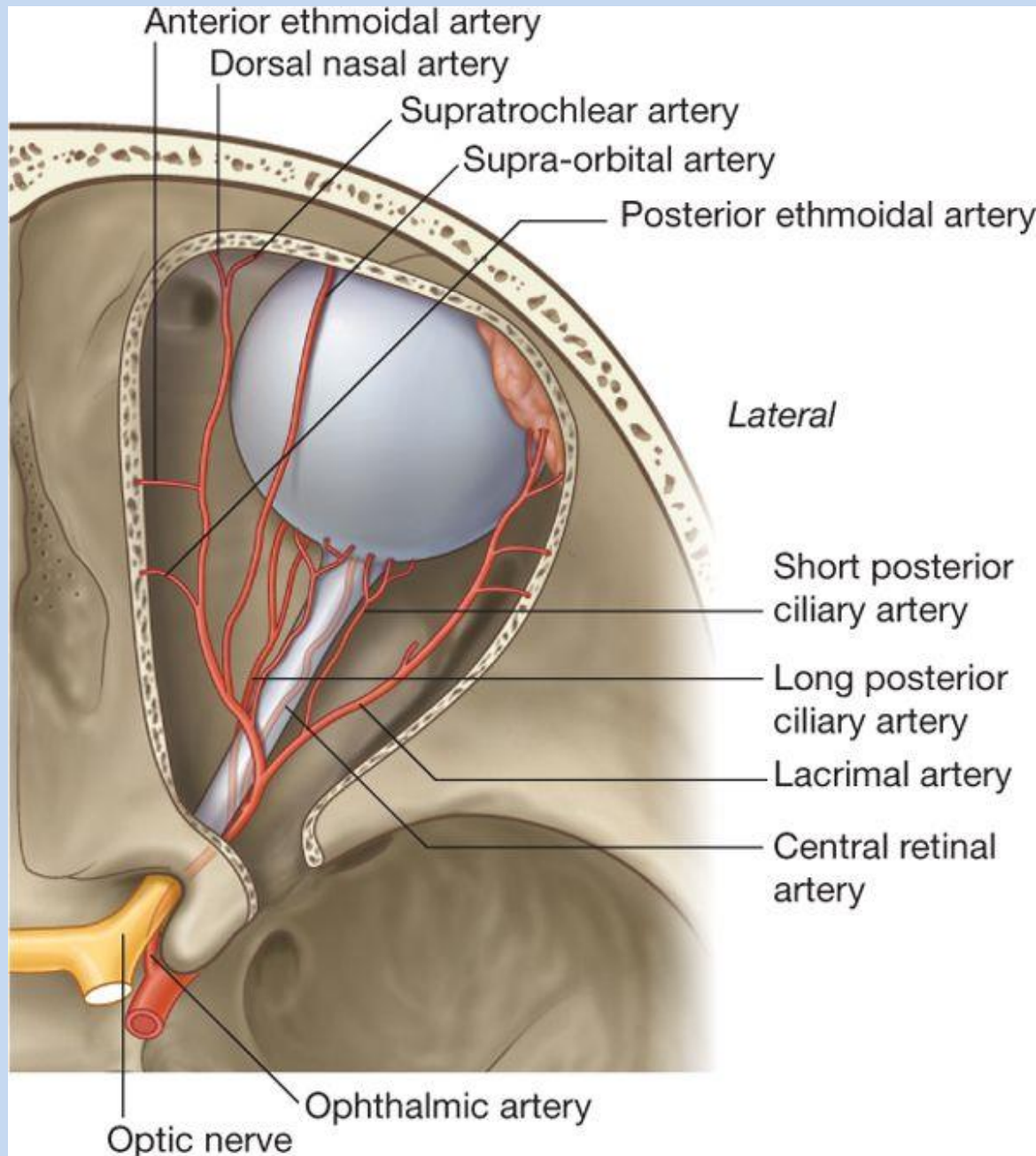
Parasympathetic and Sympathetic of the Eyeball



Blood Vessels and Lymph Vessels of the Orbit

Ophthalmic Artery

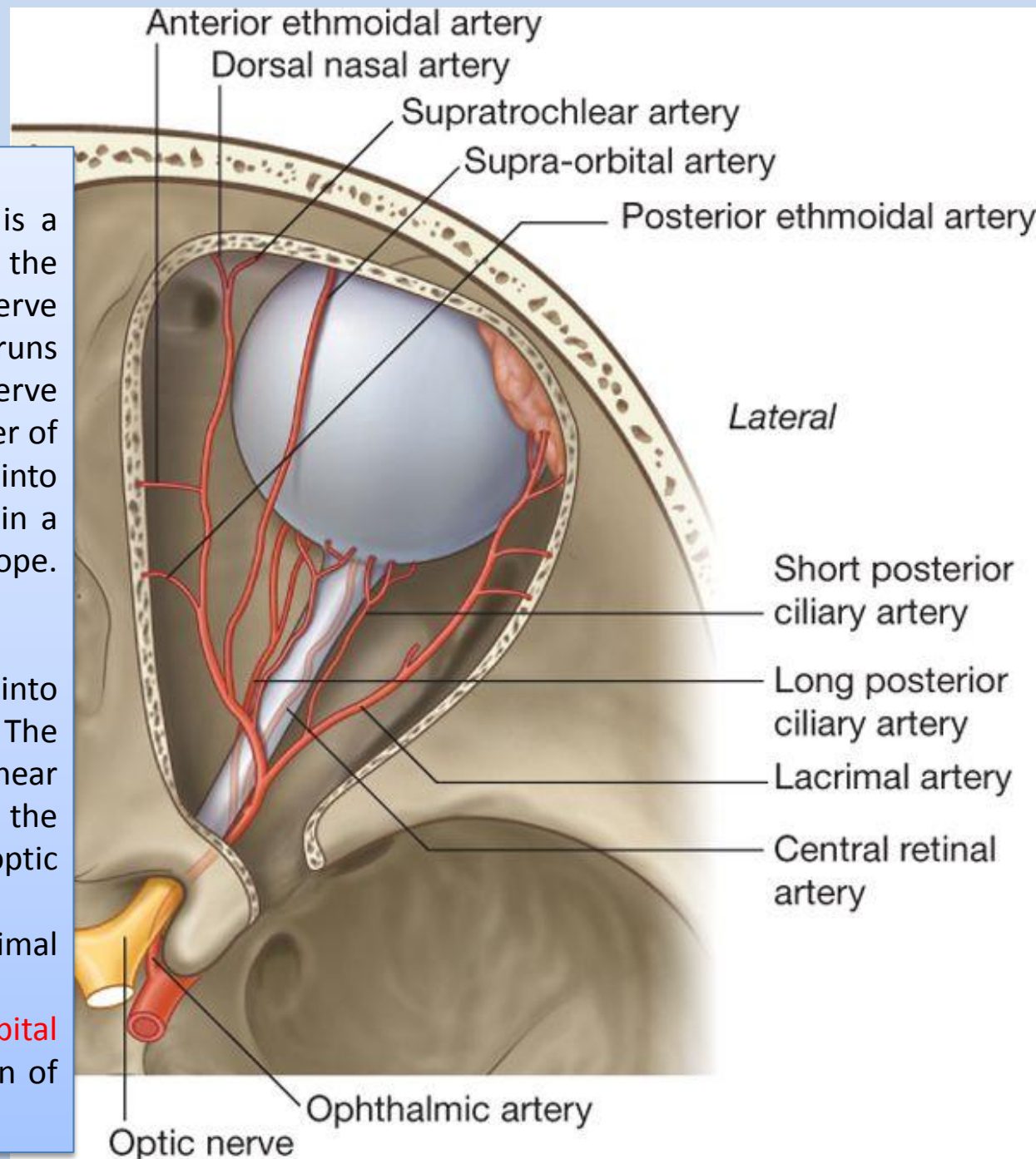
- The **ophthalmic artery** is a branch of the internal carotid artery after that vessel emerges from the cavernous sinus.
- It enters the orbit through the optic canal with the optic nerve.
- It runs forward and crosses the optic nerve to reach the medial wall of the orbit.
- It gives off numerous branches, which accompany the nerves in the orbital cavity.

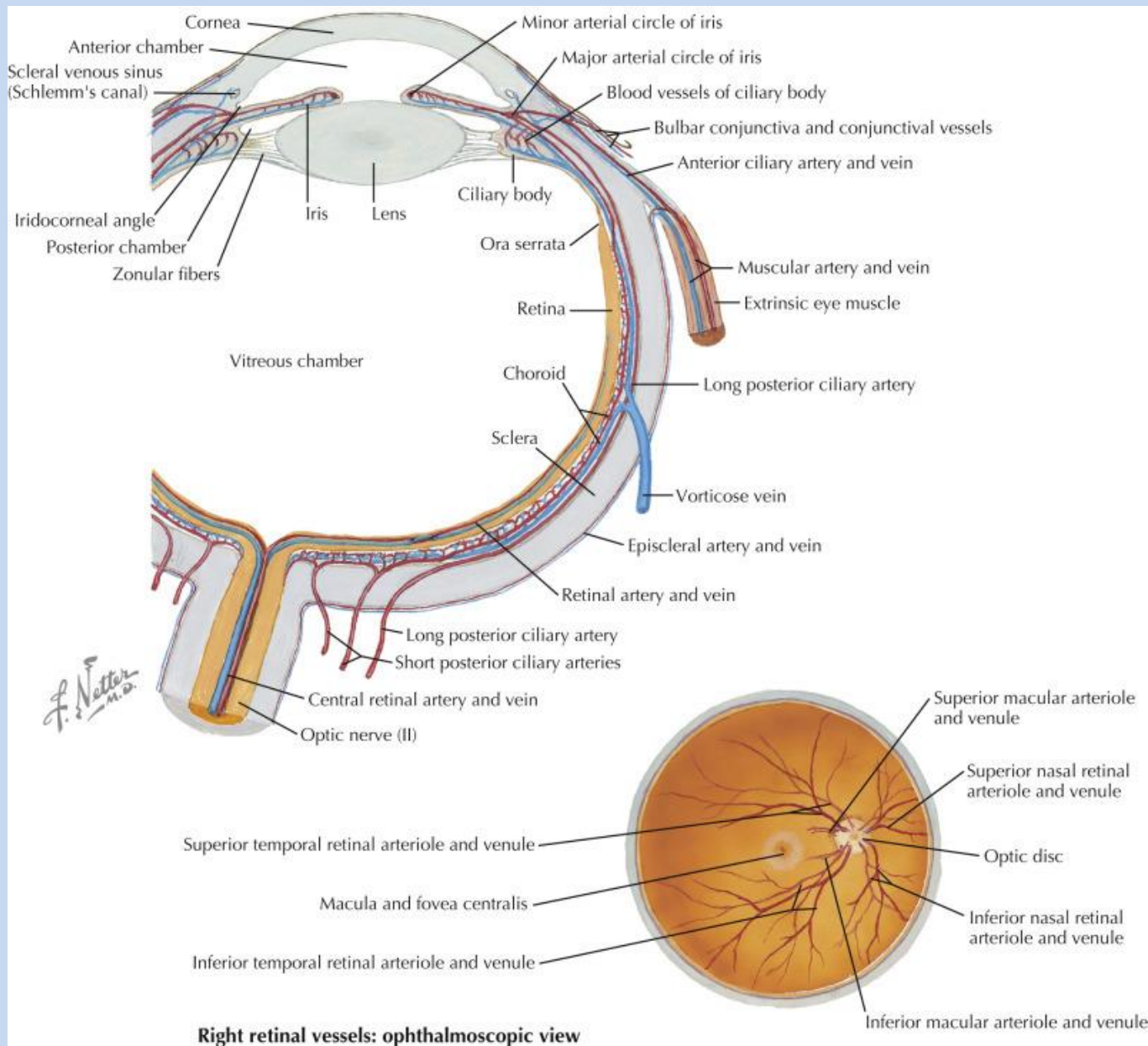


Branches of the Ophthalmic Artery

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. It runs in the substance of the optic nerve and enters the eyeball at the center of the optic disc. Here, it divides into branches, which may be studied in a patient through an ophthalmoscope. The branches are end arteries.
- The **muscular branches**
- The **ciliary arteries** can be divided into anterior and posterior groups. The anterior group enters the eyeball near the corneoscleral junction; the posterior 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.





Ophthalmic Veins

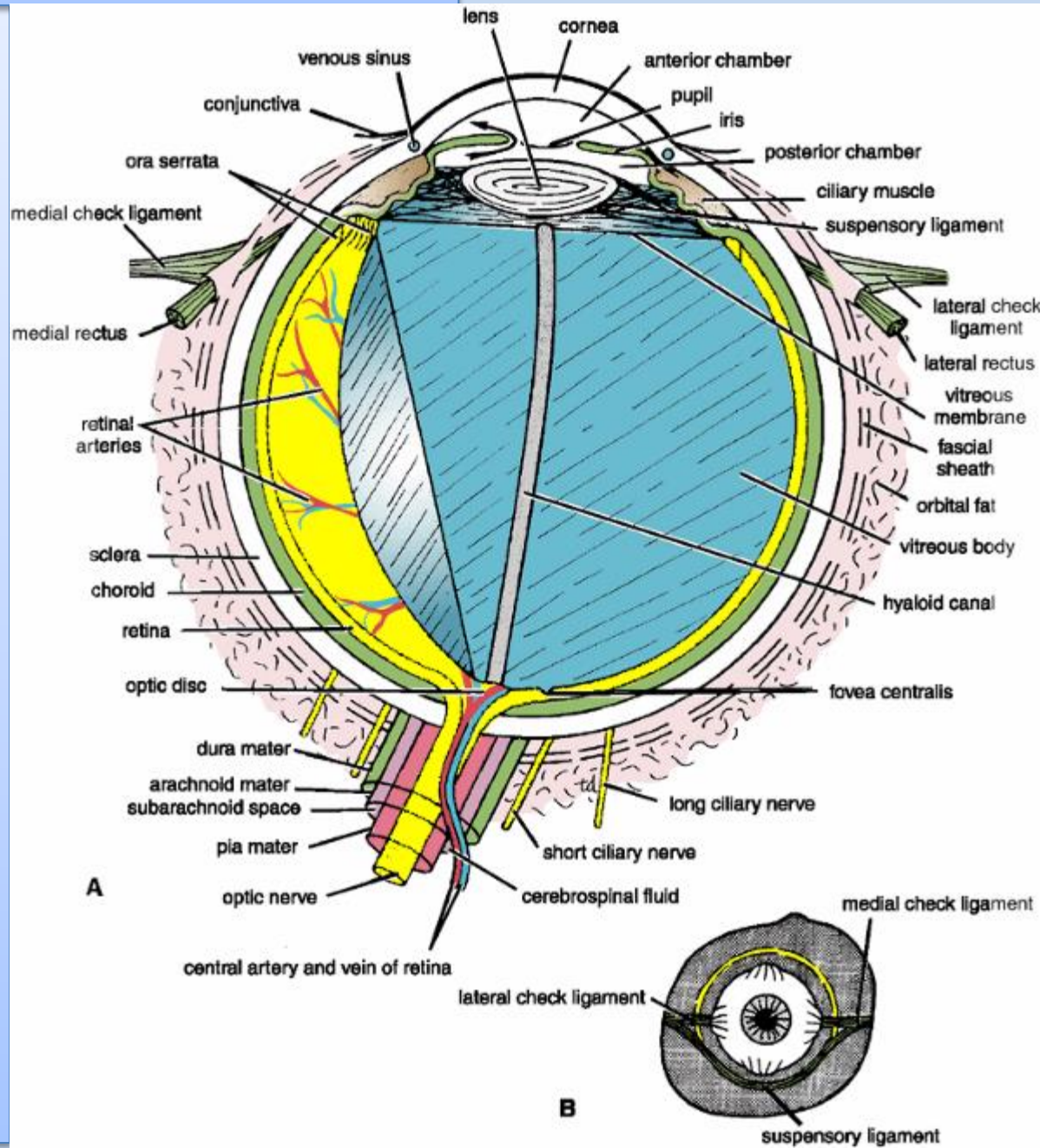
- The **superior ophthalmic vein** communicates in front with the facial vein.
- The **inferior ophthalmic vein** communicates through the inferior orbital fissure with the pterygoid venous plexus.
- Both veins pass backward through the superior orbital fissure and drain into the cavernous sinus.

Lymph Vessels

No lymph vessels or nodes are present in the orbital cavity.

Fascial Sheath of the Eyeball

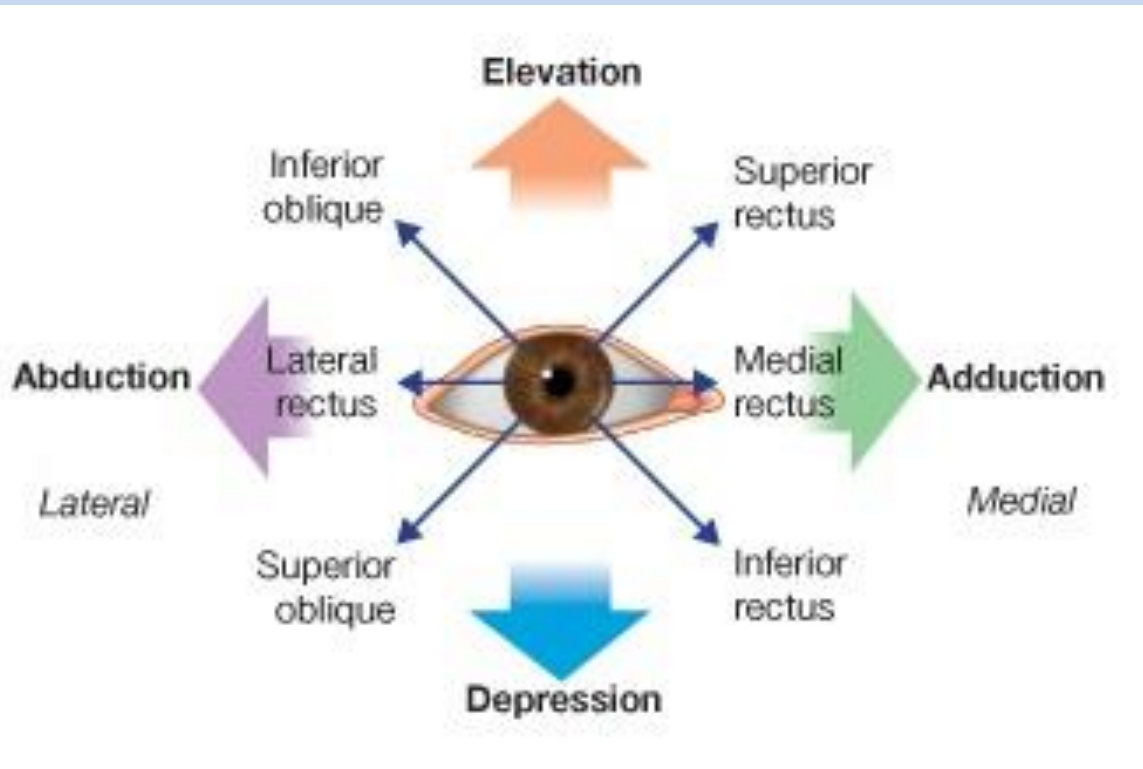
- The fascial sheath surrounds the eyeball from the optic nerve to the corneoscleral junction.
- It separates the eyeball from the orbital fat and provides it with a socket for free movement.
- It is perforated by the tendons of the orbital muscles and is reflected onto each of them as a **tubular sheath**.
- The sheaths for the tendons of the medial and lateral recti are attached to the medial and lateral walls of the orbit by triangular ligaments called the **medial** and **lateral check ligaments**.
- The lower part of the fascial sheath, which passes beneath the eyeball and connects the check ligaments, is thickened and serves to suspend the eyeball; it is called the **suspensory ligament of the eye**.
- By this means the eye is suspended from the medial and lateral walls of the orbit, as if in a hammock.



The Eye

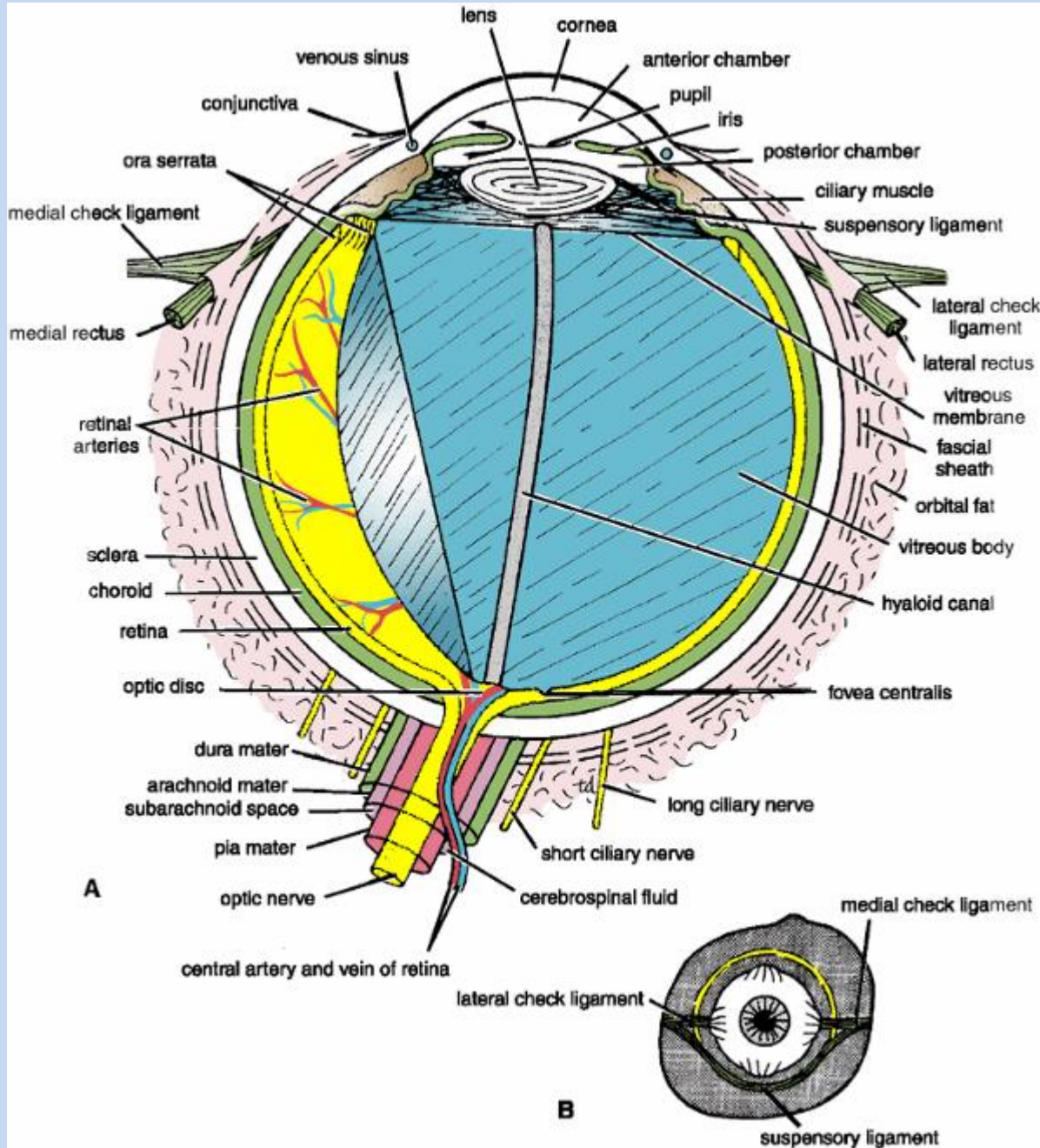
Terms Used in Describing Eye Movements

- **Elevation** is the rotation of the eye upward,
- **depression** is the rotation of the eye downward,
- **abduction** is the rotation of the eye laterally, and
- **adduction** is the rotation of the eye medially.
- Rotatory movements of the eyeball use the upper rim of the cornea (or pupil) as the marker. The eye rotates either medially or laterally.



Structure of the Eye

- The eyeball is embedded in orbital fat but is separated from it by the fascial sheath of the eyeball.
- The eyeball consists of three coats, which, from without inward, are the **fibrous** coat, the **vascular** pigmented coat, and the **nervous** coat.



Coats of the Eyeball

Fibrous Coat

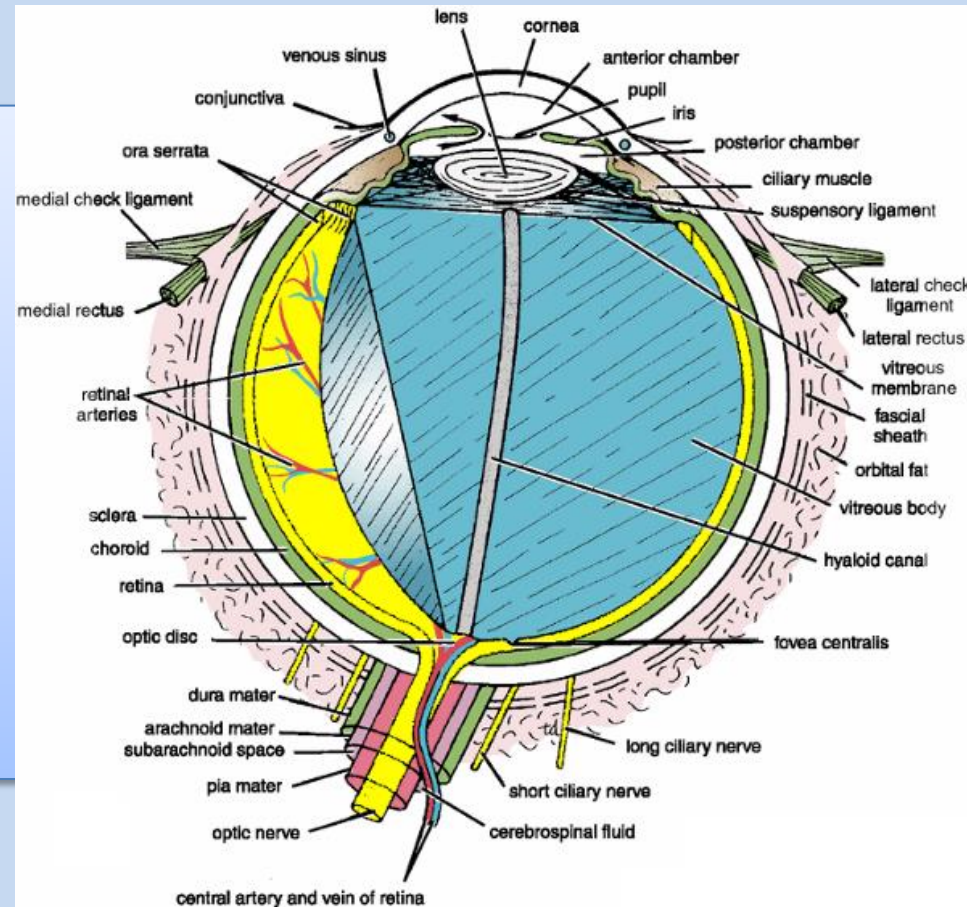
- The fibrous coat is made up of a posterior opaque part, the sclera, and an anterior transparent part, the cornea.

The Sclera

- The opaque sclera is composed of dense fibrous tissue and is white.
- Posteriorly, it is pierced by the optic nerve and is fused with the dural sheath of optic nerve.
- The **lamina cribrosa** is the area of the sclera that is pierced by the nerve fibers of the optic nerve.
- The sclera is also pierced by the ciliary arteries and nerves and their associated veins, the venae vorticosae.
- The sclera is directly continuous in front with the cornea at the corneoscleral junction, or **limbus**.

The Cornea

- The transparent cornea is largely responsible for the refraction of the light entering the eye.
- It is in contact posteriorly with the aqueous humor.



The Cornea

Blood Supply

- The cornea is avascular and devoid of lymphatic drainage.
- It is nourished by diffusion from the aqueous humor and from the capillaries at its edge.

Nerve Supply

- Long ciliary nerves from the ophthalmic division of the trigeminal nerve

Function of the Cornea

- The cornea is the most **important refractive medium** of the eye.
- This refractive power occurs on the anterior surface of the cornea, where the refractive index of the cornea (1.38) differs greatly from that of the air.
- The importance of the **tear film** in maintaining the normal environment for the corneal epithelial cells should be stressed

Vascular Pigmented Coat

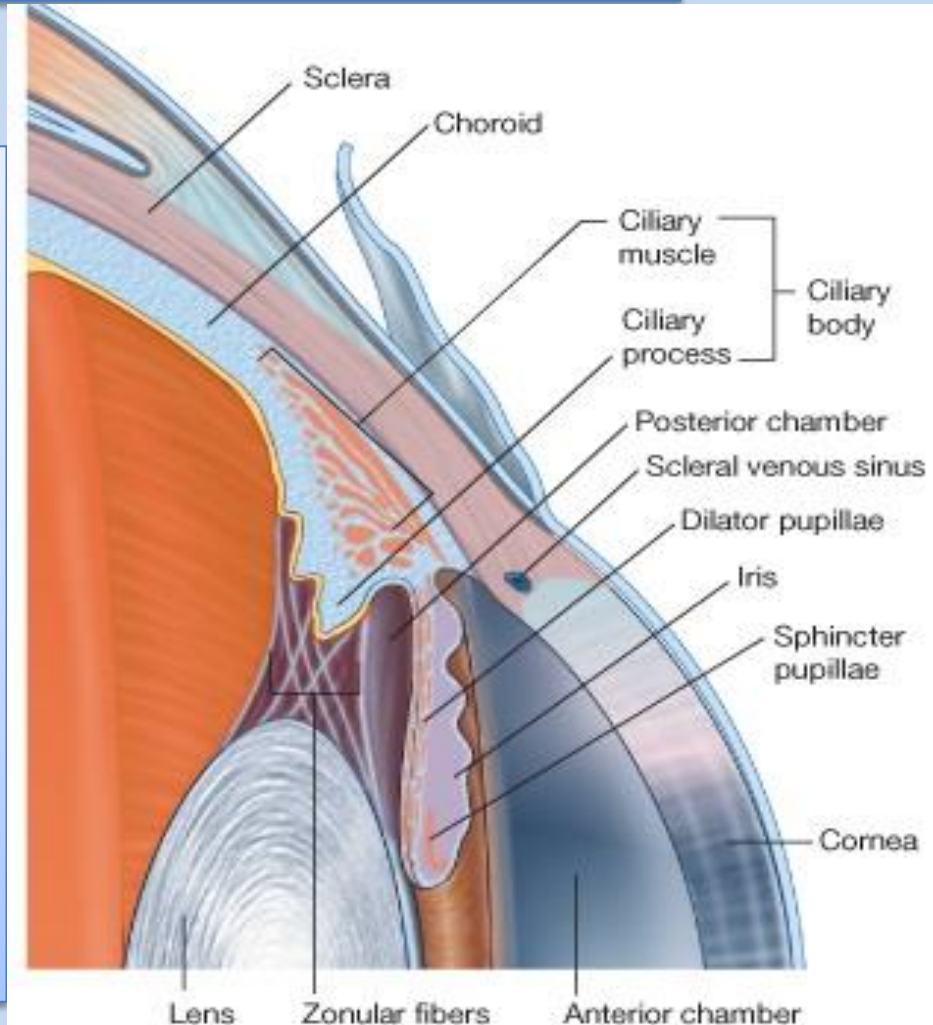
- The vascular pigmented coat consists, from behind forward, of the **choroid**, the **ciliary body**, and the **iris**.

The Choroid

- The choroid is composed of an outer pigmented layer and an inner, highly vascular layer.

The Ciliary Body

- The ciliary body is continuous posteriorly with the choroid, and anteriorly it lies behind the peripheral margin of the iris.
- It is composed of the ciliary ring, the ciliary processes, and the ciliary muscle.
- The **ciliary ring** is the posterior part of the body
- The **ciliary processes** are radially arranged folds, or ridges, to the posterior surfaces of which are connected the suspensory ligaments of the lens.
- The **ciliary muscle** is composed of **meridional** and **circular** fibers of smooth muscle. The meridional fibers run backward from the region of the corneoscleral junction to the ciliary processes. The **circular fibers** are fewer in number and lie internal to the meridional fibers.



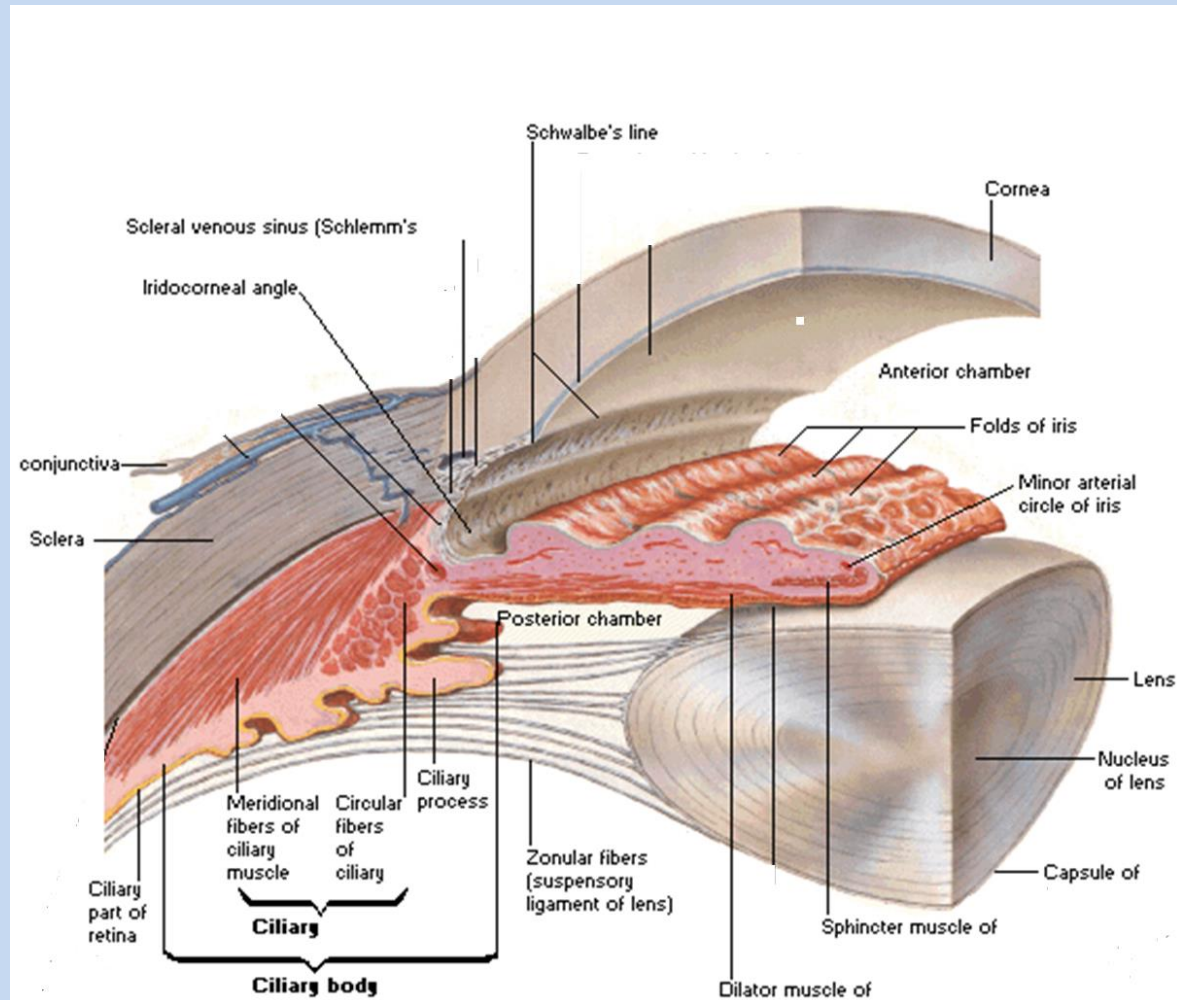
The ciliary muscle

Nerve supply

- The ciliary muscle is supplied by the parasympathetic fibers from the oculomotor nerve.
- After synapsing in the ciliary ganglion, the postganglionic fibers pass forward to the eyeball in the short ciliary nerves.

Action

- Contraction of the ciliary muscle, especially the meridional fibers, pulls the ciliary body forward.
- This relieves the tension in the suspensory ligament, and the elastic lens becomes more convex.
- This increases the refractive power of the lens.



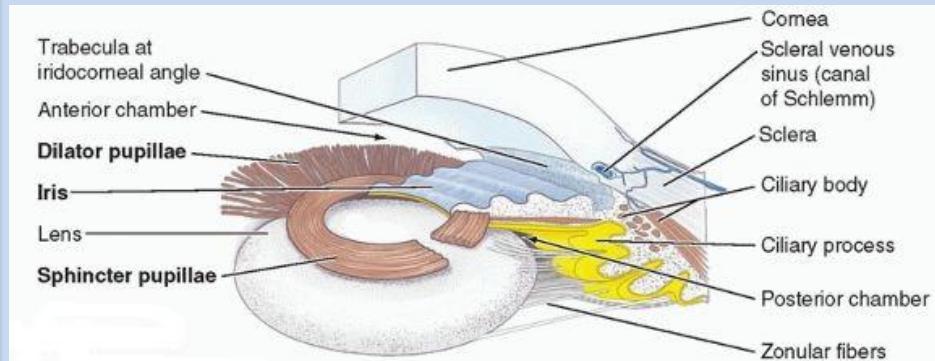
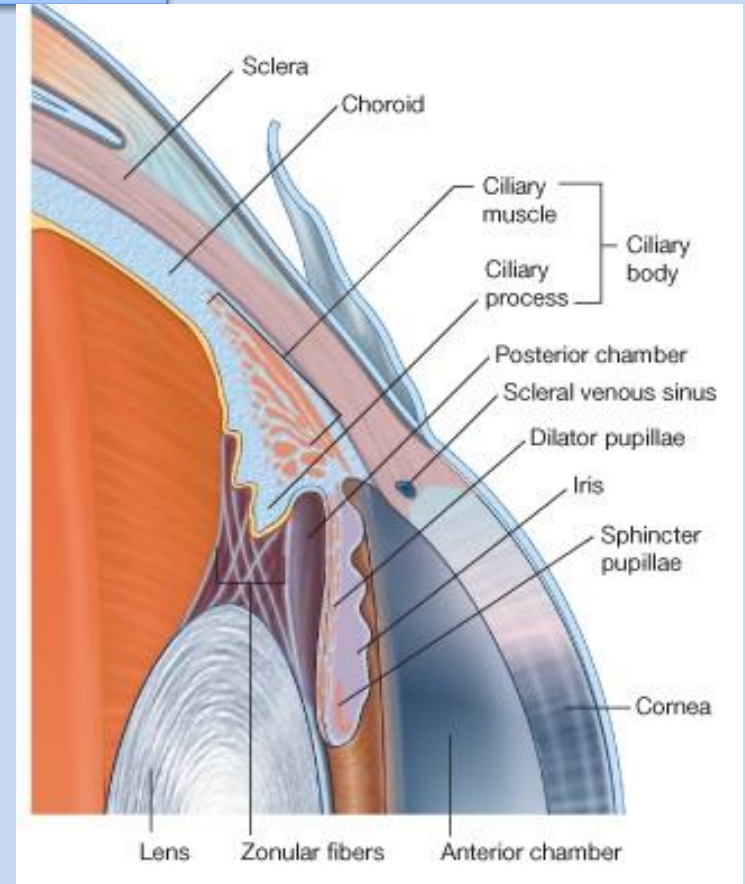
The Iris and Pupil

The iris

- It is a thin, contractile, pigmented diaphragm with a central aperture, the pupil.
- It is suspended in the aqueous humor between the cornea and the lens.
- The periphery of the iris is attached to the anterior surface of the ciliary body.
- It divides the space between the lens and the cornea into an anterior and a posterior chamber.

The muscle fibers of the iris

- They are involuntary and consist of circular and radiating fibers.
- The circular fibers form the **sphincter pupillae** and are arranged around the margin of the pupil.
- The radial fibers form the **dilator pupillae** and consist of a thin sheet of radial fibers that lie close to the posterior surface.



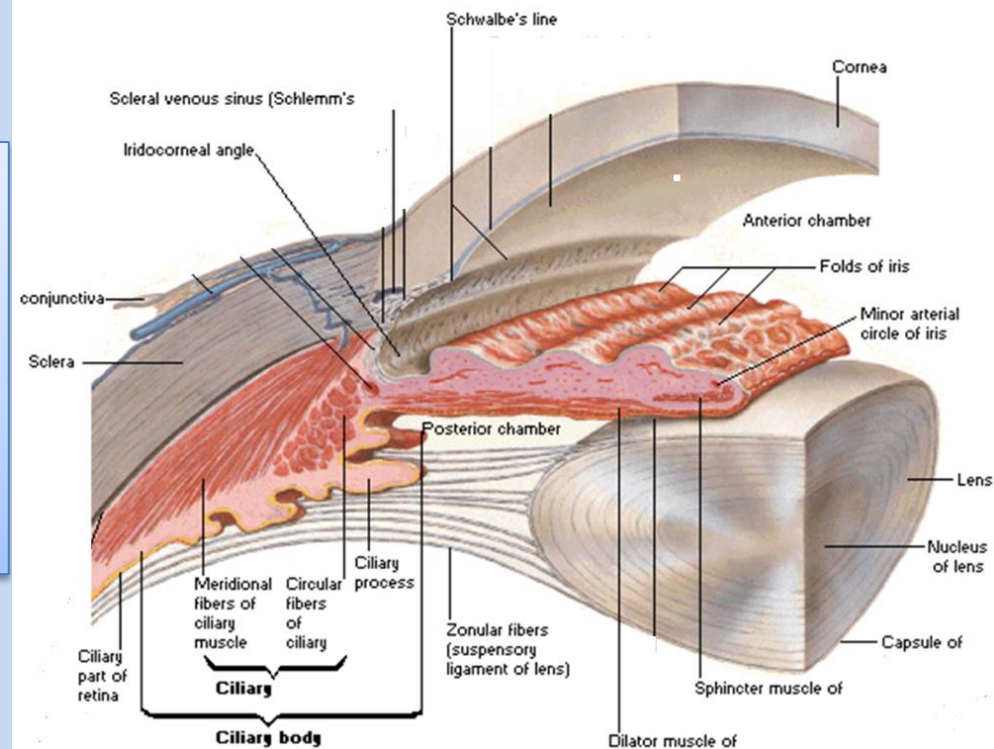
The muscle fibers of the iris

Nerve supply

- The **sphincter pupillae** is supplied by parasympathetic fibers from the oculomotor nerve.
- After synapsing in the ciliary ganglion, the postganglionic fibers pass forward to the eyeball in the short ciliary nerves.
- The **dilator pupillae** is supplied by sympathetic fibers, which pass forward to the eyeball in the long ciliary nerves.

Action

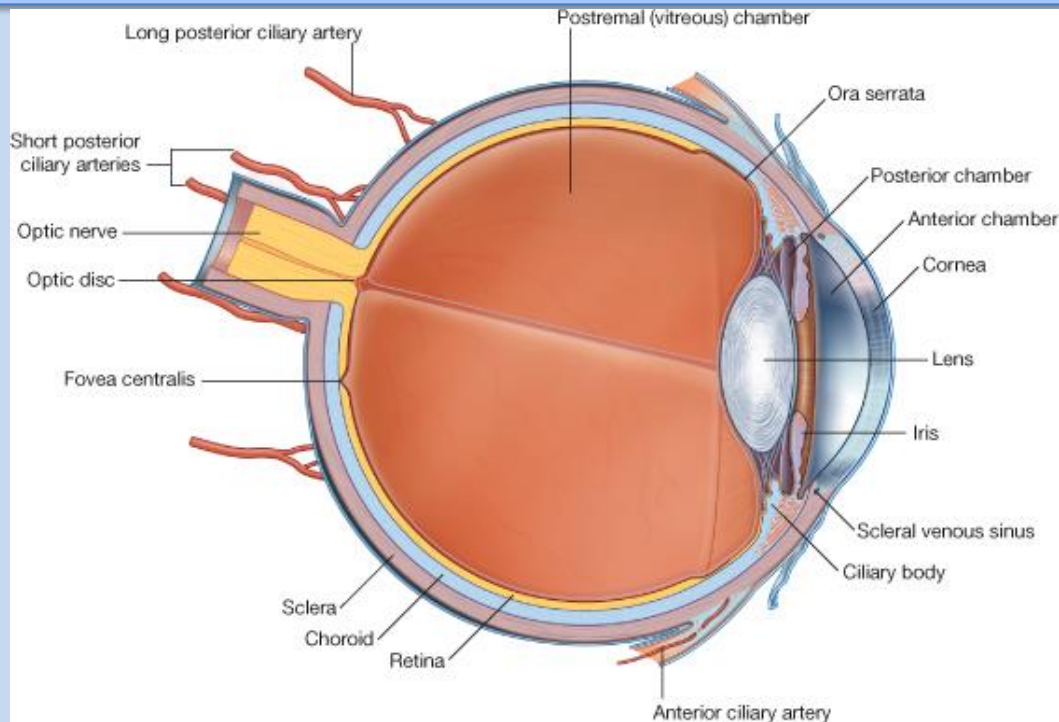
- The **sphincter pupillae** constricts the pupil in the presence of bright light and during accommodation.
- The **dilator pupillae** dilates the pupil in the presence of light of low intensity or in the presence of excessive sympathetic activity such as occurs in fright.



Nervous Coat

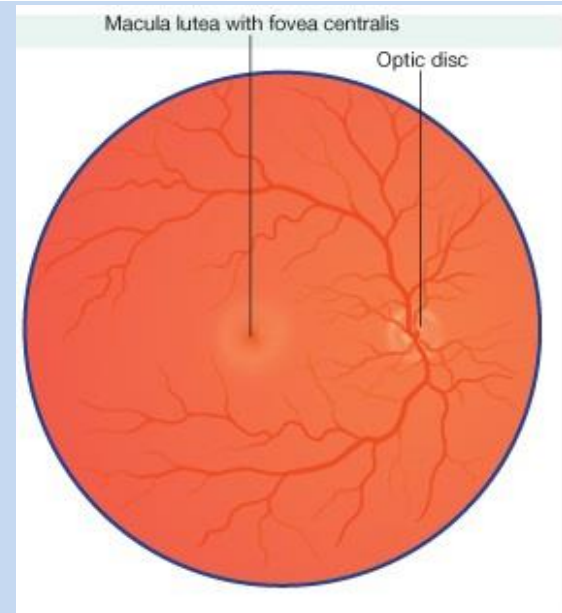
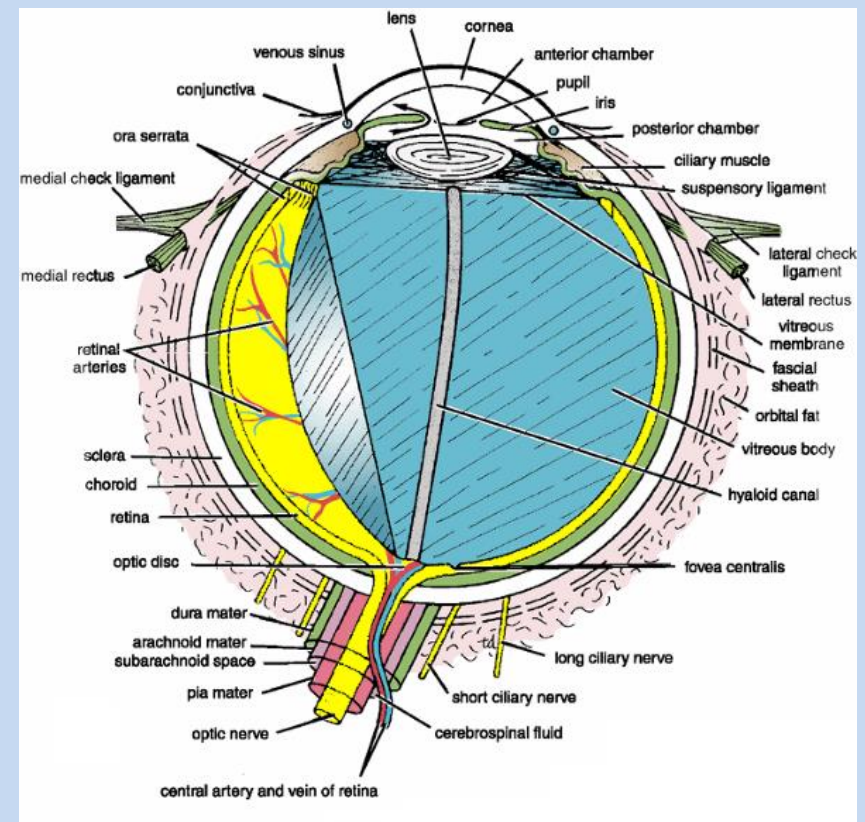
The Retina

- The retina consists of an **outer pigmented layer** and an **inner nervous layer**.
- Its outer surface is **in contact** with the choroid, and its inner surface is in contact with the vitreous body.
- The posterior three fourths of the retina is the receptor organ.
- Its anterior edge forms a wavy ring, the **ora serrata**, and the nervous tissues end here.
- The anterior part of the retina is non receptive and covers the ciliary processes and the back of the iris.



The Retina

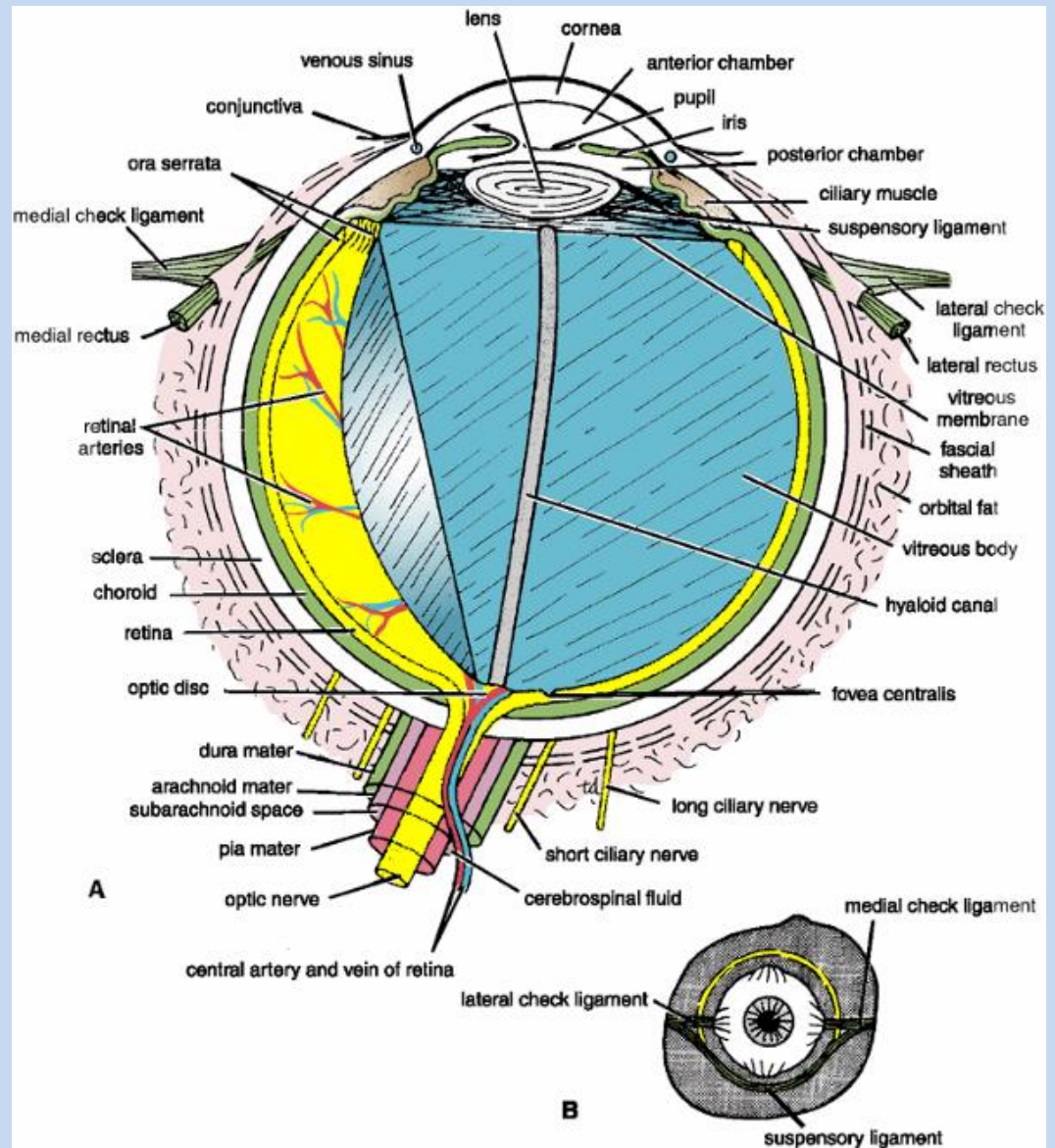
- At the center of the posterior part of the retina is an oval, yellowish area, the **macula lutea**, which is the area of the retina for the most distinct vision.
- It has a central depression, the **fovea centralis**.
- The **optic nerve** leaves the retina about 3 mm to the medial side of the macula lutea at the optic disc.
- The **optic disc** is slightly depressed at its center, where it is pierced by the **central artery of the retina**.
- At the optic disc is a complete absence of rods and cones so that it is insensitive to light and is referred to as the **blind spot**.
- On ophthalmoscopic examination, the optic disc is seen to be pale pink in color, much paler than the surrounding retina.



Contents of the Eyeball

The contents of the eyeball consist of the **refractive media**:

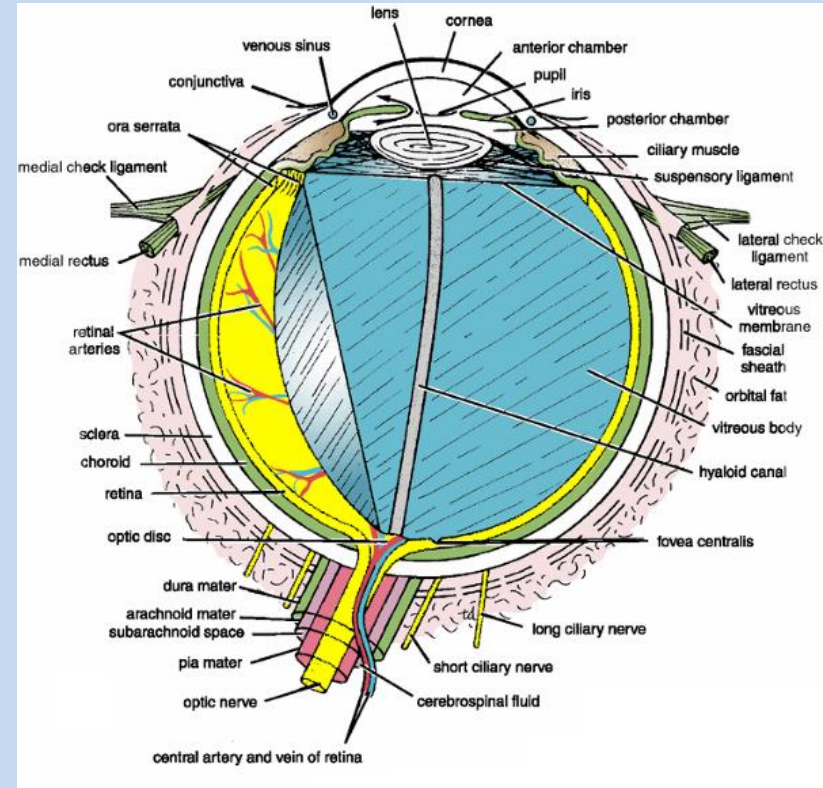
- the aqueous humor.
- the vitreous body.
- the lens.



the refractive media

Aqueous Humor:

- The aqueous humor is a clear fluid that fills the **anterior** and **posterior chambers** of the eyeball.
- It is believed to be a secretion from the ciliary processes, from which it enters the posterior chamber.
- It then flows into the anterior chamber through the pupil and is drained away through the spaces at the **iridocorneal** angle into the (venous sinus) **canal of Schlemm**.
- Obstruction to the draining of the aqueous humor results in a rise in intraocular pressure called **glaucoma**.
- This can produce degenerative changes in the retina, with consequent blindness.



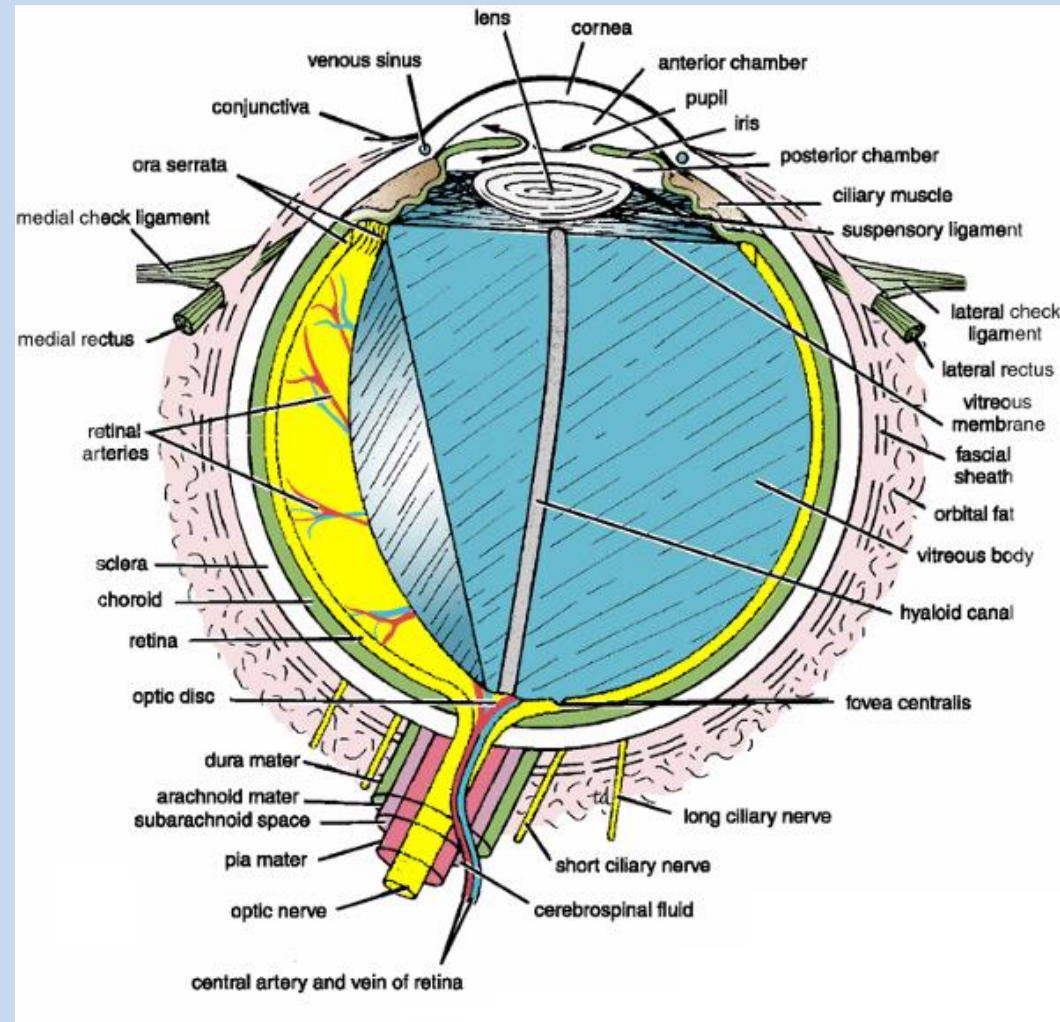
The function of the aqueous humor:

- support the wall of the eyeball by exerting internal pressure and thus maintaining its optical shape.
- It also nourishes the cornea and the lens and removes the products of metabolism.
- these functions are important because the cornea and the lens do not possess a blood supply.

The refractive media

Vitreous Body

- The vitreous body fills the eyeball behind the lens and is a transparent gel.
- The **hyaloid canal** is a narrow channel that runs through the vitreous body from the optic disc to the posterior surface of the lens; in the fetus, it is filled by the hyaloid artery, which disappears before birth.

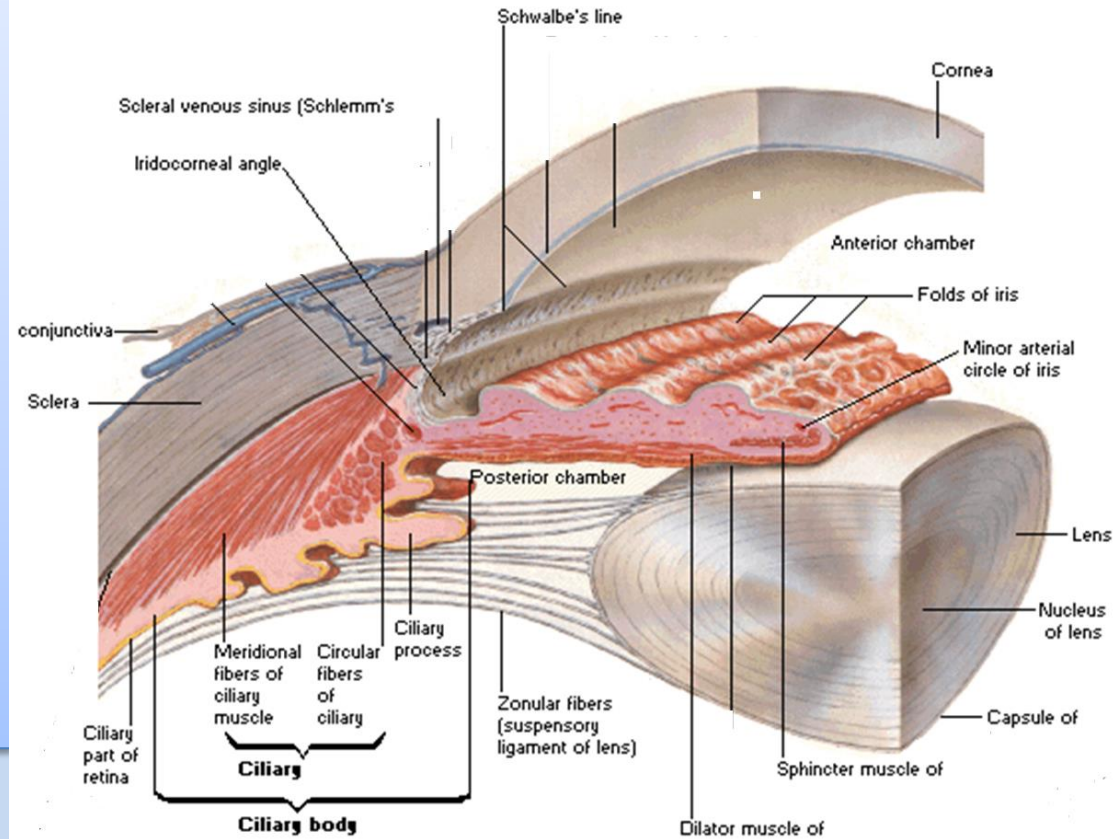


The function of the vitreous body

- is to contribute slightly to the magnifying power of the eye.
- It supports the posterior surface of the lens and assists in holding the neural part of the retina against the pigmented part of the retina.

The Lens

- The lens is a transparent, biconvex structure enclosed in a transparent capsule.
- It is situated behind the iris and in front of the vitreous body and is encircled by the ciliary processes.
- The lens consists of an elastic **capsule**.
- circumference, of the lens is attached to the ciliary processes of the ciliary body by the **suspensory ligament**.
- The pull of the radiating fibers of the **suspensory ligament** tends to keep the elastic lens flattened so that the eye can be focused on distant objects.



Accommodation of the Eye

- To accommodate the eye for close objects, the ciliary muscle contracts and pulls the ciliary body forward and inward so that the radiating fibers of the suspensory ligament are relaxed.
- This allows the elastic lens to assume a more globular shape.
- With advancing age, the lens becomes denser and less elastic, and, as a result, the ability to accommodate is lessened (presbyopia)(far-sightedness caused by aging)
- This disability can be overcome by the use of an additional lens in the form of glasses to assist the eye in focusing on nearby objects.