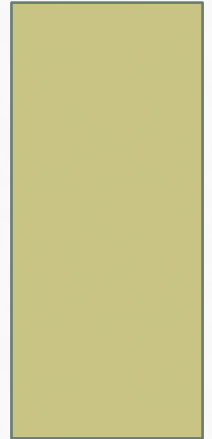


IN THE NAME OF GOD

General Anatomy
For Paramedicine
Students

By
Dr. Saeednia



VISUAL APPARATUS

Eye Ball

Vessels

Nerves

Aqueous Humor

Lens

Vitrous Body

Palpebrae

Conjunctiva

Lacrimal Apparatus

Extra Ocular Muscles

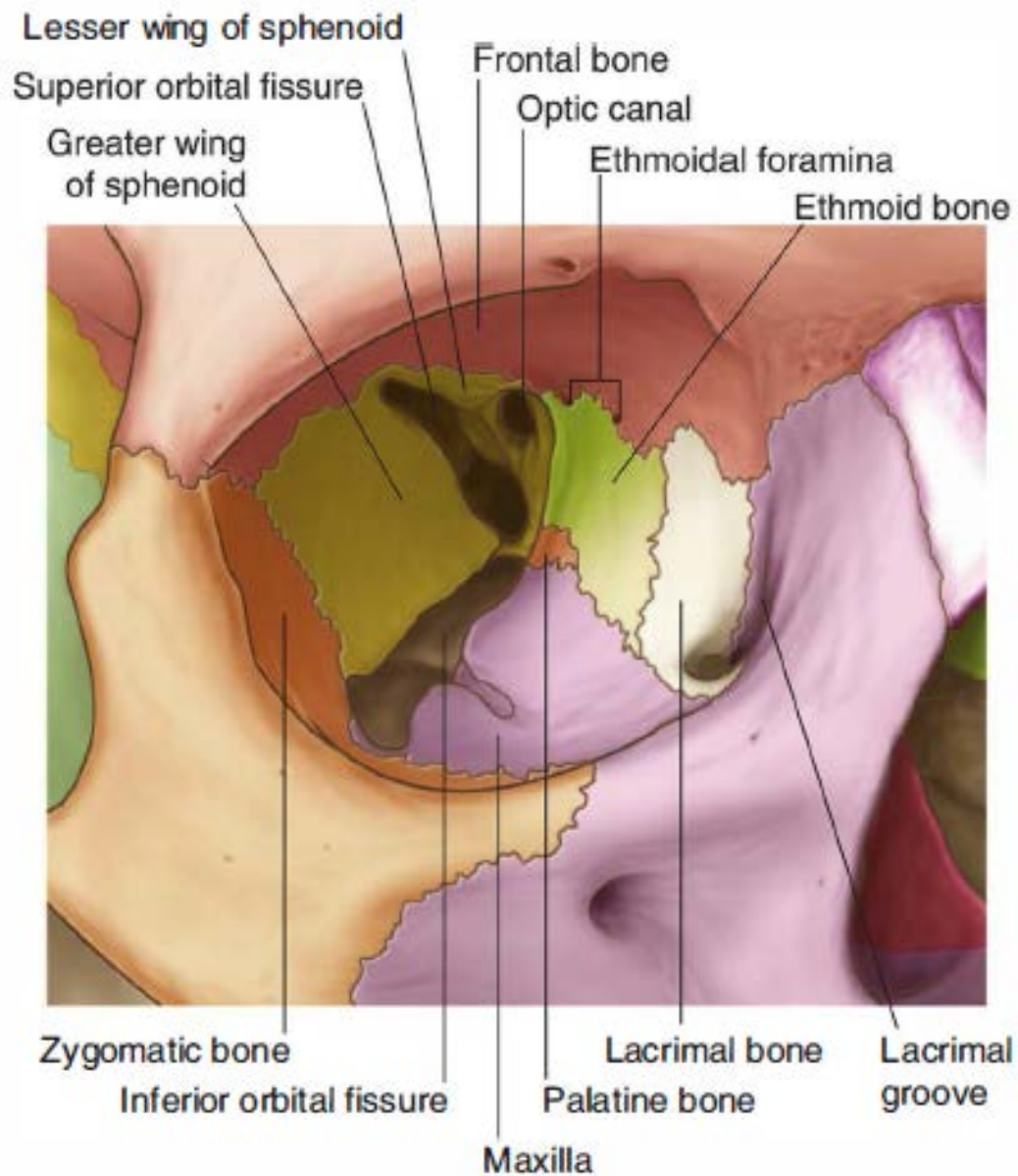
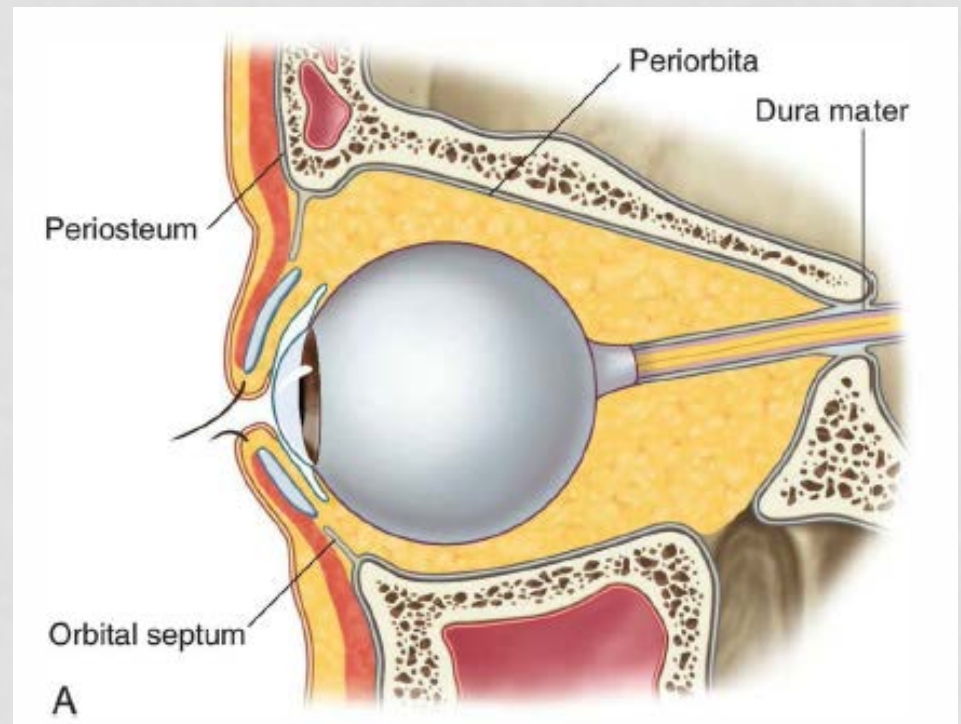


Fig. 8.73 Bones of the orbit.

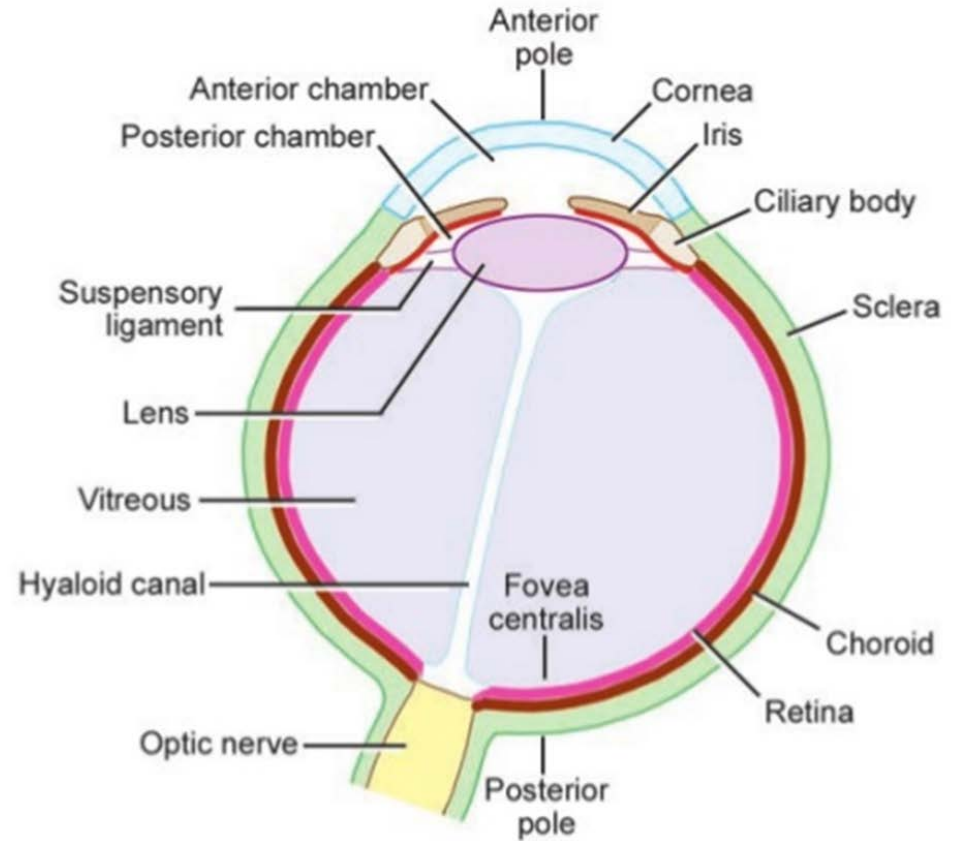
Eyeball

- The globe-shaped
- occupies the anterior part of the Orbit
- Located in orbital fat
- Separated from fat by tenon capsule
- bulges outward



Walls of the eyeball

- Surrounding the internal components of the eyeball
- They consist of three layers :
 - **The outer fibrous layer** consists of the sclera posteriorly and the cornea anteriorly.
 - **The middle vascular layer** consists of the choroid posteriorly and is continuous with the ciliary body and iris anteriorly.
 - **The inner layer** consists of the optic part of the retina posteriorly and the nonvisual retina anteriorly.



44.8: Horizontal section across the eyeball to show the main features of its structure

THE OUTER FIBROUS LAYER

- The Sclera
- The Cornea (avascular)
- Limbus
- Scleral Venous Sinus (the canal of Schlemm)

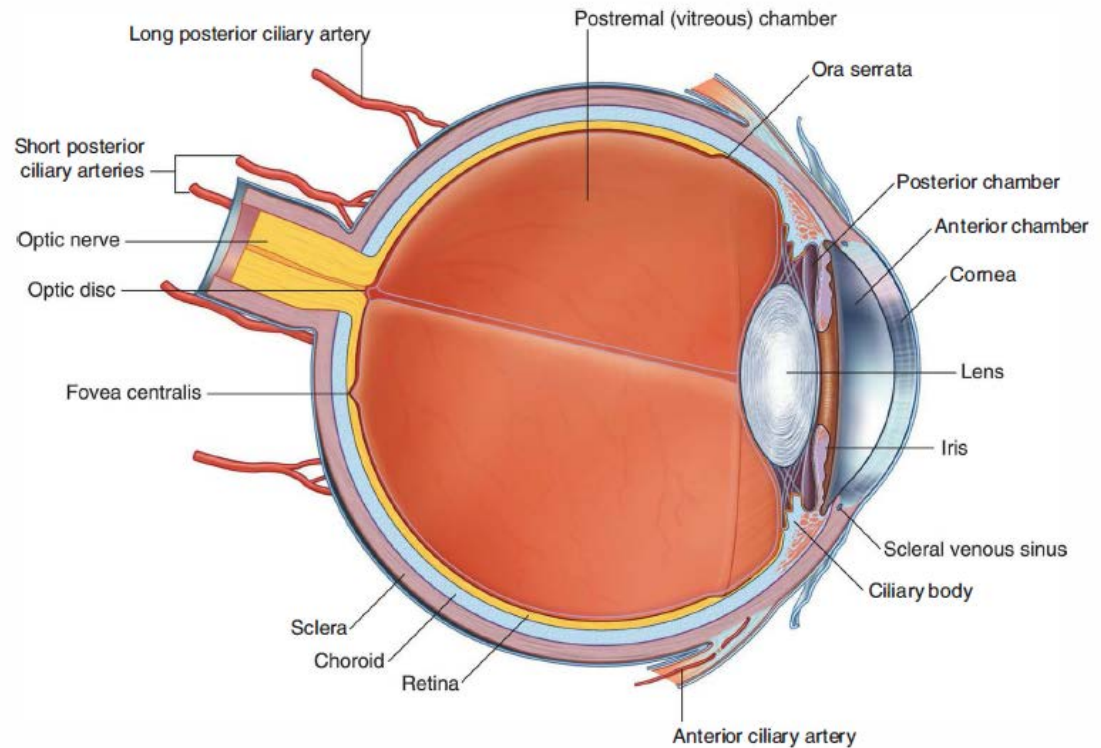


Fig. 8.104 Eyeball.

THE OUTER FIBROUS LAYER

The sclera is an **opaque layer of dense connective tissue** as the "white of the eye . "

The sclera provides **attachment for the various muscles** involved in eyeball movements

Cornea

Continuous with the sclera anteriorly is the transparent cornea.

It covers the **anterior one-sixth** of the surface of the eyeball and, being **transparent, allows light to enter the eyeball.**

Vascular layer of the eyeball

The vascular layer of the eyeball consists of three continuous parts-*the choroid, the ciliary body, and the iris* from posterior to anterior

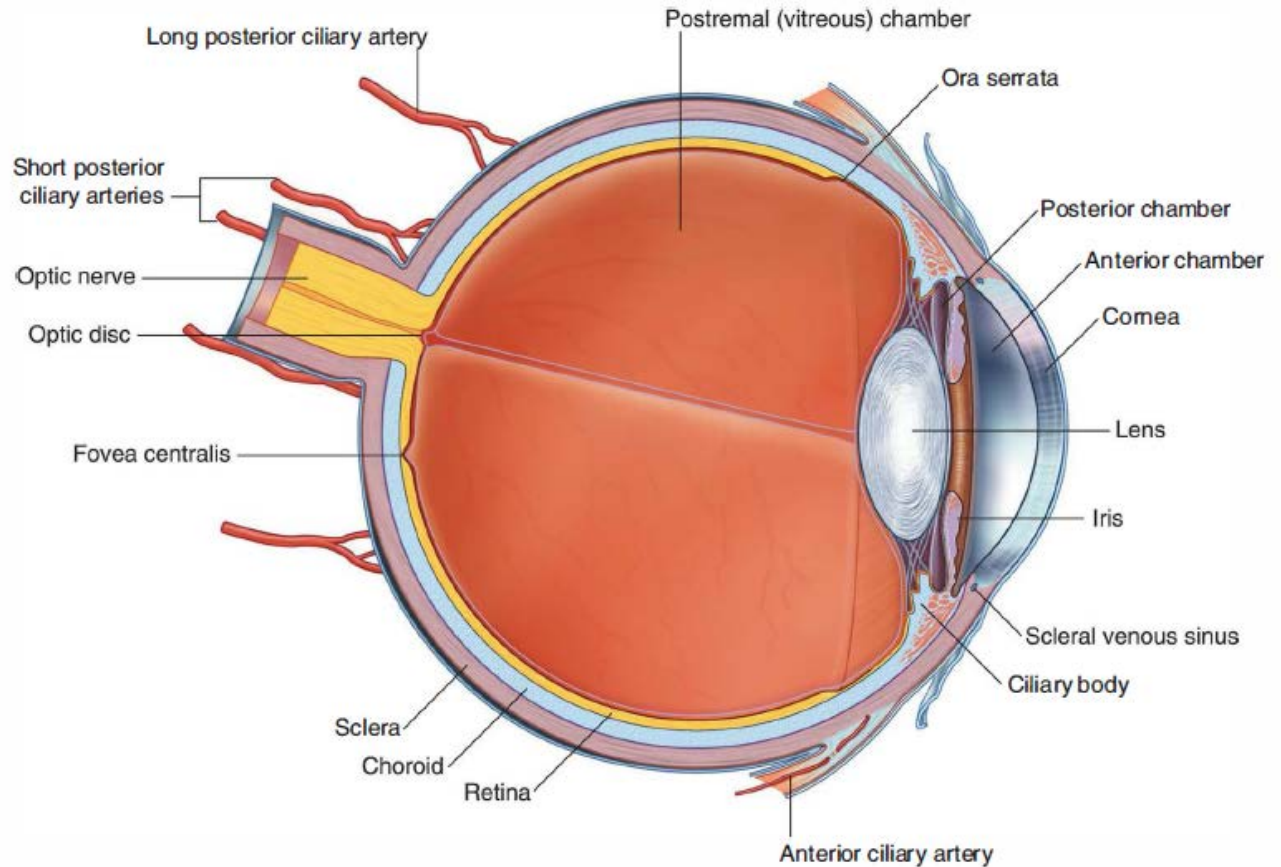


Fig. 8.104 Eyeball.

THE MIDDLE VASCULAR LAYER

Choroid

The choroid is posterior and represents approximately **two thirds** of the vascular layer.

It is a **thin, highly vascular, pigmented layer** consisting of smaller vessels adjacent to the retina and larger vessels more peripherally

It is firmly attached to the retina internally and loosely attached to the sclera externally.

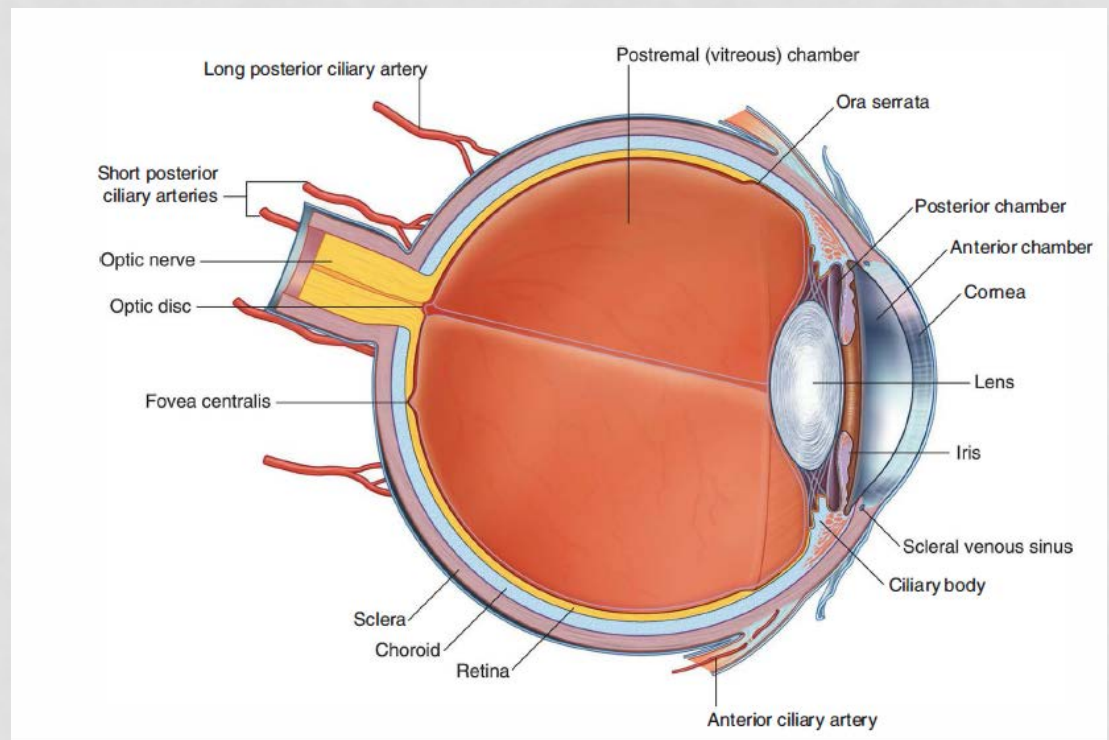


Fig. 8.104 Eyeball.

ciliary body is triangular-shaped structure, between the choroid and the iris, forms a complete ring around the eyeball.

Its components include the **ciliary muscle** and the **ciliary processes**

The **ciliary muscle** consists of smooth muscle fibers arranged longitudinally, circularly, and radially

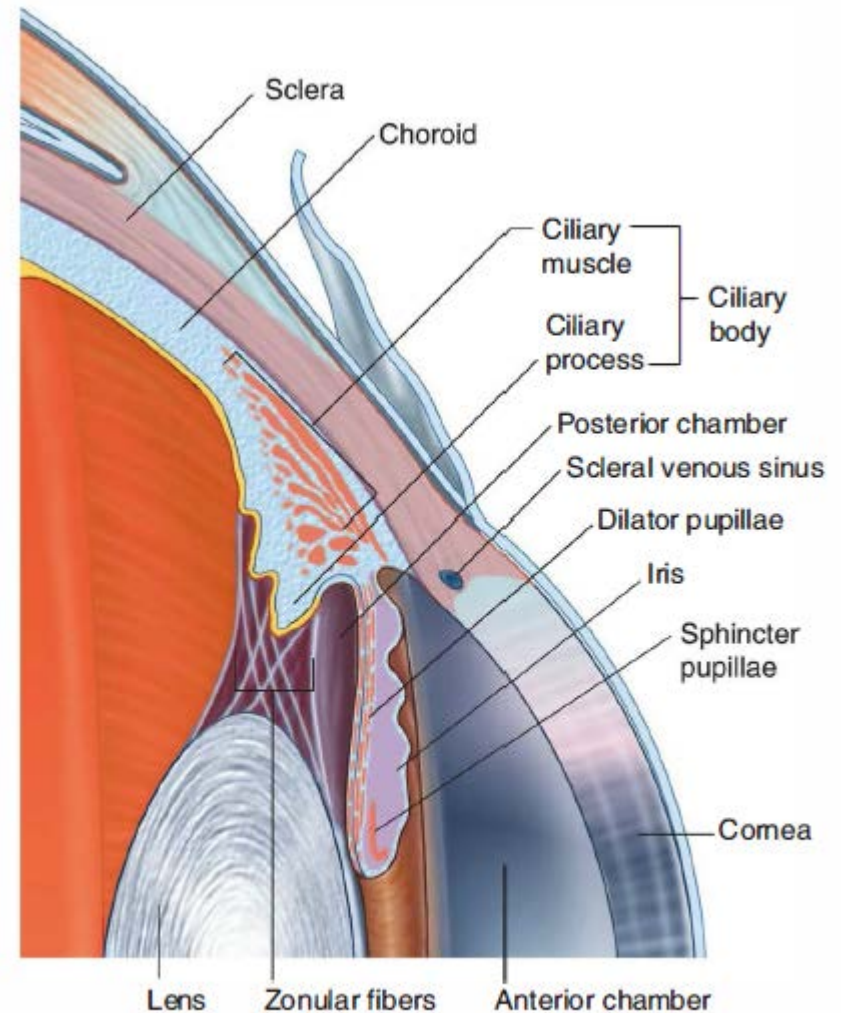


Fig. 8.106 Ciliary body.

Contraction of the ciliary muscle decreases the size of the ring formed by the ciliary body.

This reduces tension on the suspensory ligament of the lens.

The **lens** therefore becomes more **rounded** (relaxed) resulting in **accommodation of the lens for near vision**.

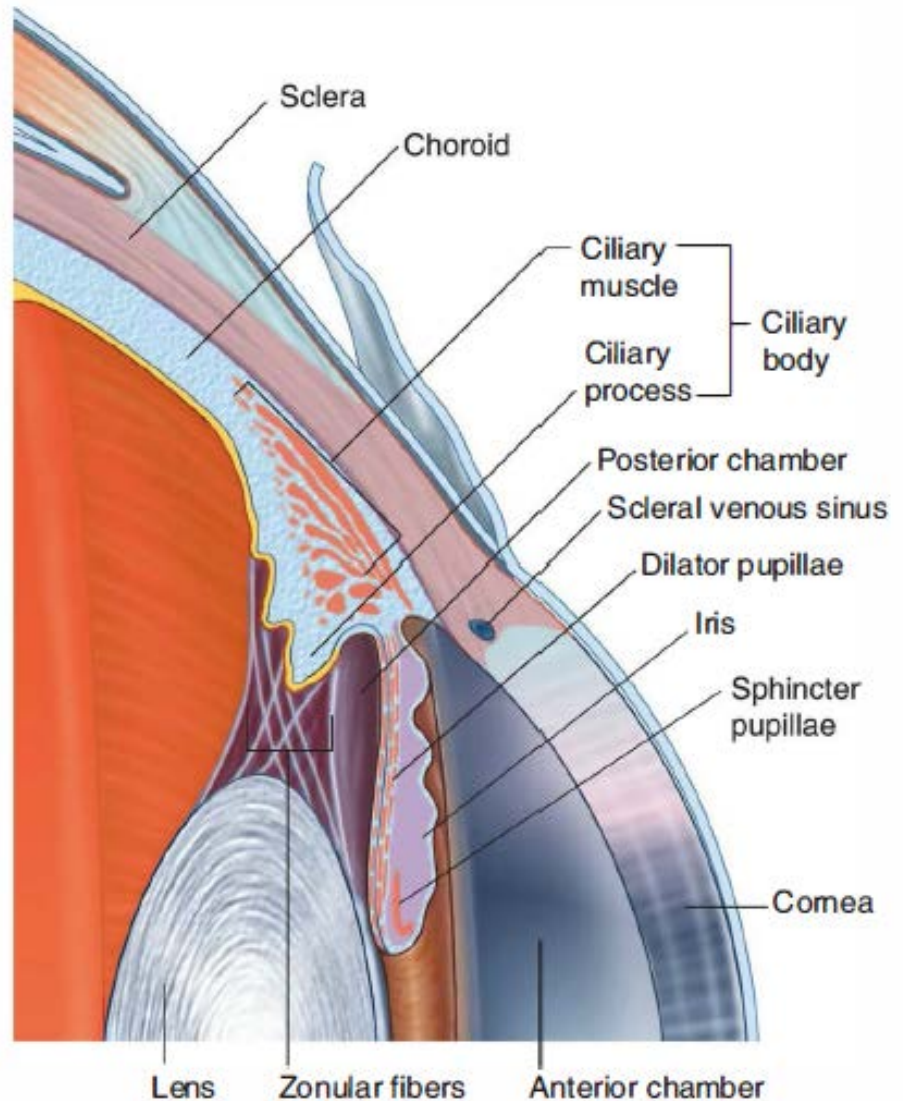
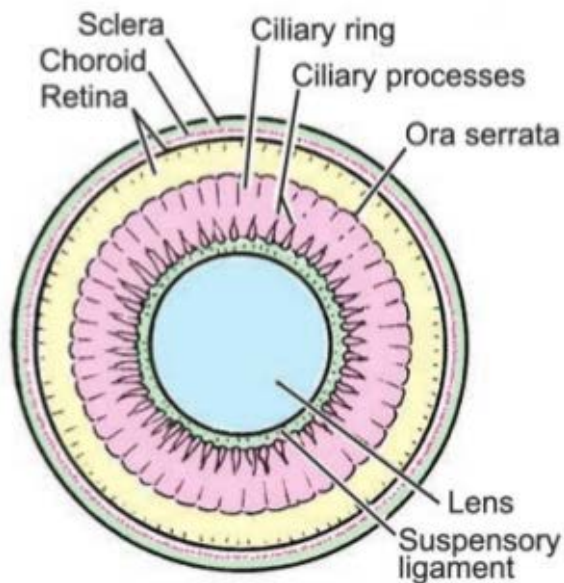


Fig. 8.106 Ciliary body.

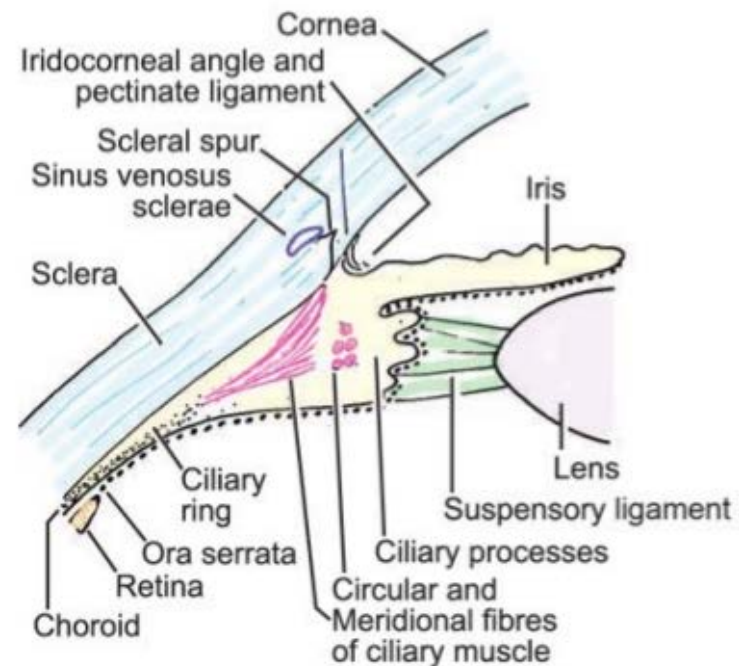
The ciliary processes are longitudinal ridges projecting from the inner surface of the ciliary body

Extending from them are **zonular fibers** attached to the lens of the eyeball, which suspend the lens in its proper position and collectively form the suspensory ligament of the lens.

Ciliary processes also contribute to the **formation of aqueous humor**.



44.11: Anterior part of the eyeball viewed from behind after cutting the eyeball in the coronal plane



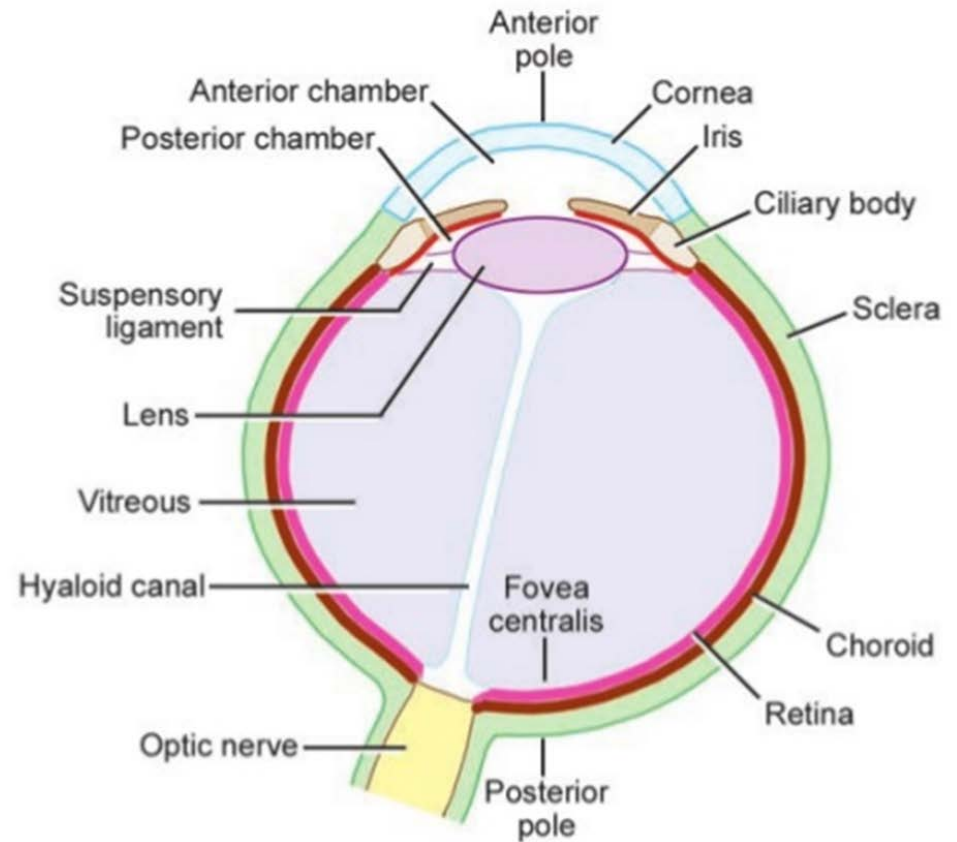
44.12: Meriodonal section through the ciliary body and iris

Iris

Completing the **vascular layer** of the eyeball anteriorly is the iris.

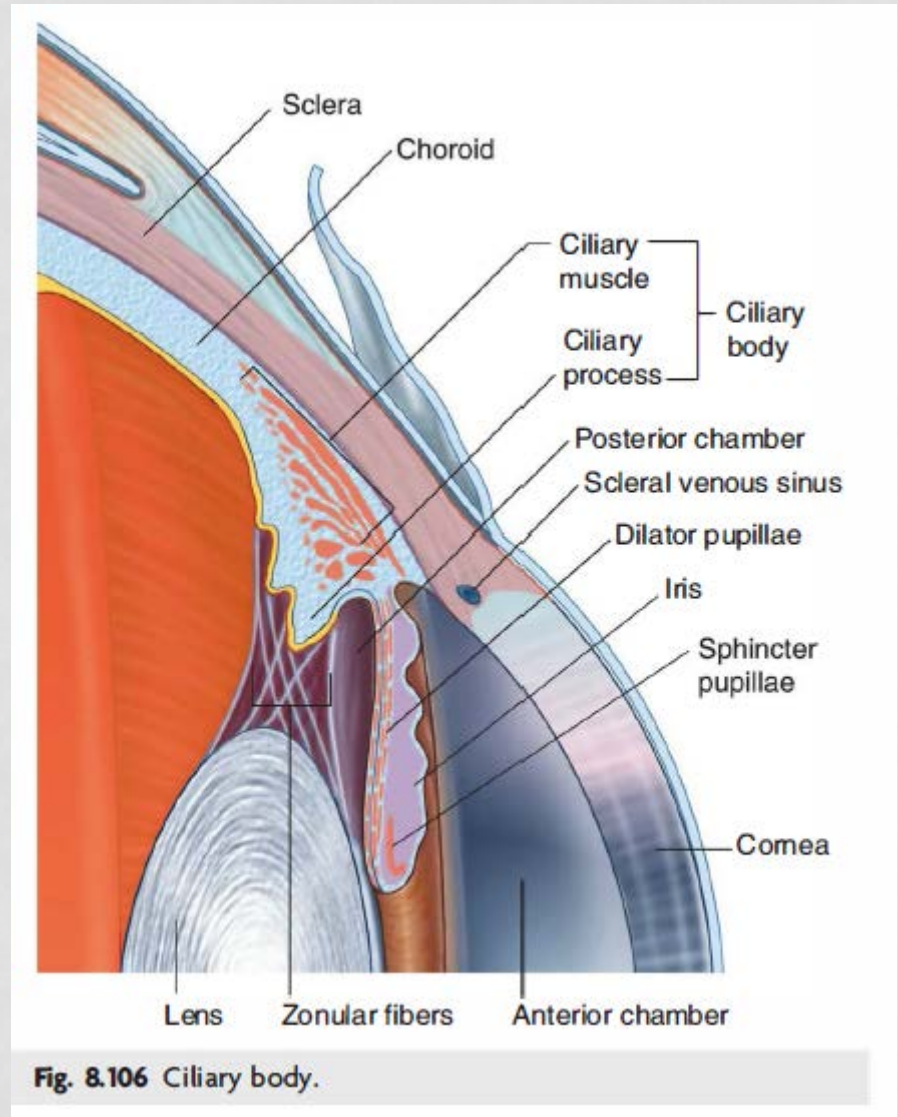
This circular structure, projecting outward from the ciliary body, is the **colored part of the eye** with a central opening (the pupil) .

Controlling the size of the pupil are smooth muscle fibers within the iris



44.8: Horizontal section across the eyeball to show the main features of its structure

Fibers arranged in a *circular pattern* make up the *sphincter pupillae* muscle, which is innervated by *parasympathetics* contraction of its fibers decreases *or constricts the pupillary opening*



Fibers arranged in a *radial pattern* make up the *dilator pupillae* muscle, which is innervated by *sympathetics* contraction of its fibers increases or *dilates the pupillary opening*.

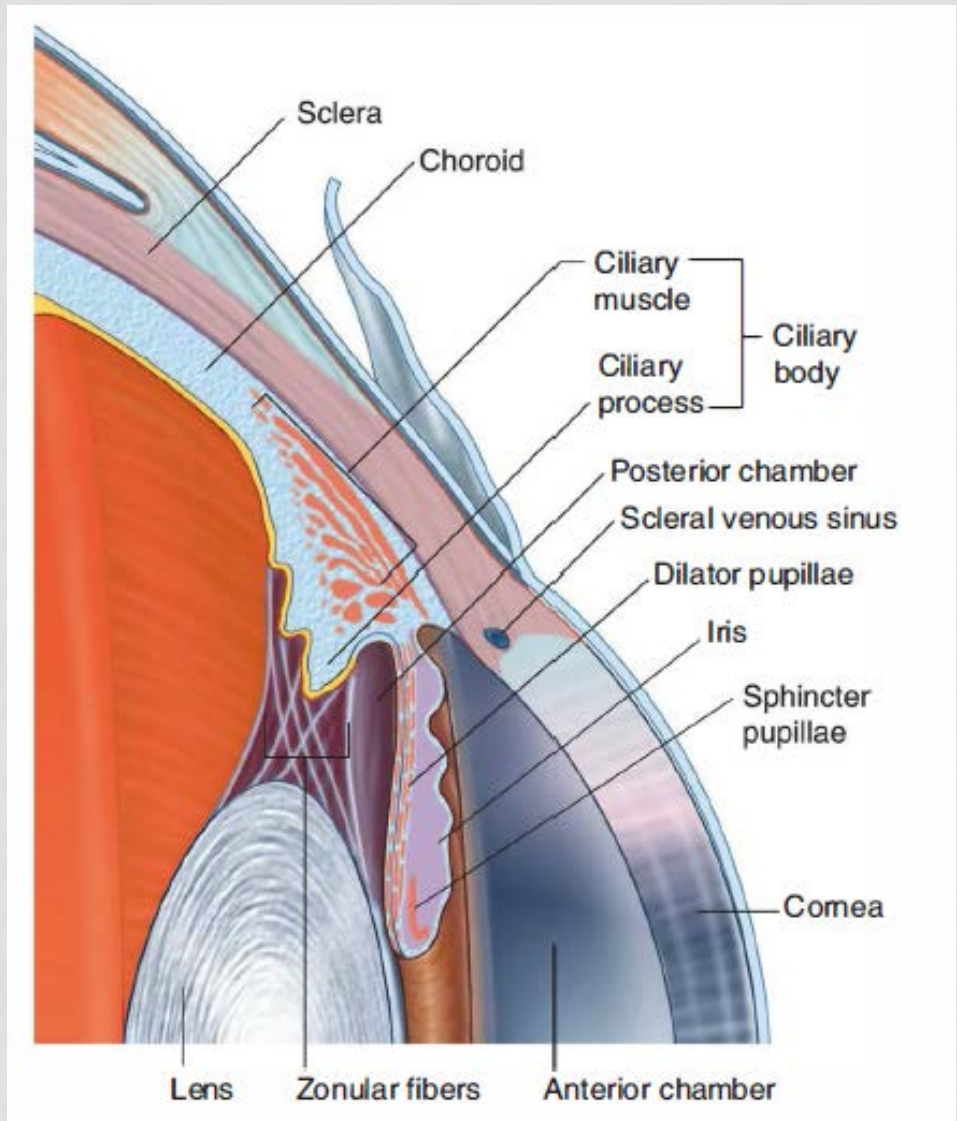


Fig. 8.106 Ciliary body.

Table 8.9 Intrinsic muscles of the eye

Muscle	Location	Innervation	Function
Ciliary	Muscle fibers in the ciliary body	Parasympathetics from the oculomotor nerve (III)	Constricts ciliary body, relaxes tension on lens, lens becomes more rounded
Sphincter pupillae	Circularly arranged fibers in the iris	Parasympathetics from the oculomotor nerve (III)	Constricts pupil
Dilator pupillae	Radially arranged fibers in the iris	Sympathetics from the superior cervical ganglion (T1)	Dilates pupil

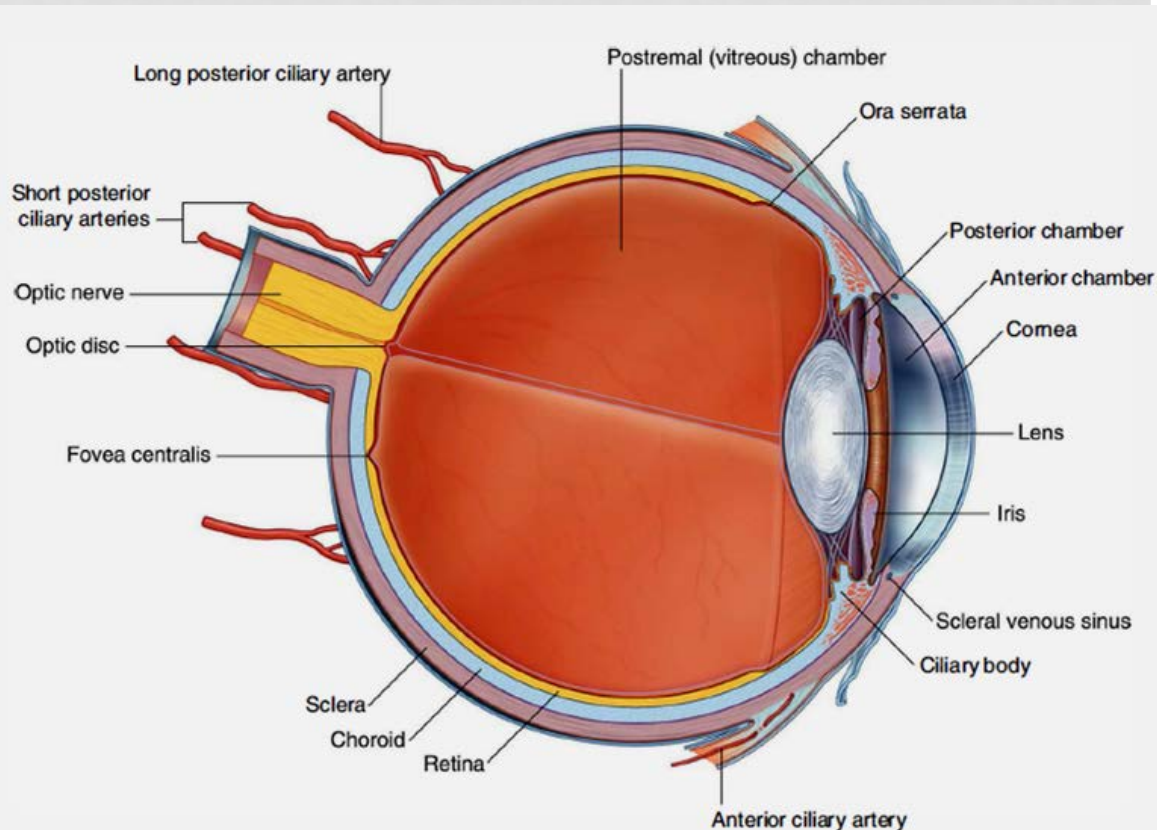
The inner layer of the eyeball is the retina.

It consists of two parts.

Posteriorly and laterally is the **optic part** of the retina, which is sensitive to light

and anteriorly is the **nonvisual part**, which covers the internal surface of the ciliary body and the iris .

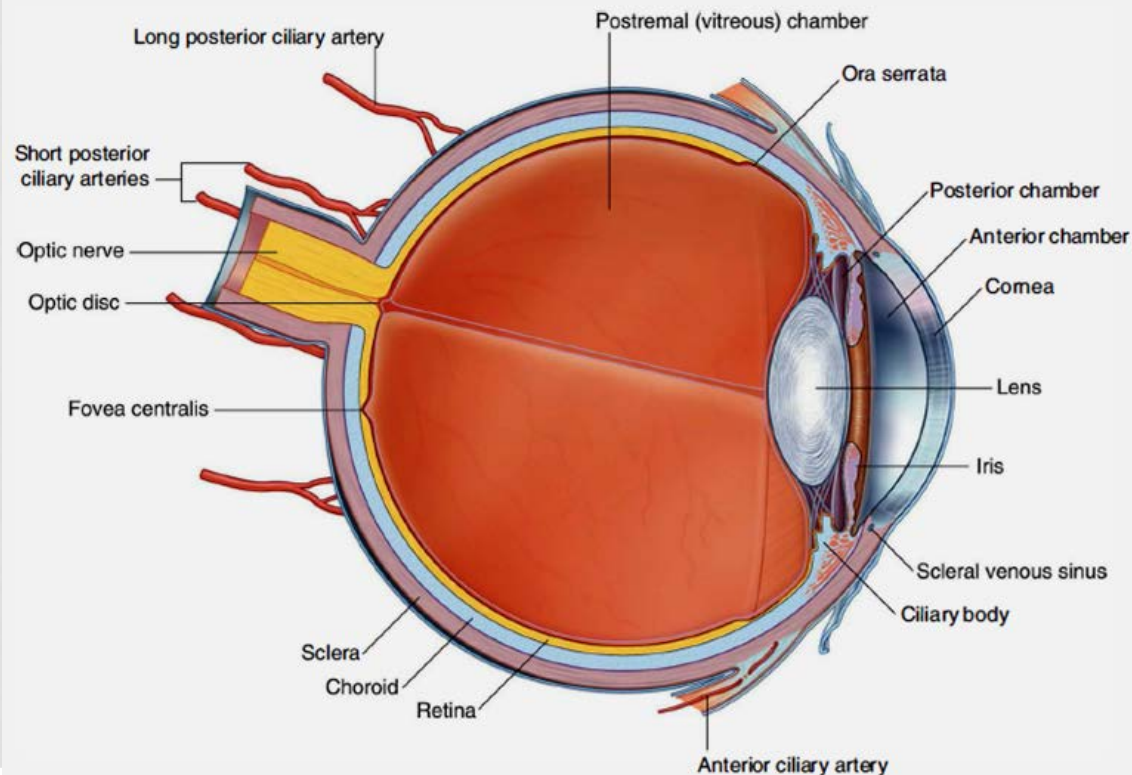
The junction between these parts is an irregular line (**the ora serrata**).

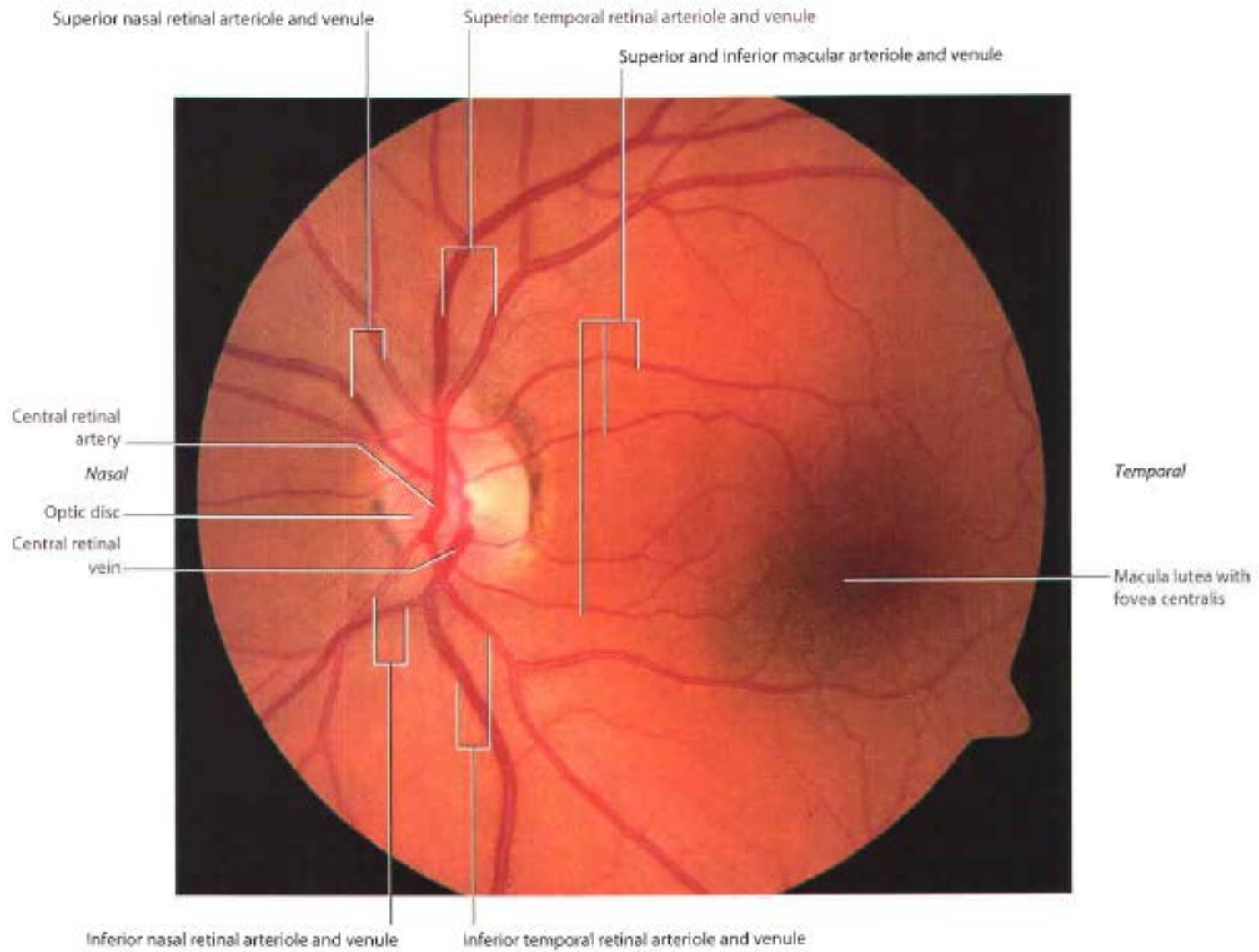


optic part of the retina consists of two layers , *an outer pigmented layer* and *an inner neural layer*:

- **The pigmented layer** is firmly attached to the choroid and continues anteriorly over the internal surface of the ciliary body and iris .
- **The neural layer**, which can be further subdivided into its various neural components, is only attached to the pigmented layer around the optic nerve and at the ora serrata.

Macula Lutea
The Fovea Centralis
Optic Disc

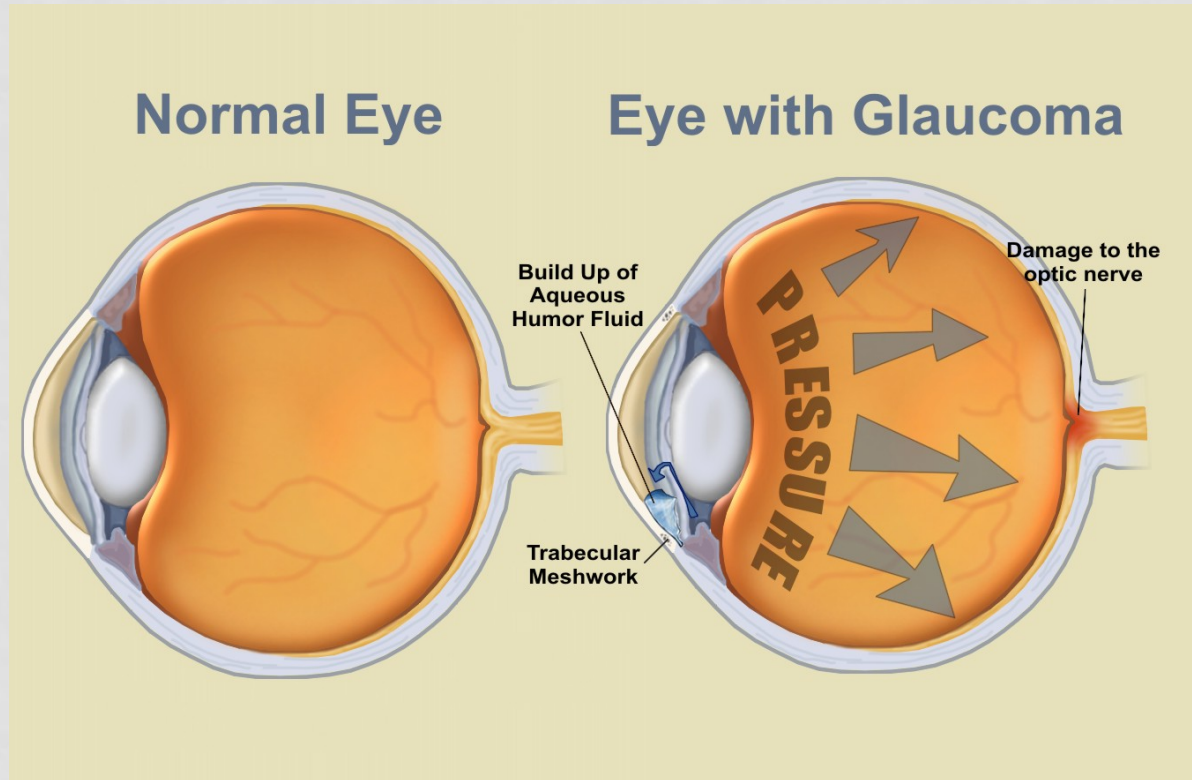




Ophthalmoscopic view of the left retina showing the optic disc, the macula lutea, and the retinal vasculature.

GLAUCOMA

Failure Drainage
Of Aqueous
Humor



Arteries

The arterial supply to the structures in the orbit, including the eyeball, is by the **ophthalmic artery**. This vessel is a branch of **the internal carotid artery**

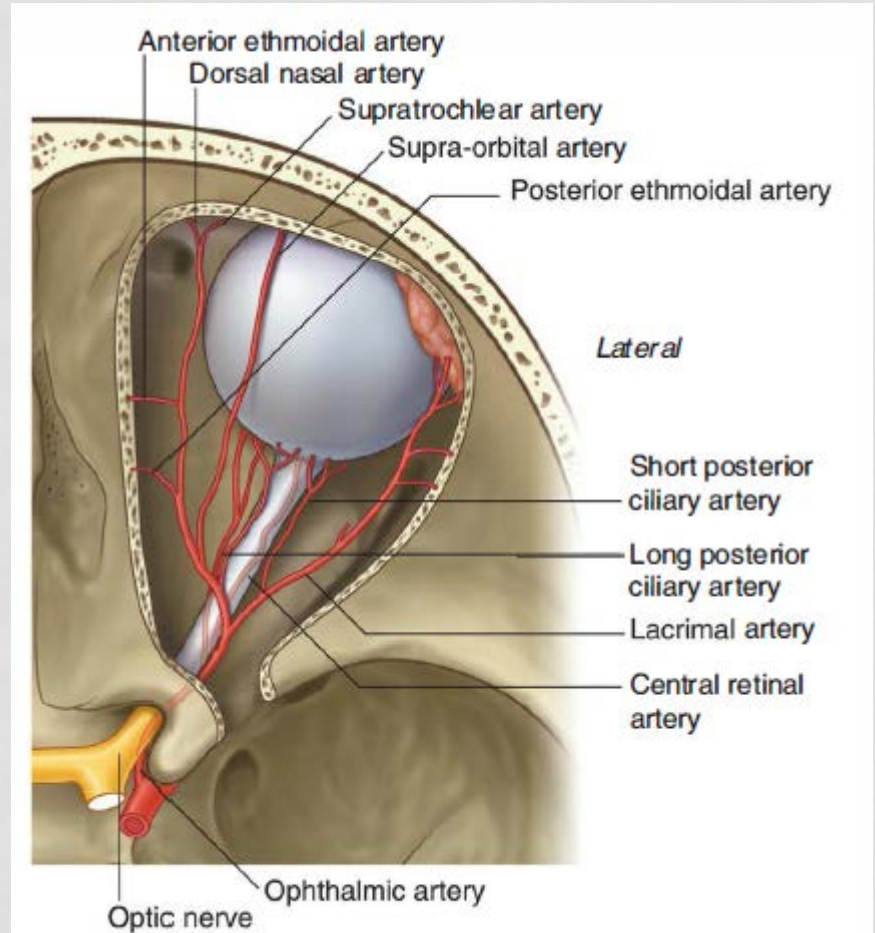


Fig. 8.95 Arterial supply to the orbit and eyeball.

INNERVATION

Optic Nerve (Special Sense)

Ophthalmic Nerve (General Sense)

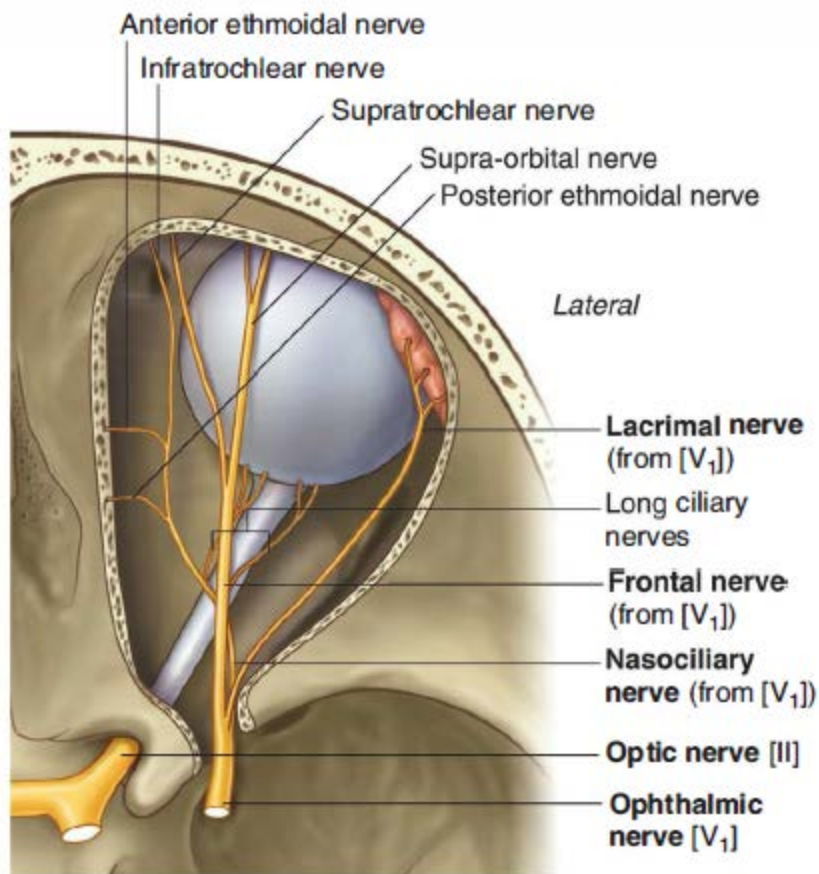


Fig. 8.100 Ophthalmic nerve [V₁] and its divisions.

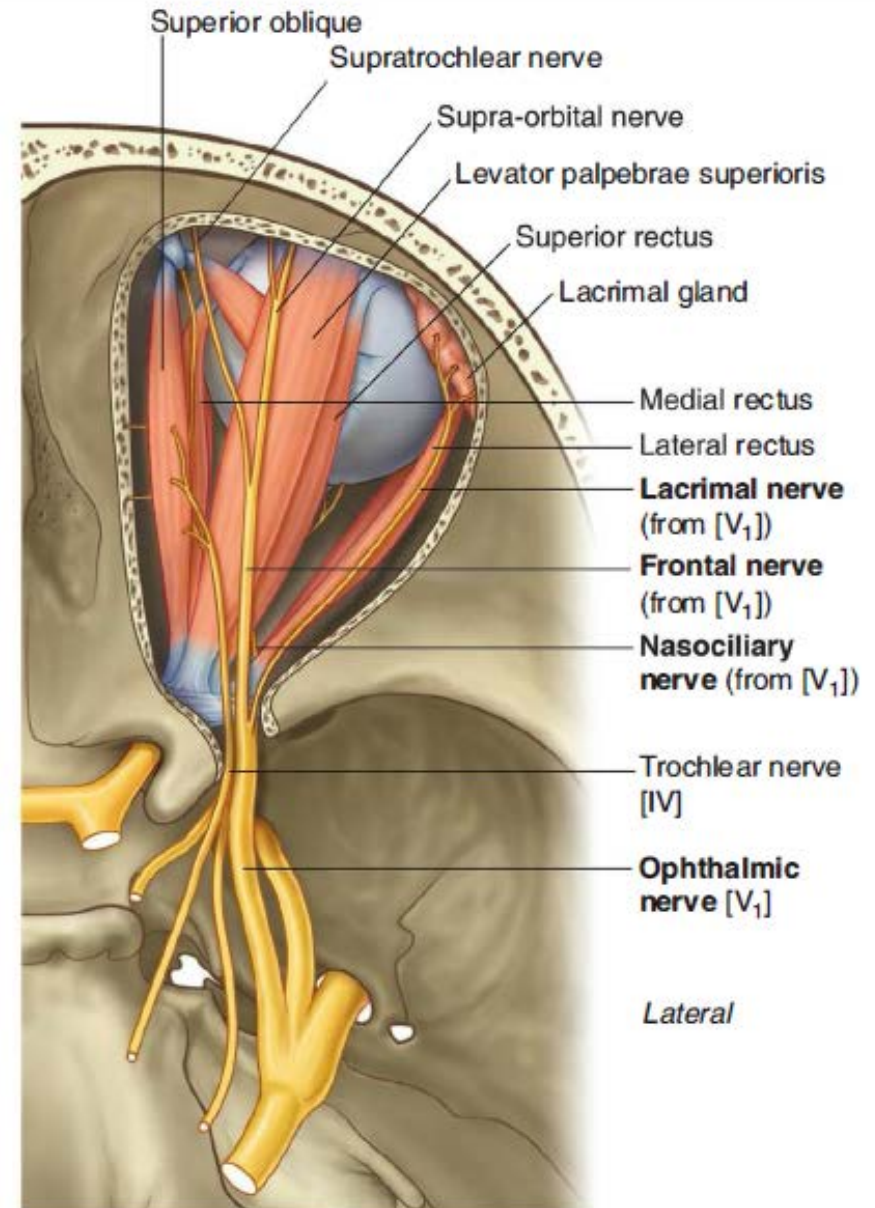


Fig. 8.101 Relationship of the ophthalmic nerve [V₁] and its divisions to the muscles of the eyeball.

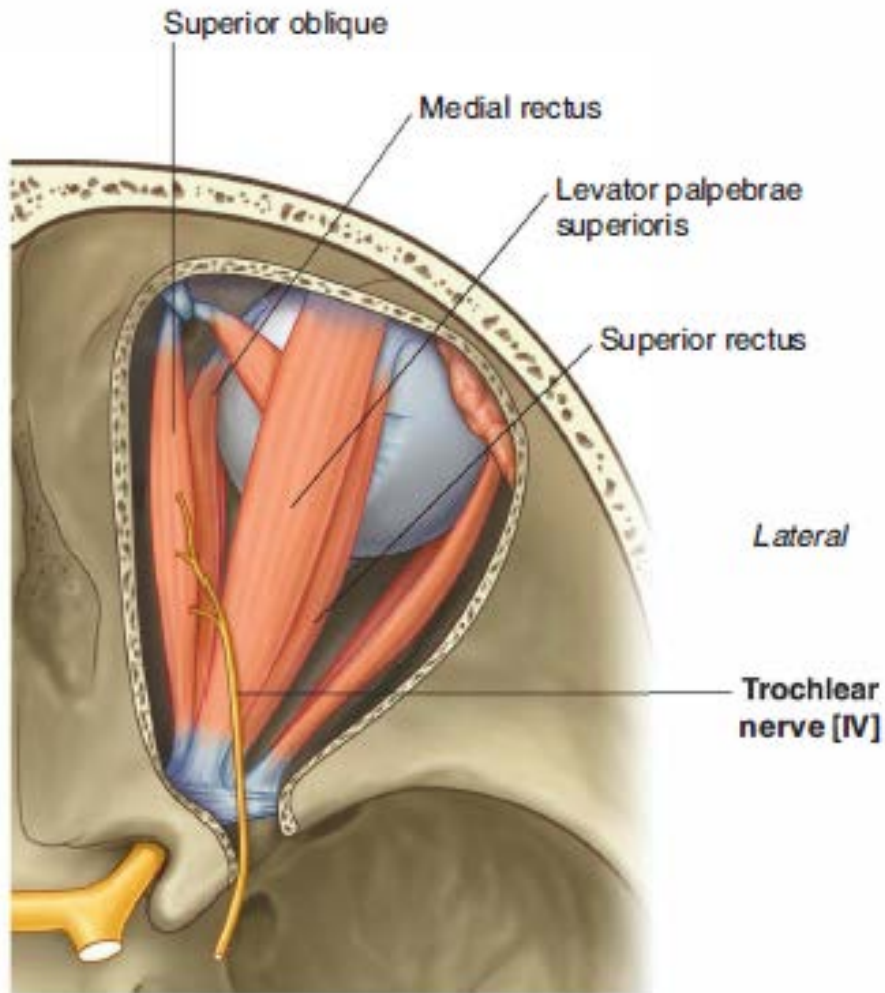


Fig. 8.99 Trochlear nerve [IV] in the orbit.

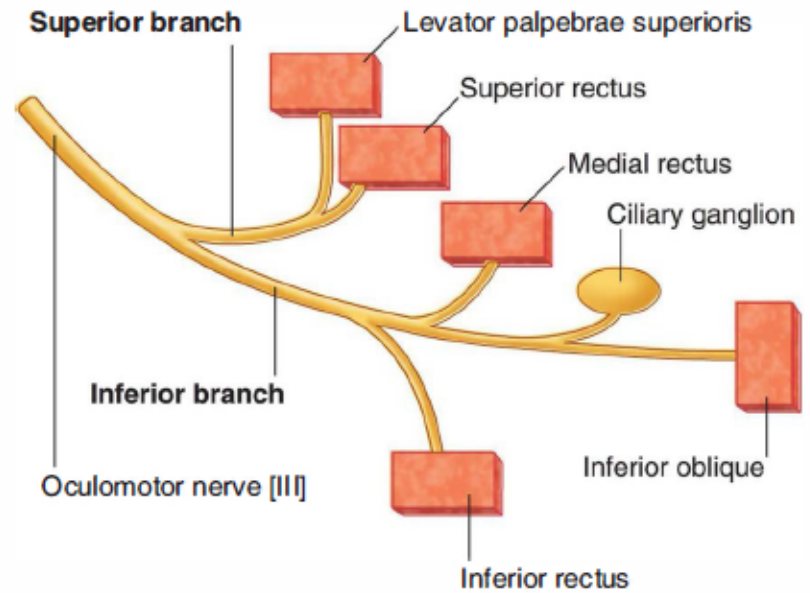


Fig. 8.98 Oculomotor nerve [III] and its divisions.

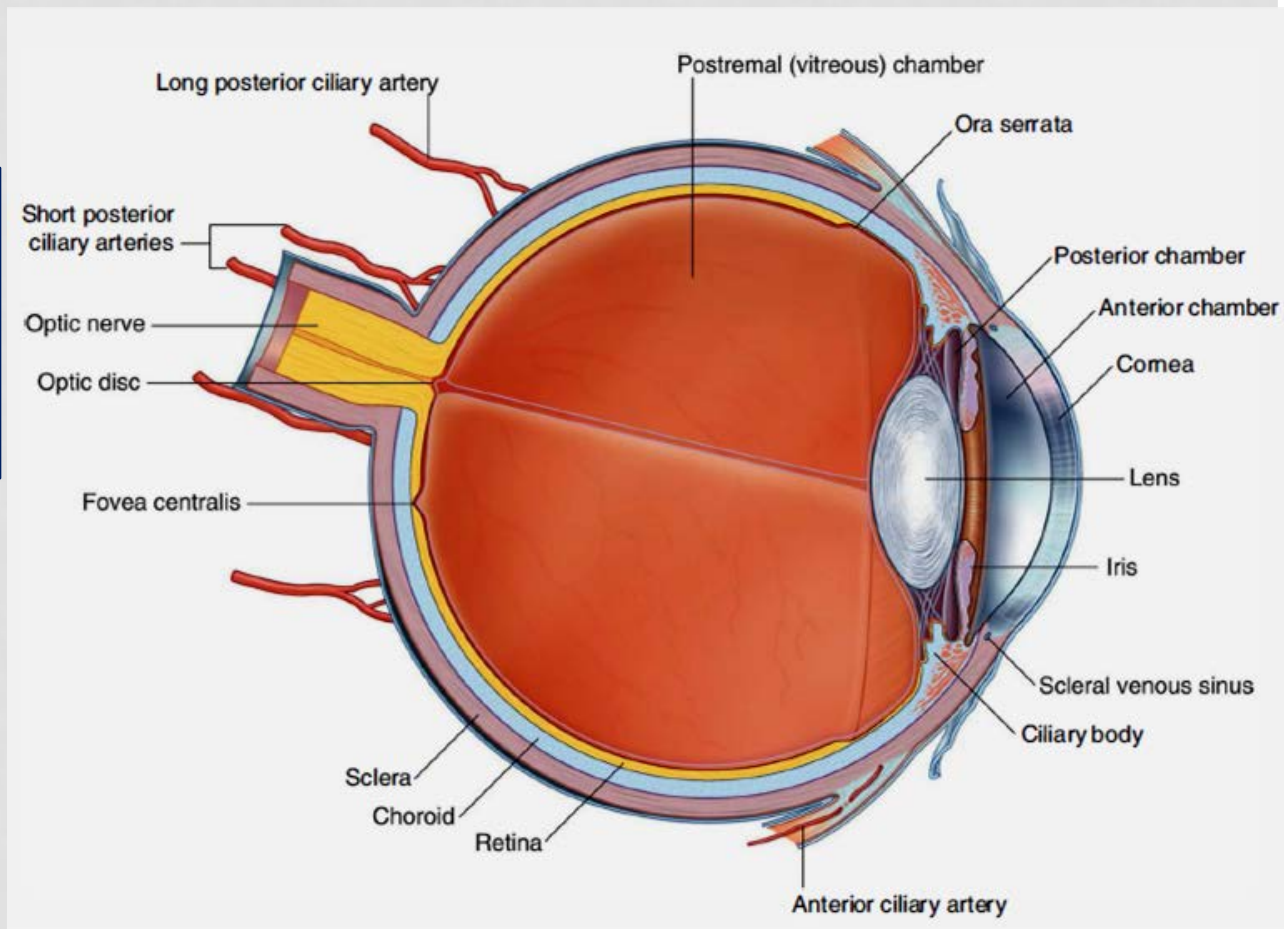
Motor nerve

Oculomotor
Trochlear
Abducent

The anterior and posterior chambers are continuous with each other through the *pupillary opening*.

Orbit filled with a fluid (aqueous humor) , which is secreted into the posterior chamber from ciliary body, flows into the anterior chamber through the pupil, and is *absorbed into the scleral venoussinus (the canal of Schlemm)*

The aqueous humor supplies nutrients to the *avascular cornea* and *lens* and *maintains the intra-ocular pressure*

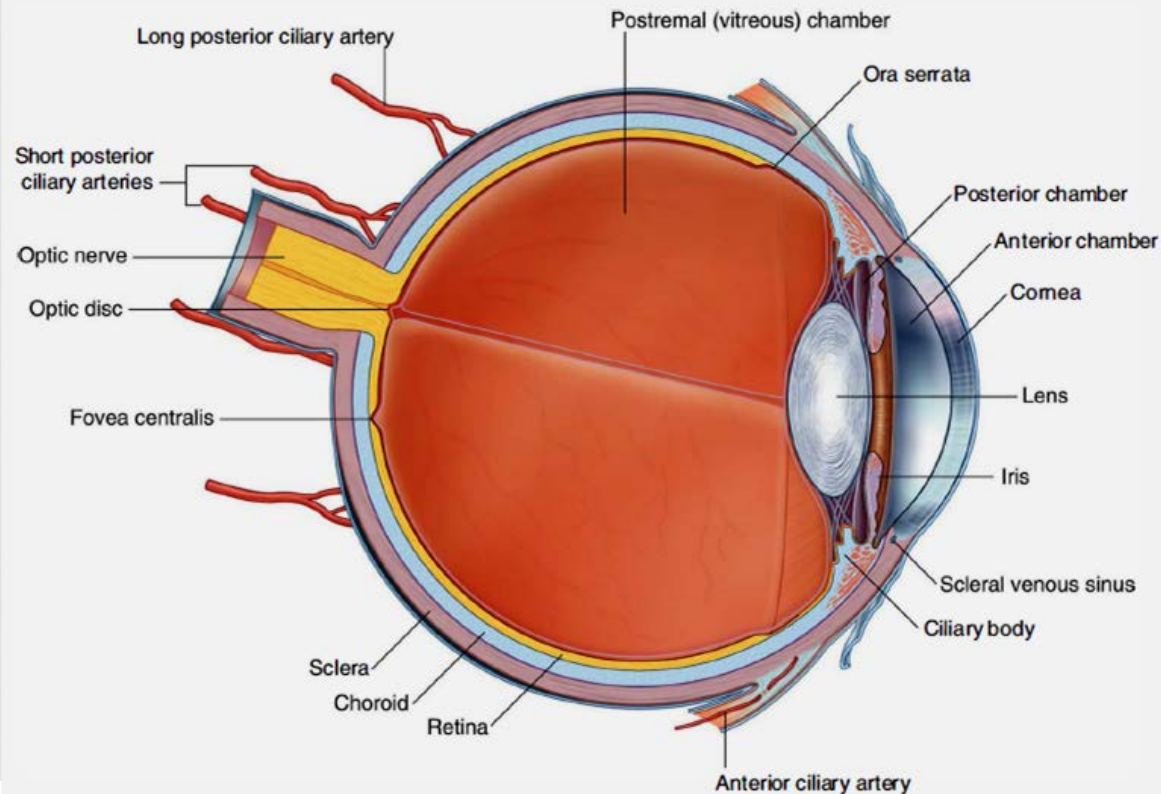


Lens

The lens separates the anterior one-fifth of the eyeball from the posterior four-fifths.

It is a **transparent, biconvex elastic disc** attached circumferentially to muscles associated with the outer wall of the eyeball.

This lateral attachment provides the lens with the ability to change its refractive ability to maintain visual acuity



vitreous humor

The posterior four-fifths of the eyeball, from the lens to the retina, is occupied by the *postremal (vitreous) chamber*.

This segment is filled with a transparent, gelatinous substance—the vitreous body (vitreous humor) .

This substance, unlike aqueous humor, *cannot be replaced*

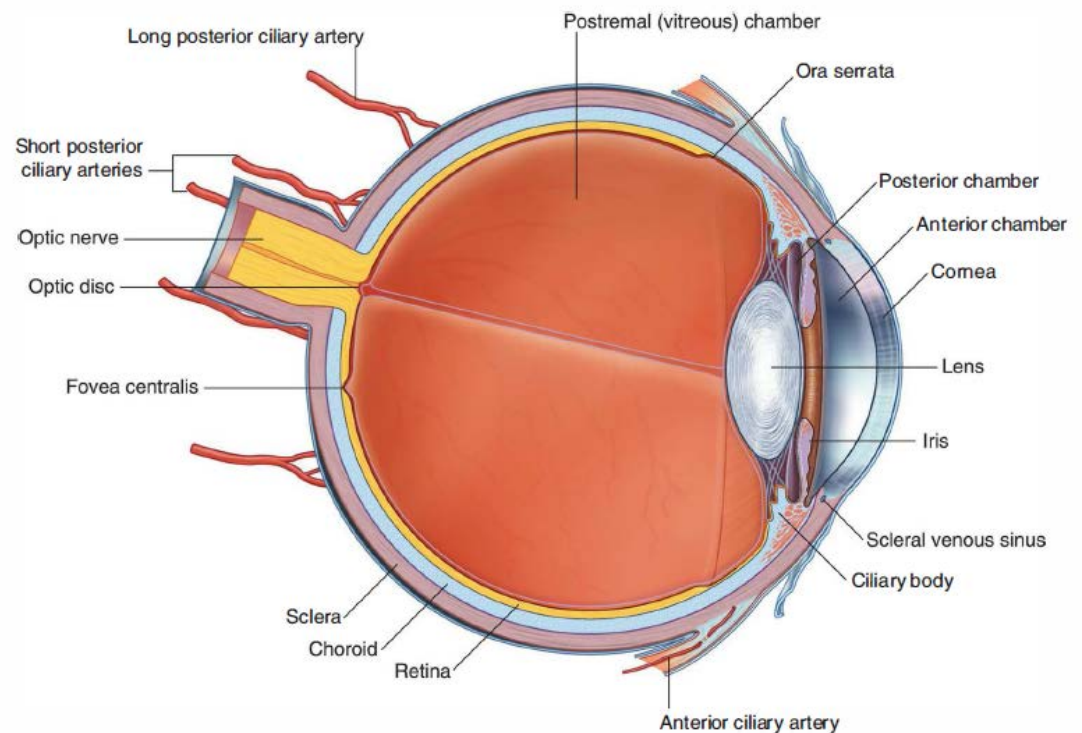


Fig. 8.104 Eyeball.

Palpebrae

Internal Surface:
Conjunctiva

External Surface:
Skin

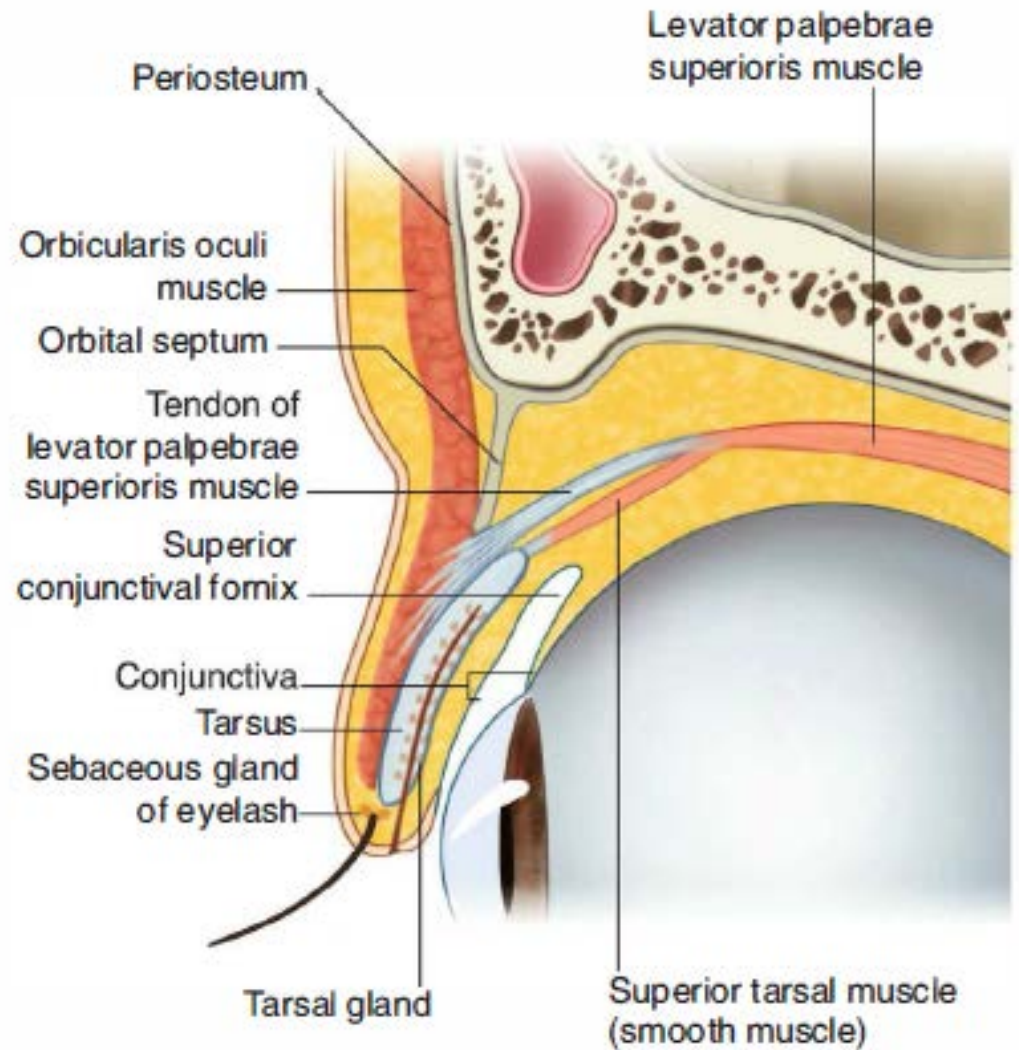


Fig. 8.74 Eyelids.

Conjunctiva

This membrane covers the full extent of the **posterior surface of each eyelid** before reflecting onto the outer surface (sclera) of the eyeball.

It **attaches** to the eyeball at the **junction between the sclera and the cornea**.

With this membrane in place, a **conjunctival sac** is formed when the eyelids are closed, and the upper and lower extensions of this sac are the **superior and inferior conjunctival fornices**

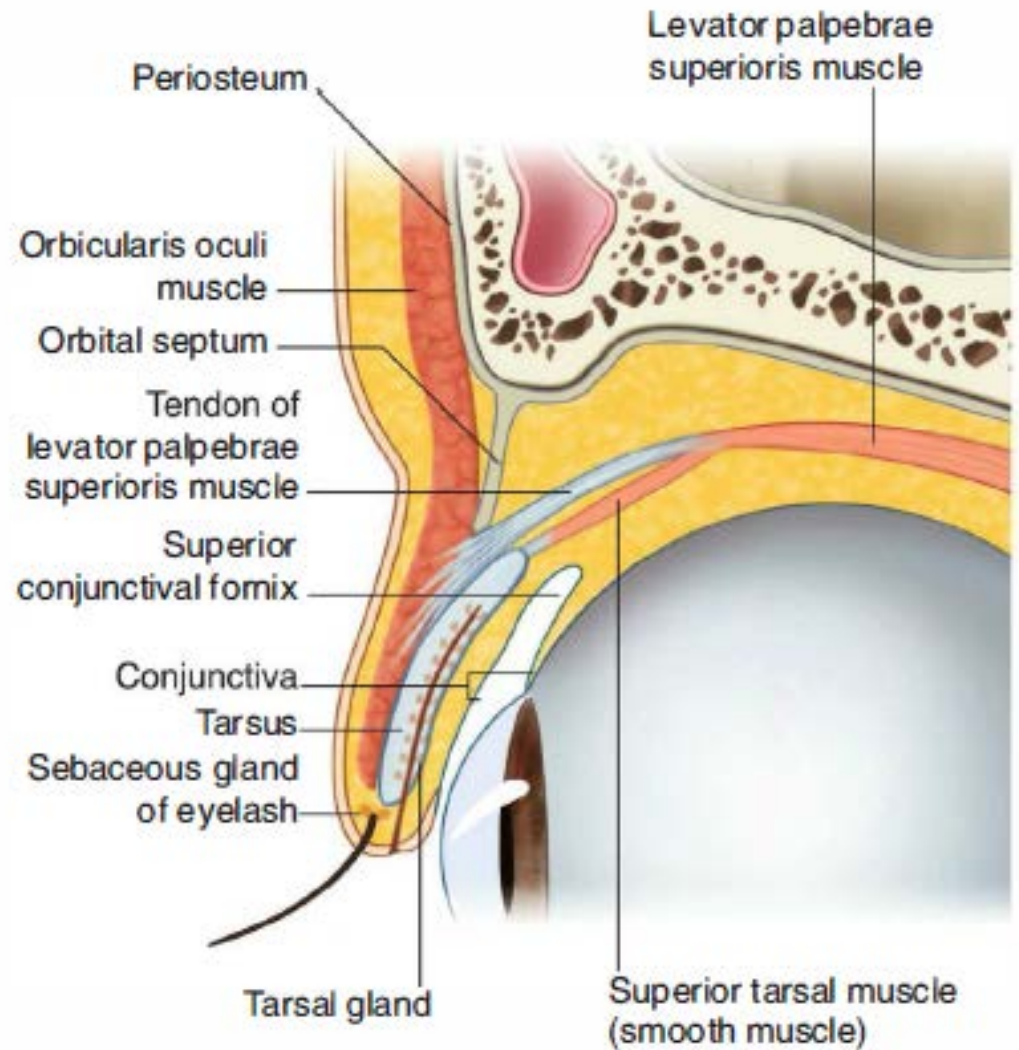


Fig. 8.74 Eyelids.

LACRIMAL APPARATUS

Lacrimal gland
Lacrimal ducts
Lacrimal sac
Nasolacrimal duct

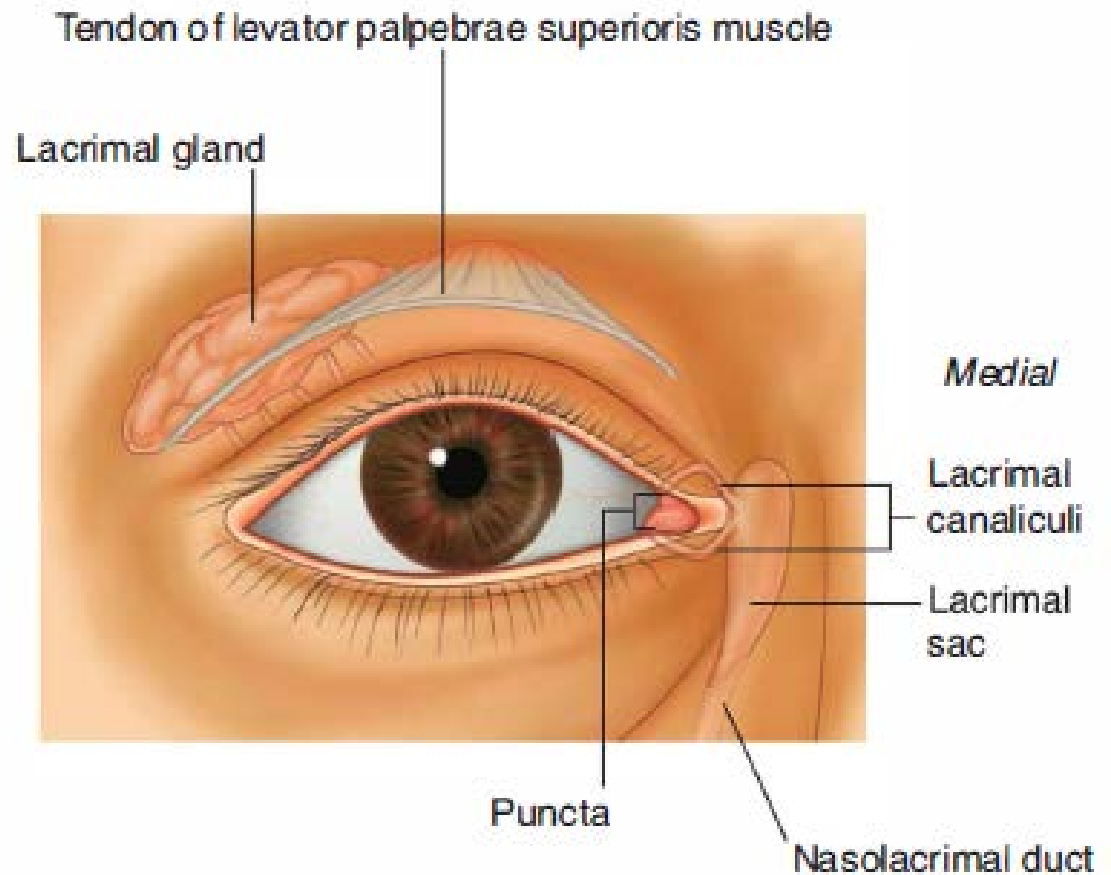


Fig. 8.80 Lacrimal gland, anterior view.

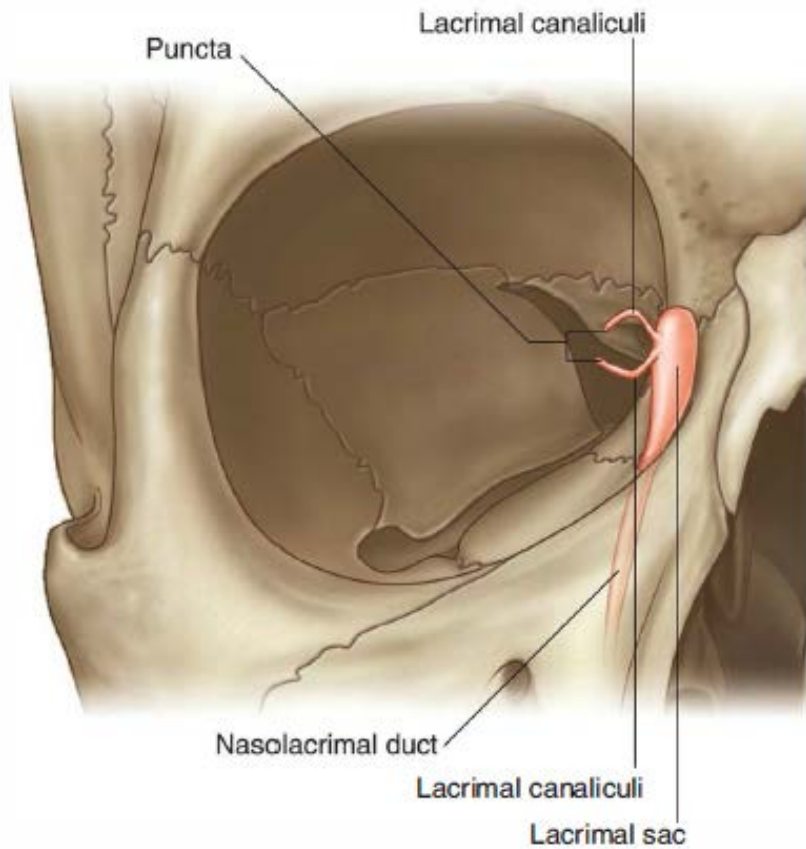


Fig. 8.82 The lacrimal sac.

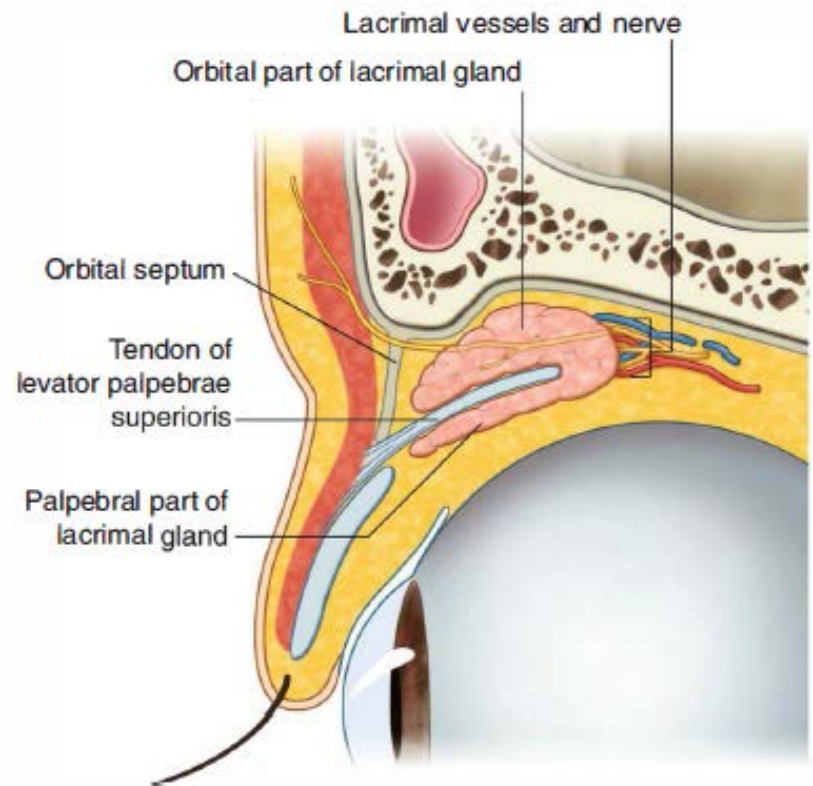
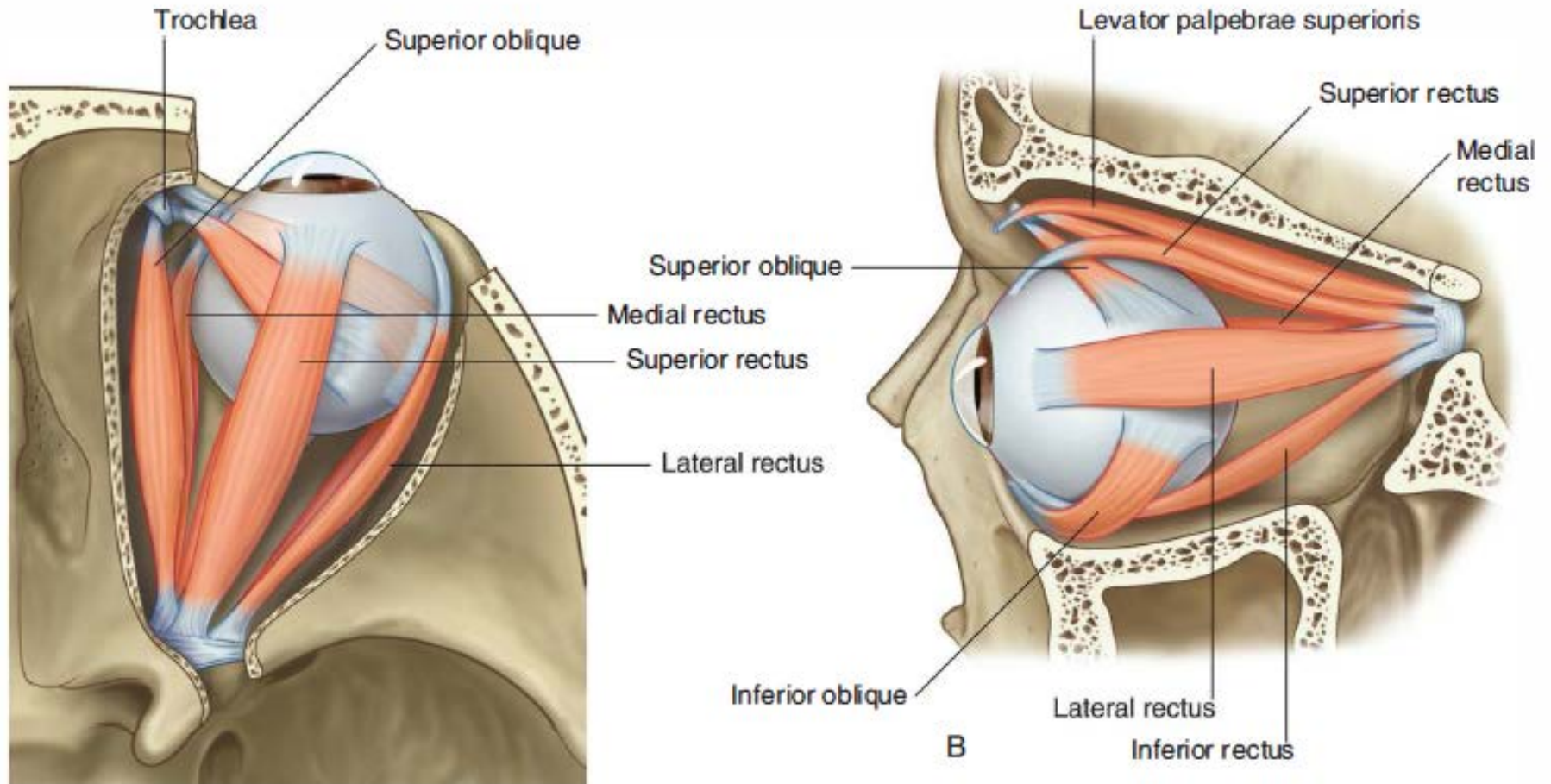


Fig. 8.81 Lacrimal gland and levator palpebrae superioris.

Extra Ocular Muscles



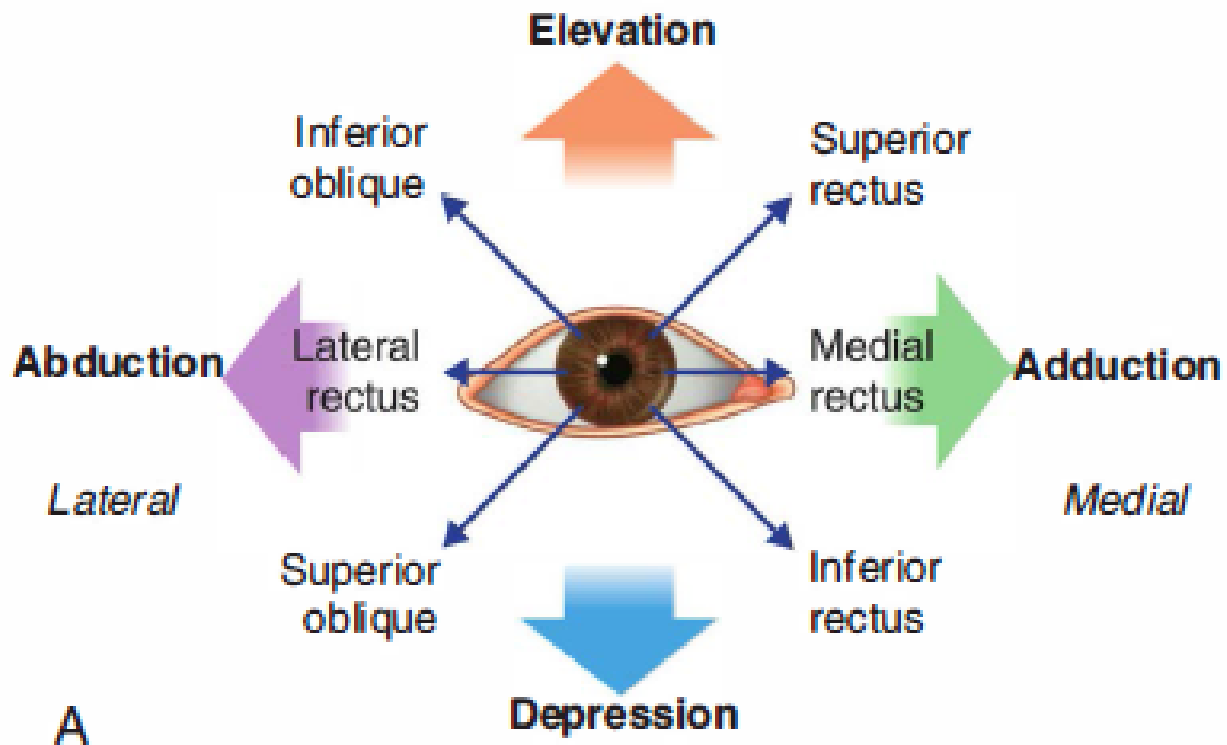
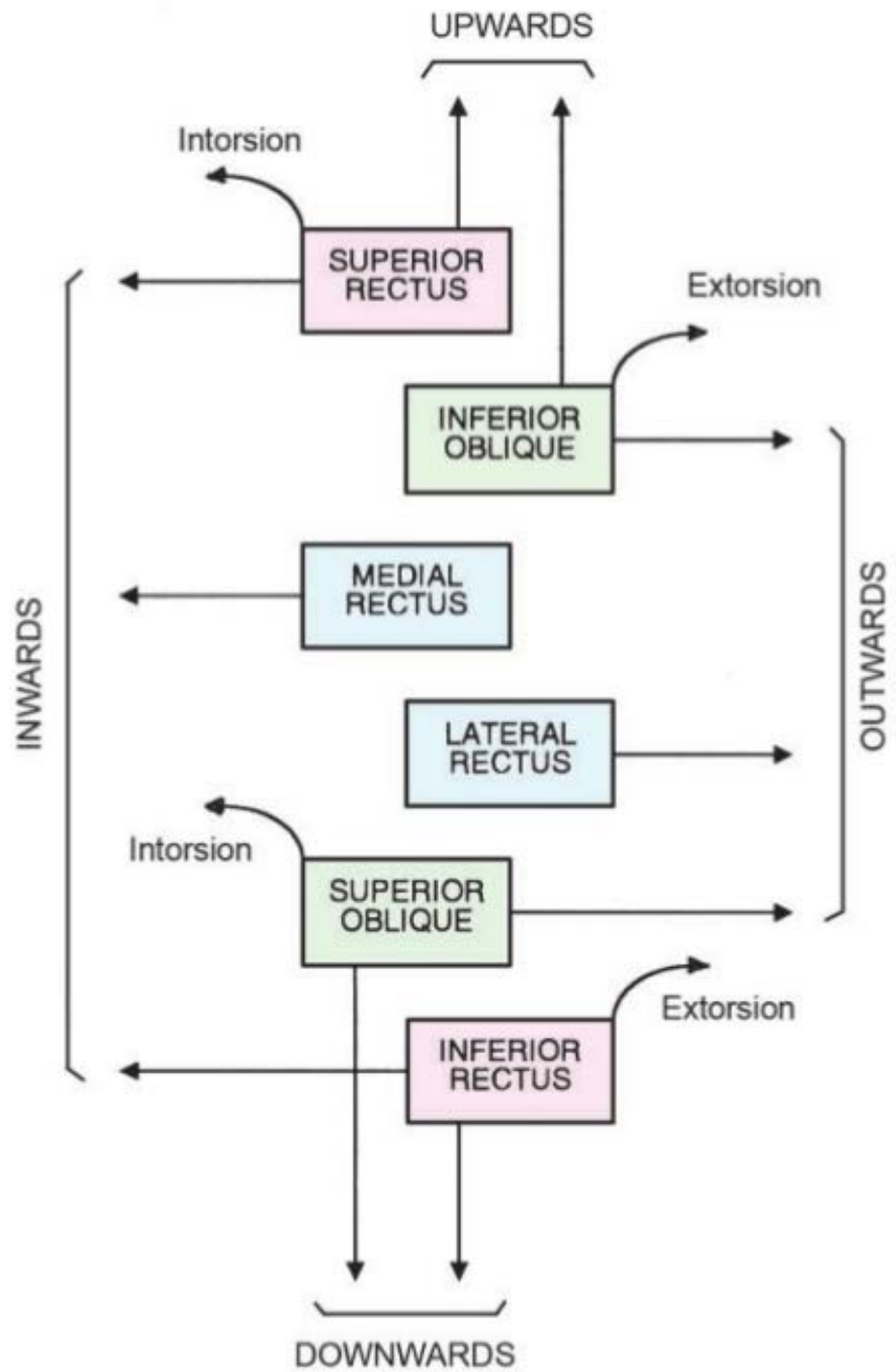
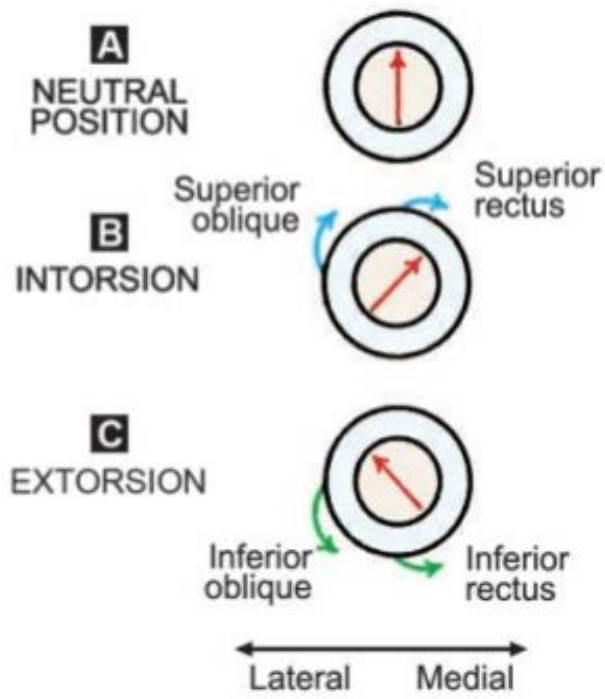


Table 8.8 Extrinsic (extra-ocular) muscles

Muscle	Origin	Insertion	Innervation	Function
Levator palpebrae superioris	Lesser wing of sphenoid anterior to optic canal	Anterior surface of tarsal plate; a few fibers to skin and superior conjunctival fornix	Oculomotor nerve [III]—superior branch	Elevation of upper eyelid
Superior rectus	Superior part of common tendinous ring	Anterior half of eyeball superiorly	Oculomotor nerve [III]—superior branch	Elevation, adduction, medial rotation of eyeball
Inferior rectus	Inferior part of common tendinous ring	Anterior half of eyeball inferiorly	Oculomotor nerve [III]—inferior branch	Depression, adduction, lateral rotation of eyeball
Medial rectus	Medial part of common tendinous ring	Anterior half of eyeball medially	Oculomotor nerve [III]—inferior branch	Adduction of eyeball
Lateral rectus	Lateral part of common tendinous ring	Anterior half of eyeball laterally	Abducent nerve [VI]	Abduction of eyeball
Superior oblique	Body of sphenoid, superior and medial to optic canal	Outer posterior quadrant of eyeball (superior surface)	Trochlear nerve [IV]	Depression, abduction, medial rotation of eyeball
Inferior oblique	Medial floor of orbit posterior to rim; maxilla lateral to nasolacrimal groove	Outer posterior quadrant of eyeball (inferior surface)	Oculomotor nerve [III]—inferior branch	Elevation, abduction, lateral rotation of eyeball



Have A Good Time

