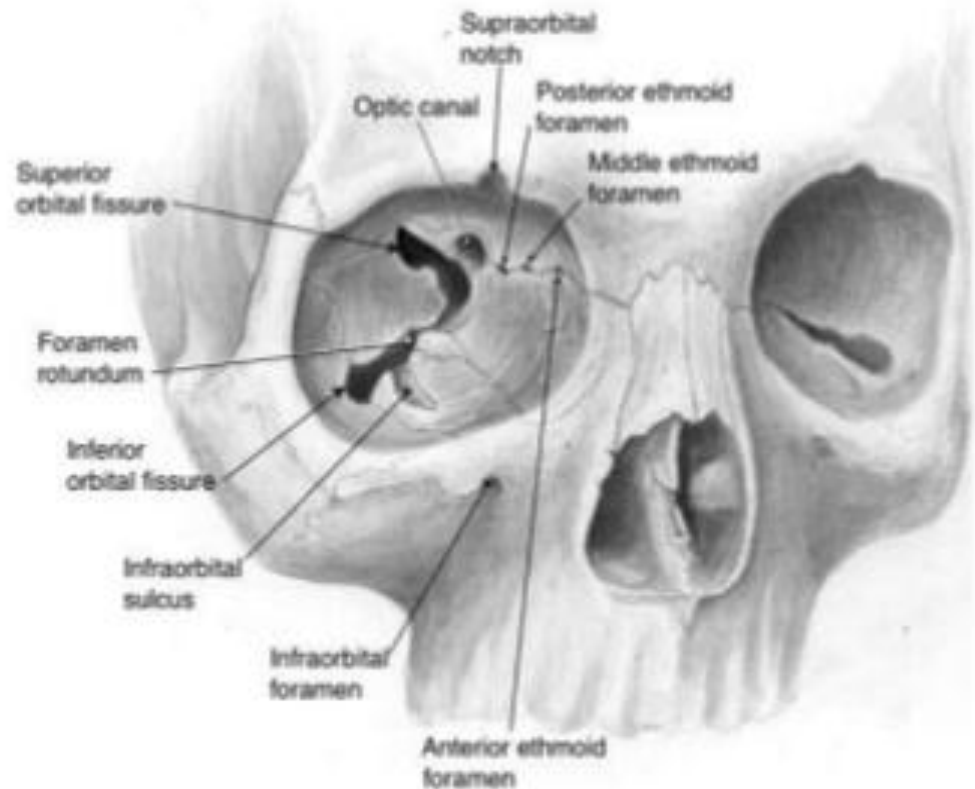


The orbit

- Pair of pyramidal bony cavities, with its base in front, and its apex behind
- The **orbital margin** is formed above by the frontal bone with the supraorbital notch or foramen
- The **lateral margin** is formed by the processes of frontal and zygomatic bones
- The **inferior margin** is formed by zygomatic bone and maxilla
- The **medial margin** by the processes of maxilla and the frontal bones



Orbital Walls

- 1. Roof:** frontal bone, sphenoid bone
- 2. Lateral Wall:** sphenoid bone, zygomatic bone
- 3. Floor:** maxillary bone, zygomatic bone
- 4. Medial Wall:** ethmoid, lacrimal bone, frontal bone, maxillary bone



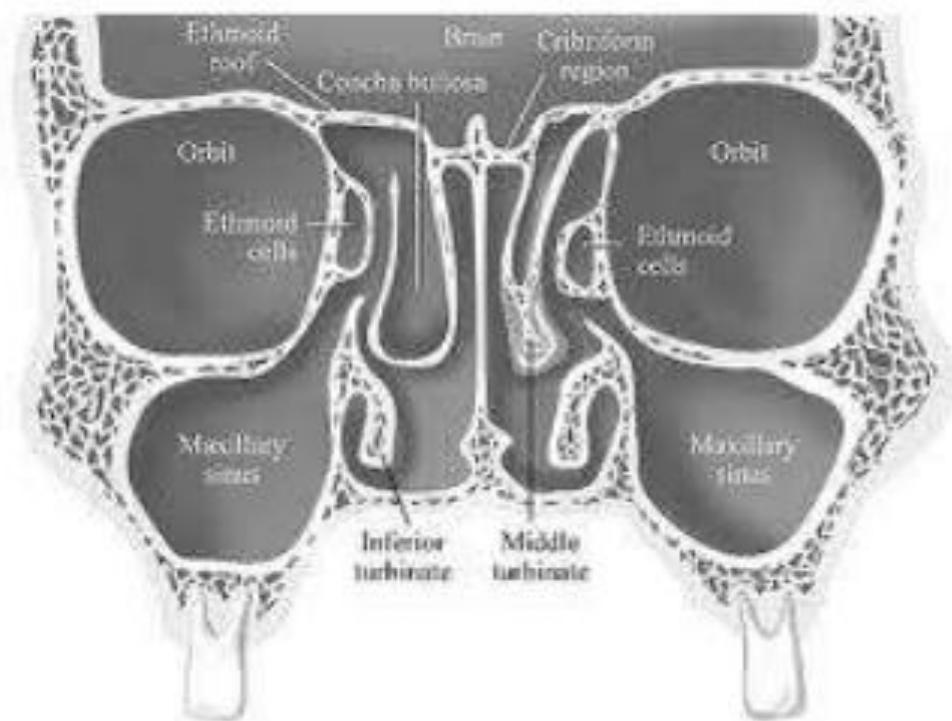
- **The medial wall** is formed primarily by the ethmoid bone, along with contributions from the frontal, lacrimal, and sphenoid bones; anteriorly,
- the *paper-thin medial wall* is indented by a lacrimal fossa for the lacrimal sac and the proximal part of the nasolacrimal duct. The medial walls of the two orbits are essentially parallel, separated by the ethmoidal sinuses and the upper nasal cavity.

Relationship to Sinuses

Frontal sinus: above

Maxillary sinus: below

**Ethmoid & sphenoid
sinuses:** medial

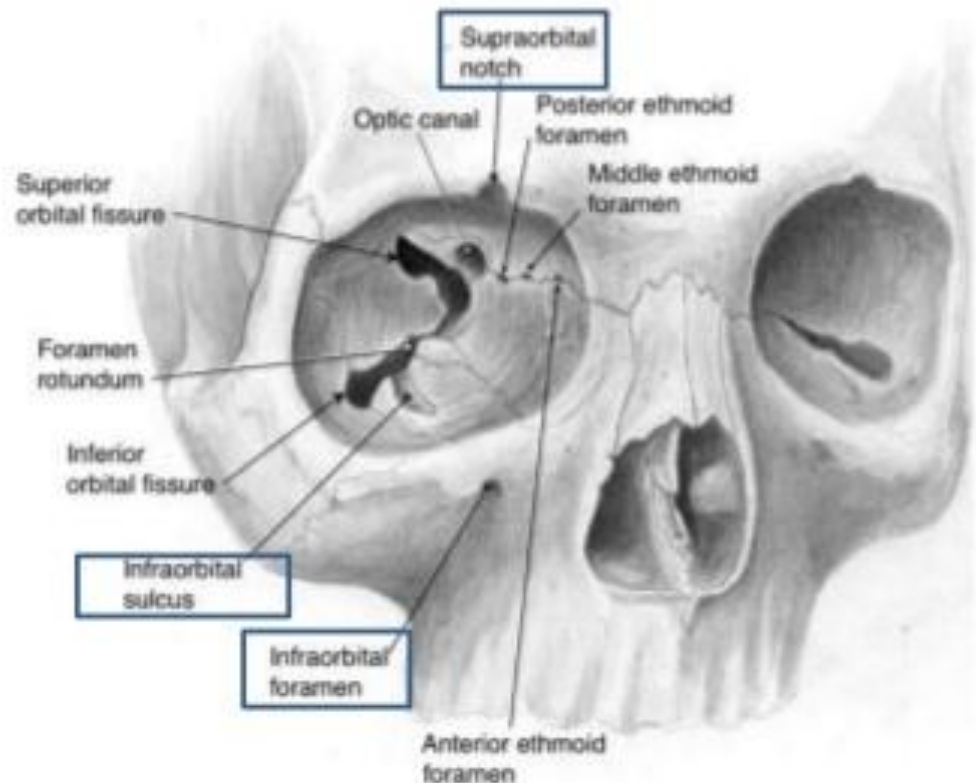


Orbital opening; lies anteriorly, exposes 1\6 of the eye

Suoraorbital foramen or notch; situated in the superior orbital margin, it transmits supraorbital nerve and vessels.

Infraorbital groove and canal; situated in the floor, in orbital plate of maxilla, transmits infraorbital nerve and vessels

Opening in the orbital cavity



Inferior orbital fissure;

located posteriorly, between maxilla and greater wing of sphenoid,

communicates with ptergopalatine fossa, transmits maxillary nerve, and its zygomatic branch, inferior ophthalmic vein, and sympathetic nerves.

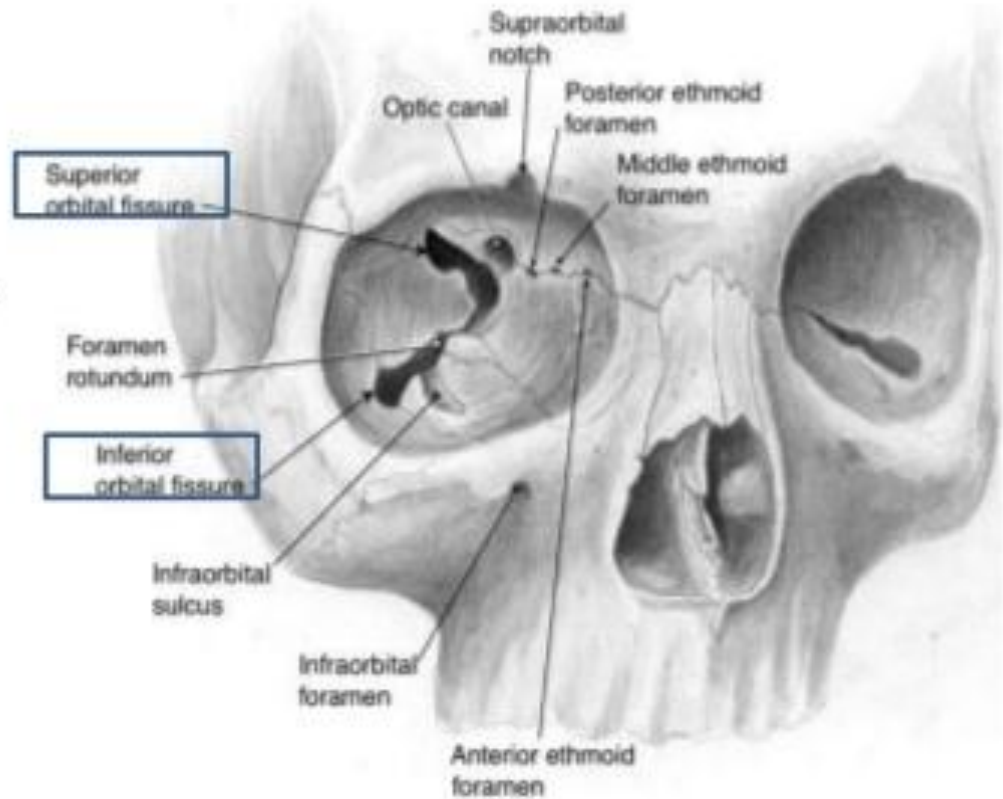
Superior orbital fissure;

located posteriorly, between greater and lesser wings of sphenoid bone,

communicates with the middle cranial fossa,

transmitting the lacrimal nerve, frontal nerve, trochlear nerve, oculomotor nerve (anterior and posterior divisions) abducent nerve, nasociliary nerve, and superior ophthalmic vein

Opening in the orbital cavity

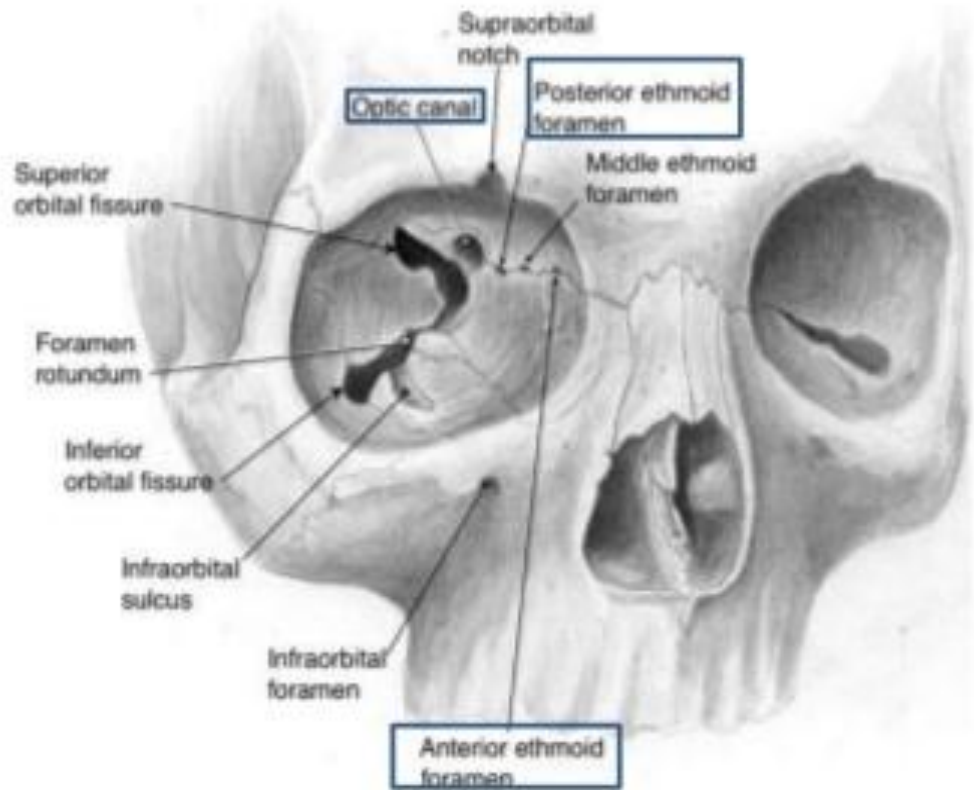


Optic canal;

located posteriorly in the lesser wing of sphenoid , communicates with the middle cranial fossa, transmitting the optic nerve and the ophthalmic artery.

Anterior and posterior ethmoidal foramina;

located in the medial wall, the ethmoid bone, transmitting anterior and posterior ethmoidal nerves.

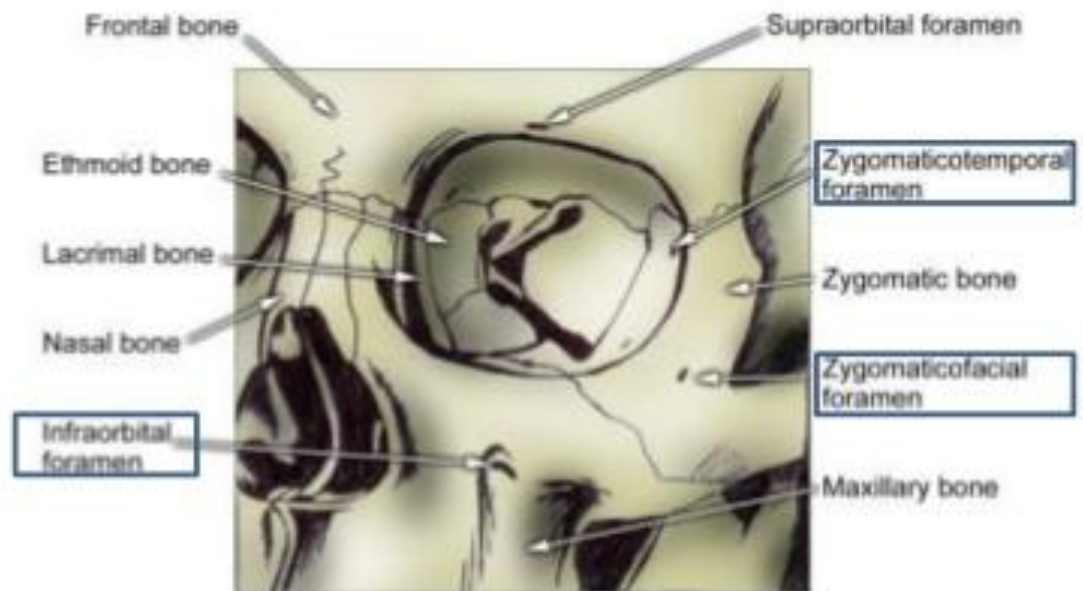


Zygomaticotemporal and Zygomatofascial foramina;

located in the lateral wall, transmitting the Zygomaticotemporal and Zygomatofascial nerves.

Nasolacrimal canal ;

located anteriorly on the medial wall, communicates with the inferior meatus of the nose, transmits nasolacrimal duct.



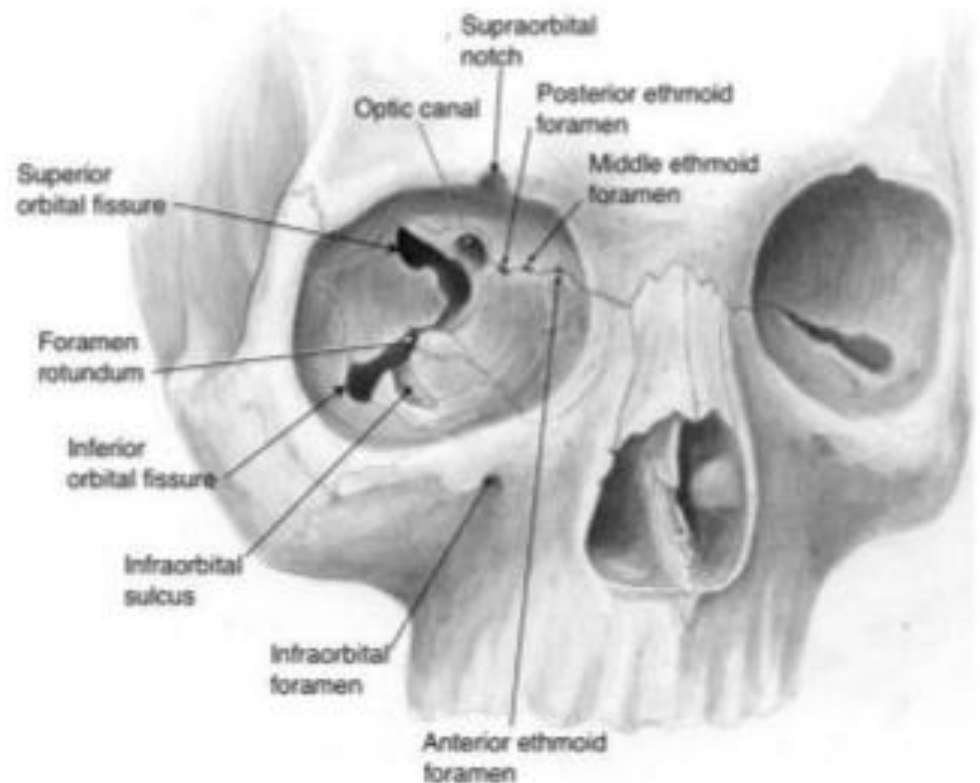


Is the periosteum of bone forming the walls of the orbit. It is loosely attached to bones and continuous through the foramina and fissures with periosteum covering the outer surface of the bones.

For the superior orbital fissure, the optic canal and the anterior ethmoidal canal it become continuous with the endosteal layer of the dura matter

The orbitalis muscle is a smooth muscle bridges the inferior orbital fissure supplied by sympathetic fibers and of unknown function.

Orbital fascia



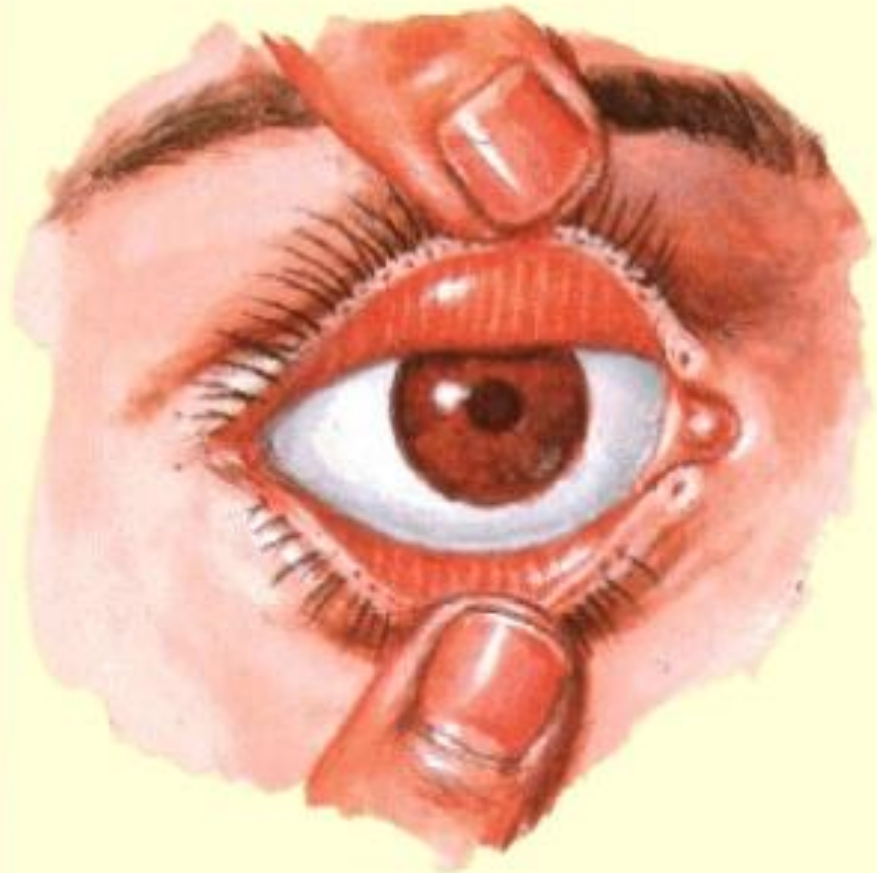
Orbital Contents

The contents of the orbit are :-

- the eyeball
- optic nerve
- ocular muscles
- fascia
- nerves
- vessels
- fat
- lacrimal gland
- and conjunctival sac.

The orbit

Eyelids
Anterior View



Anatomy

What does it have?

Skin

Subcutaneous areolar tissue

Striated muscle (orb. oculi)

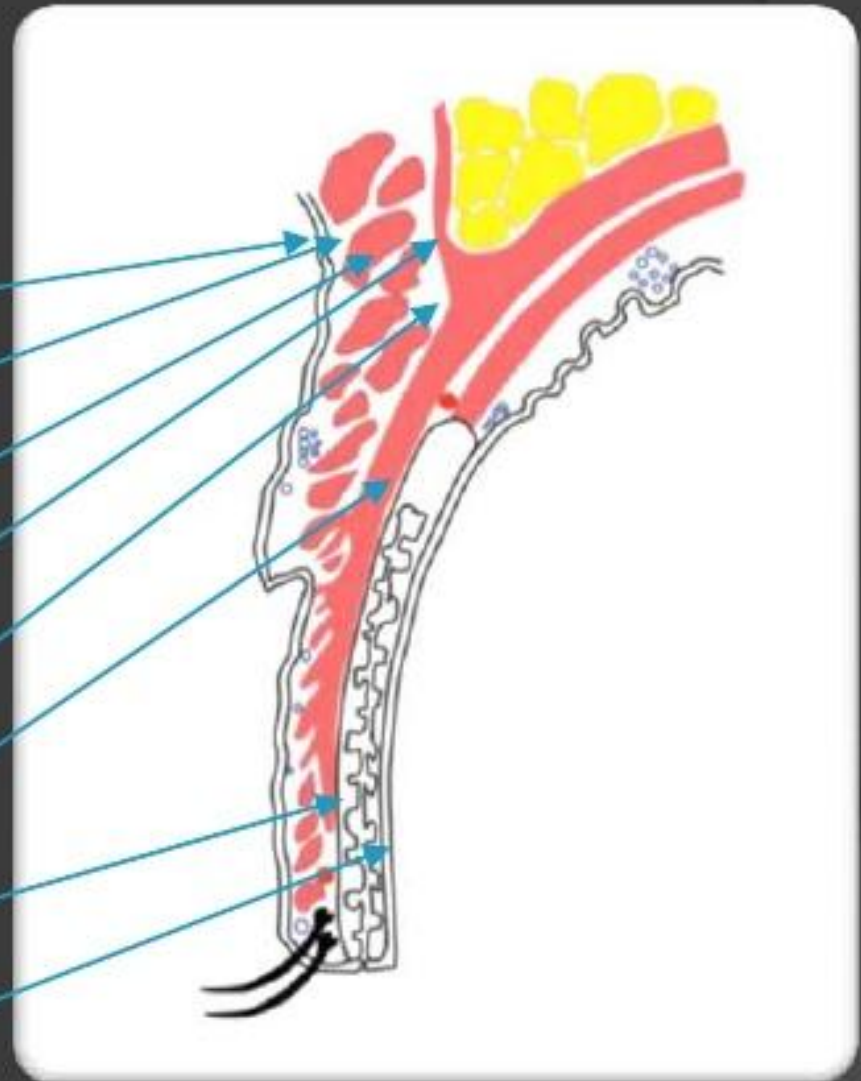
Orbital septum

Submuscular areolar tissue

Levator aponeurosis

Tarsus

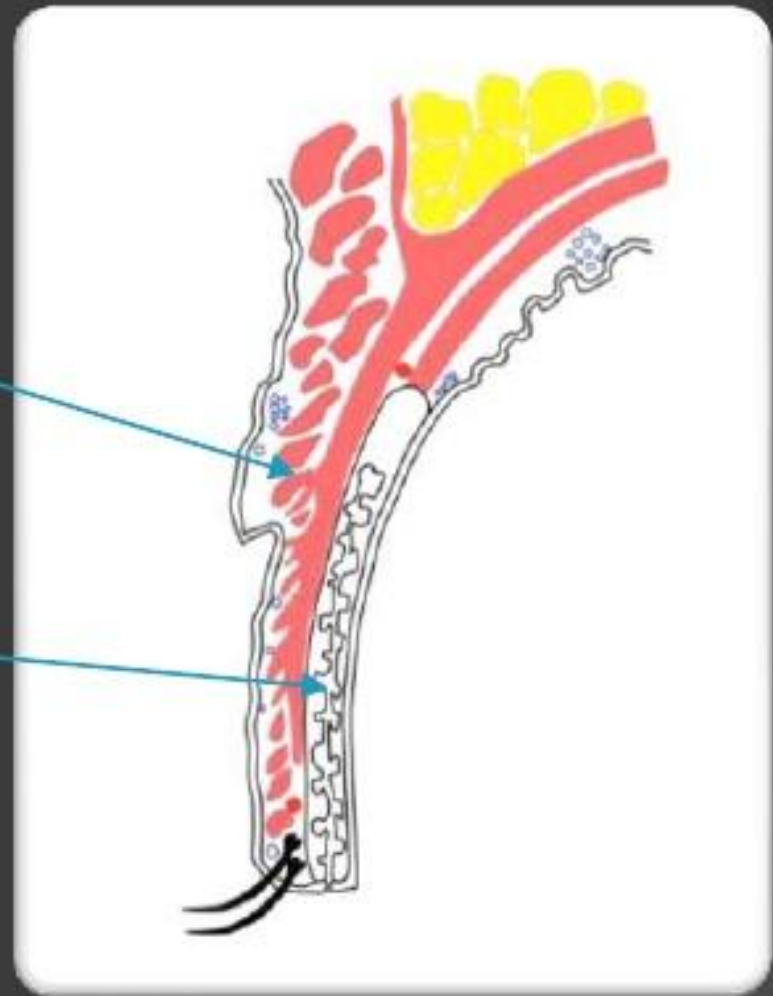
Conjunctiva



Anatomy

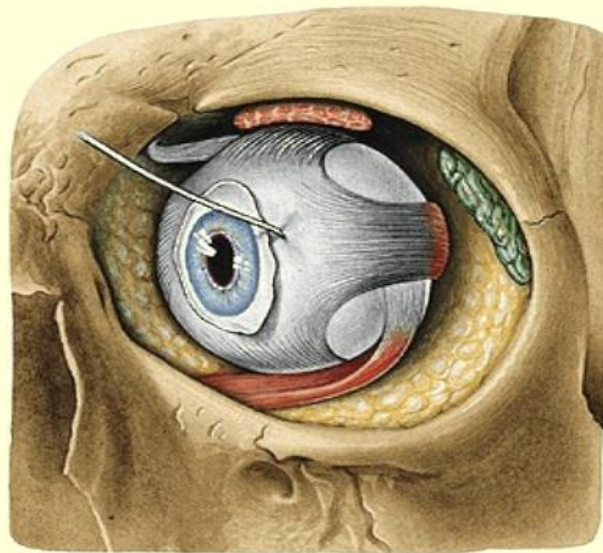
In simpler terms

- Anterior lamella
skin and orbicularis
- Posterior lamella
tarsus and conjunctiva



Structure of the Eye

- The eyeball (
- is embedded in orbital fat but is separated from it by the fascial sheath of the eyeball.



Intrinsic Muscles

Fascial Sheath of the Eyeball

The fascial sheath surrounds the eyeball from the optic nerve to the corneoscleral junction (

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 related to 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.

This means the eye is suspended from the medial and lateral walls of the orbit, as if in a hammock.

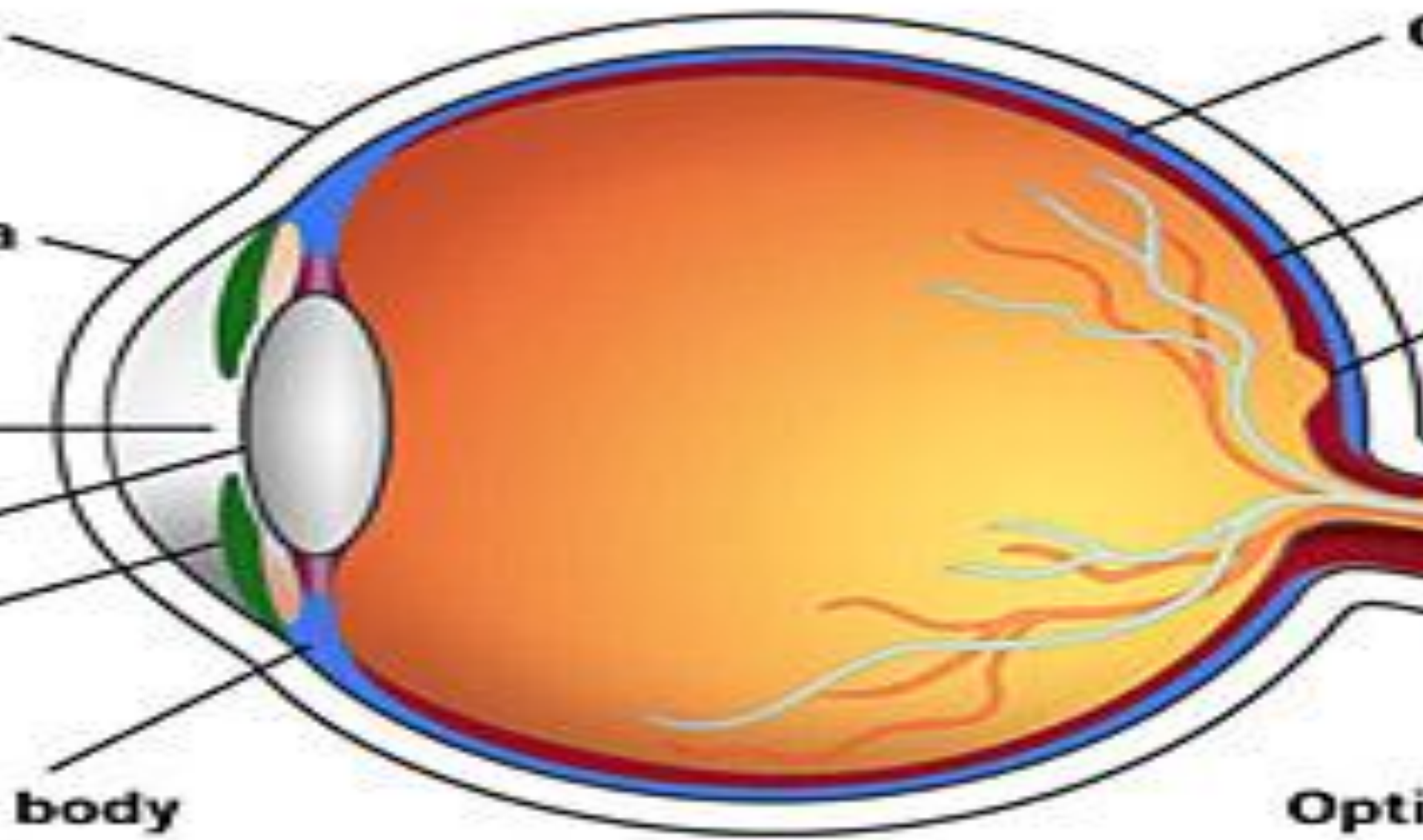
The eyeball.

The eye ball is globe shaped and made of three main layers:

- An outer layer which is fibrous and protective
- A middle layer which contains many blood vessels
- An inner layer known as the optic part of the eye

The eyeball has three layers

- The outer fibrous layer — the sclera and cornea
- The middle vascular (pigmented) layer — the choroid, ciliary body, and iris
- The inner layer — the retina, consisting of optic and nonvisual parts.



The outer layer of the eyeball:

What was the function of the outer layer?

The fibrous layer is divided into two parts:

Five-sixths of the eye is known as the sclera which is the white of the eye you can see.

At the front of the eye the sclera becomes the cornea which is transparent and allows light to enter the eye.

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 that nerve
- . The lamina cribrosa is the area of the sclera that is pierced by the nerve fibers of the optic nerve.

Coats of the Eyeball

- 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 middle layer:

The middle layer contains many blood vessels such as arteries and veins. Within this layer there are also muscles (ciliary muscles) and at the front of the eyeball, the iris.

The iris is a circular, coloured structure which has a central opening called the pupil.

Muscles within the iris are responsible for changing the size of the pupil in different conditions.

Intrinsic Muscles of Eyeball (Smooth Muscle)

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

Pupil size

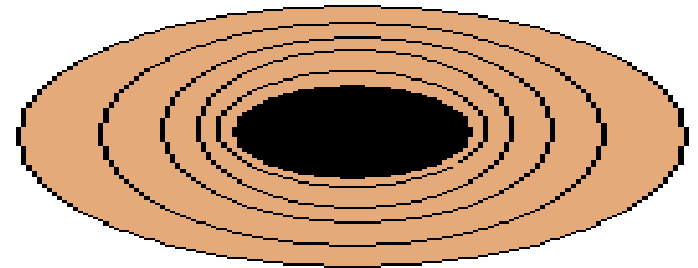
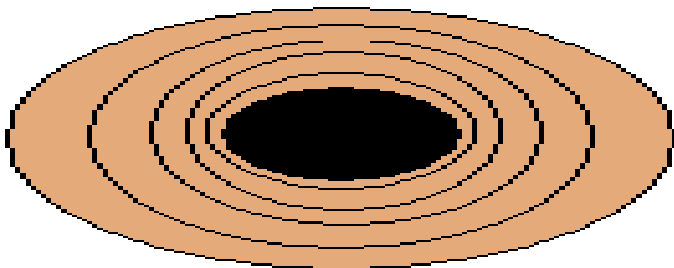
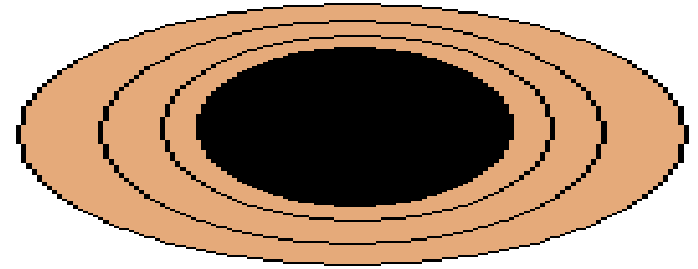
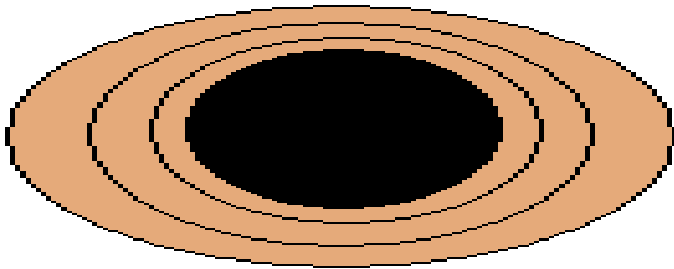
Can you think of any times when your pupils have •
changed size?

In order to control the amount of light entering the eye, the pupil can become smaller or larger.

Muscles in the iris are arranged in differing ways to allow this to happen.

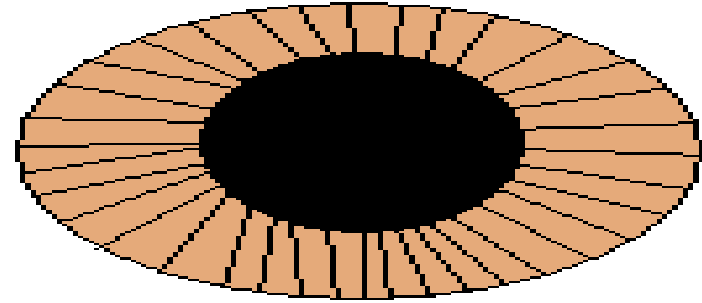
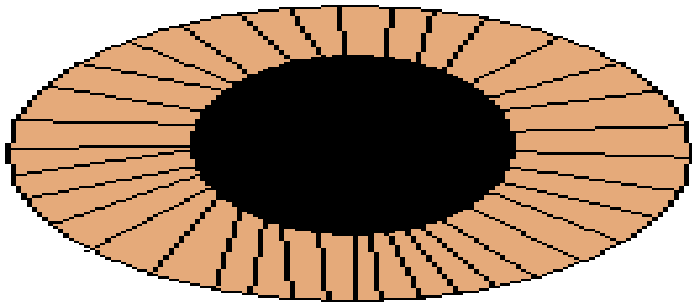
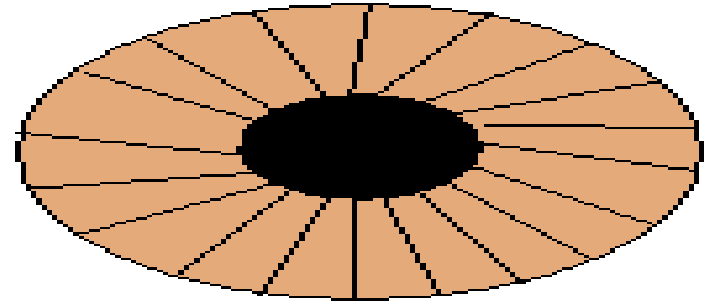
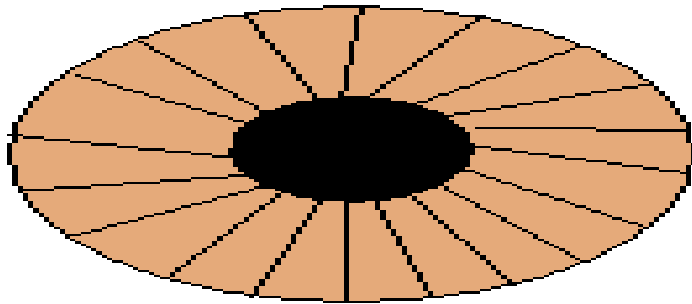
Constriction

A circular pattern of muscle (the sphincter pupillae muscle) when contracted decreases the size of the pupil. This is constriction. This happens in light situations. •



Dilation

A radial pattern of muscle (the dilator pupillae muscle) • when contracted increase the size of the pupil. This is dilation. This happens in dark situations.



Vascular Pigmented Coat

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

Middle Vascular Layer of the Eyeball

- The choroid a dark brown membrane between the sclera and retina — forms the largest part of the vascular layer of the
- Eyeball and lines most of the sclera.
- It terminates anteriorly in the ciliary body.
- The choroid attaches firmly to the pigment layer of the retina, but it can easily be stripped from the sclera.

Vascular Pigmented Coat

- **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.

Vascular Pigmented Coat

- The ciliary ring is the posterior part of the body, and its surface has shallow grooves, the ciliary striae.
- 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.

Vascular Pigmented Coat

- **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.

Intrinsic Muscles of Eyeball (Smooth Muscle)

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

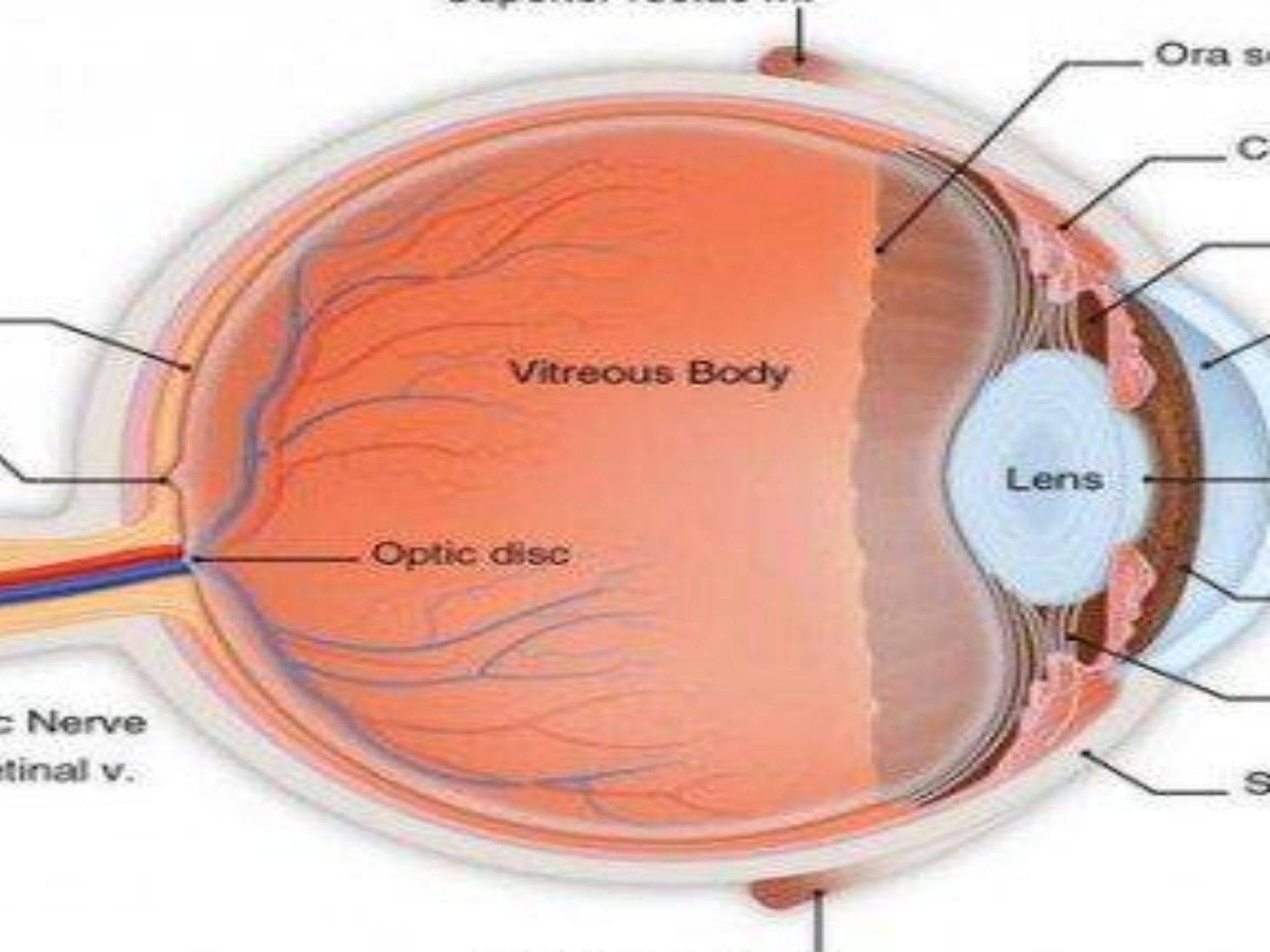
The inner layer of the eyeball

The inner layer of the eyeball is known as the retina which is sensitive to light.

On the retina there are some obvious features:

The optic disc is where the optic nerve leaves the retina to carry information to the brain. This is not sensitive to light and is sometimes referred to as the blind spot.

The fovea is the thinnest area of the retina and is the most sensitive part of the eye. This is because there are a lot of cells known as cones in this area.



Nervous Coat: The Retina

Retina consists of an outer pigmented layer and an inner nervous layer.

The outer surface is in contact with the choroid, and the inner surface is in contact with the vitreous body.

The posterior three-fourths of the retina is the receptive part.

The anterior edge forms a wavy ring, the ora serrata, where the nervous tissues end here.

The anterior part of the retina is nonreceptive and consists merely of pigment cells, with a deeper layer of inner epithelium. This anterior part of the retina is attached to the ciliary processes and the back of the lens.

Nervous Coat: The Retina

er of the posterior part of the retina is an oval, yellowish spot called the macula lutea, which is the area of the retina for the most acute 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 by the optic disc.

The optic disc is slightly depressed at its center, where it is perforated by the central artery of the retina.

There is a complete absence of rods and cones at the optic disc, due to light and is referred to as the blind spot.

On ophthalmoscopic examination, the optic disc is seen to be a pale pink, much paler than the surrounding retina.

Nervous Coat: The Retina

Contents of the Eyeball

- The contents of the eyeball consist of the
- refractive media,
- the aqueous humor,
- the vitreous body, and
- the lens.
- Aqueous Humor

Nervous Coat: The Retina

Contents of the Eyeball

- 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 canal of Schlemm.

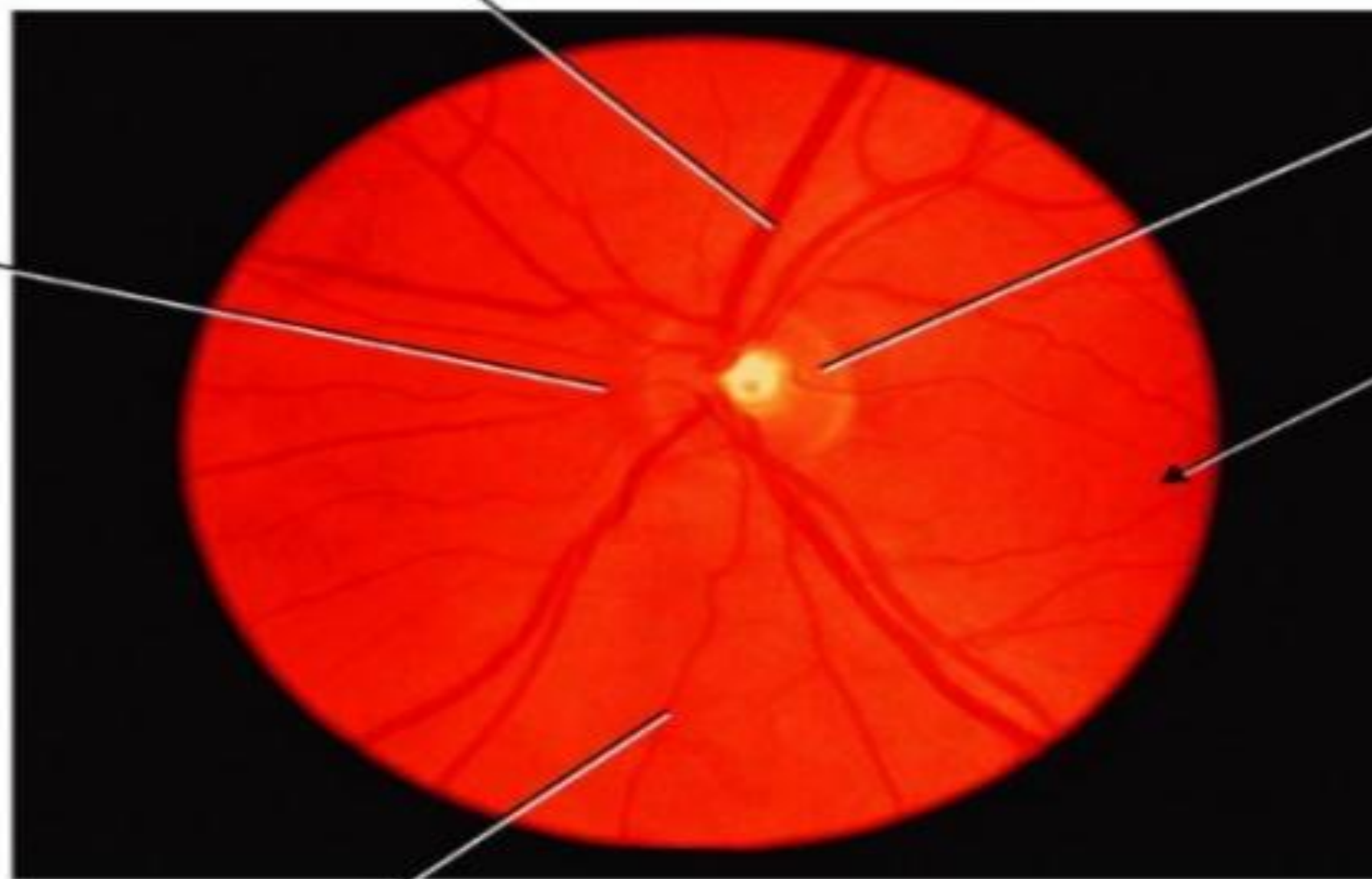
Nervous Coat: The Retina

Contents of the Eyeball

- 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 is to 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.

segmentation
of retina

tributary of central vein of retina



branch of central artery of retina

Figure 11-26 The left ocular fundus as seen with an ophthalmoscope.

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.

Vitreous Body

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.