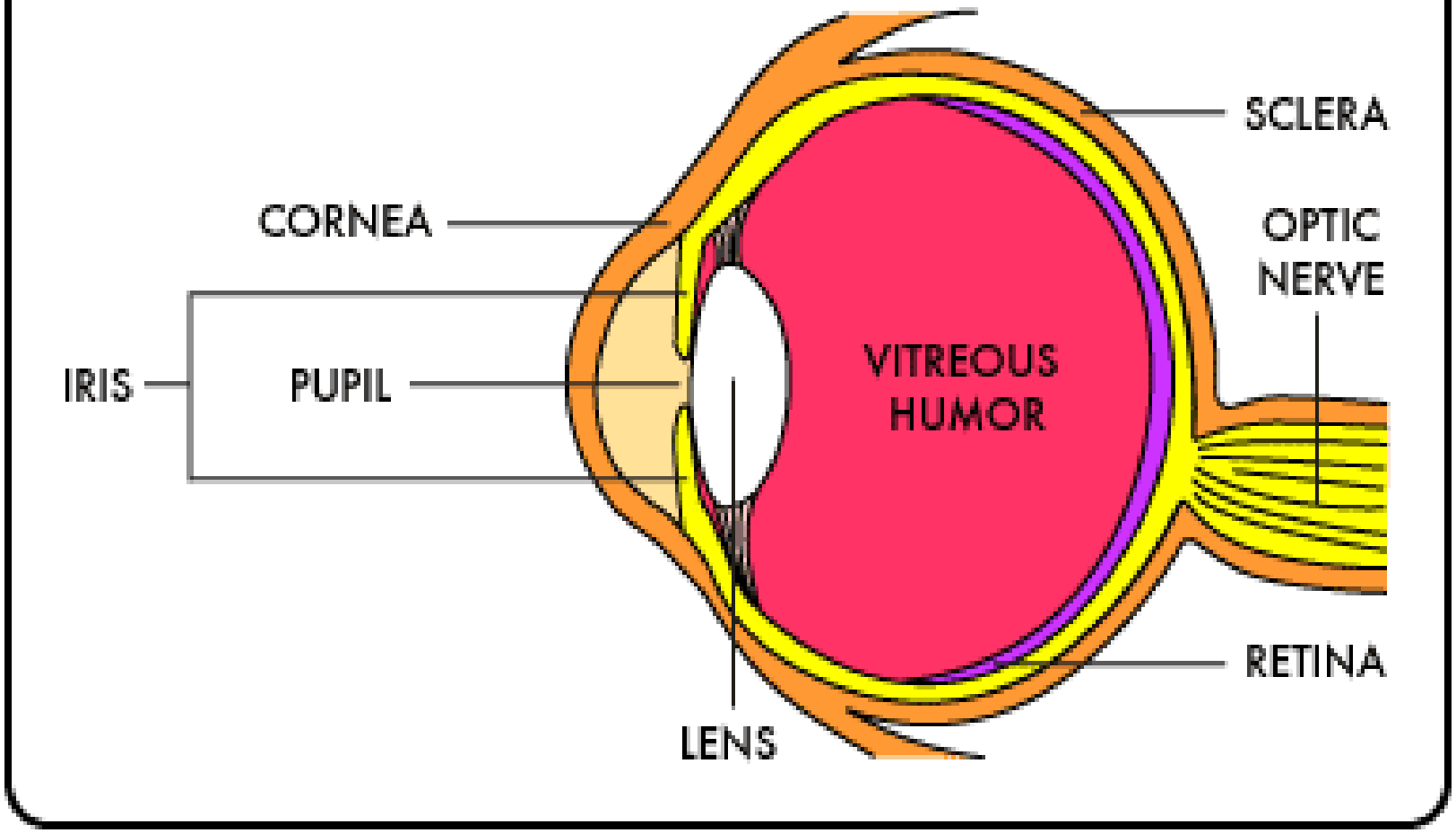
Anatomy of the eye

Topics

-Eye ball.
-Muscles of the eye.
-Eye lids.
-Lacrimal apparatus.

DIAGRAM OF THE EYE



The Eye ball

It consists of three layers:

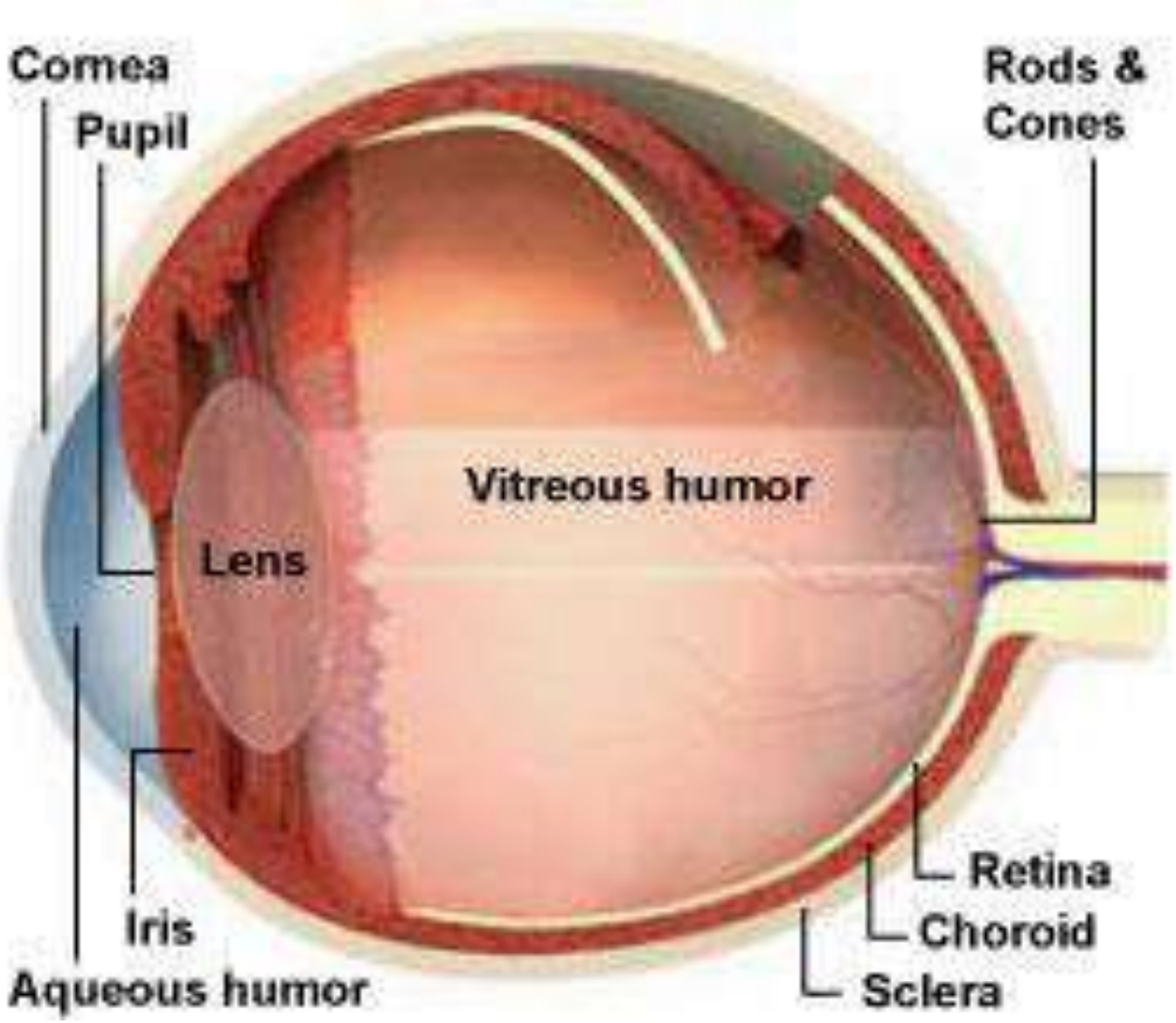
- **Outer fibrous connective tissue layer** for protection (Sclera and Cornea).
- **Middle vascular layer** for nourishment (Choroid, Ciliary body and Iris).
- **Inner nervous layer** (Optic nerve and Retina).
- **tears** form a protective layer at the front of the eye and also help to direct the light coming into our eye.

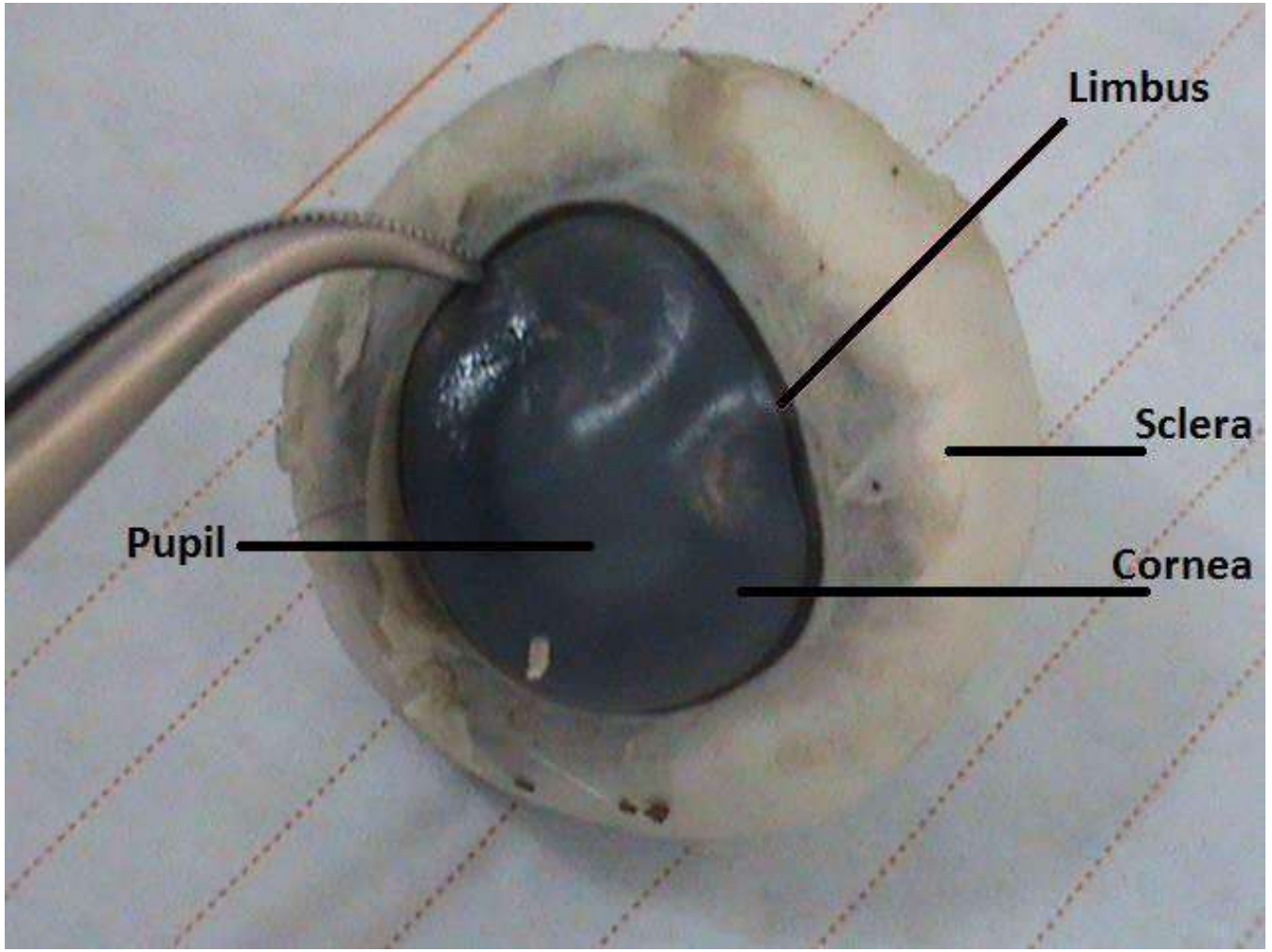
Sclera

- It is the white part of the eyeball, which covers most of the eyeball
- It is made of a tough material, so it is opaque.
- It constitutes 4/5 of the outer coat.
- It has blood vessels, as tiny tubes.

Cornea

- It is the part of the sclera in front of the colored part of the eye.
- Unlike the rest of the sclera, which is white, the cornea is transparent, or completely clear, which lets light travel through it.
- It is a very important part of the as it helps the eye focus.
- Its outer surface covered with tears, while inner surface covered with aques humers.


Cornea
Pupil
Rods &
Cones
Vitreous humor
Lens
Retina
Iris
Choroid
Aqueous humor
Sclera


Limbus
Sclera
Pupil
Cornea

Iris and Pupil

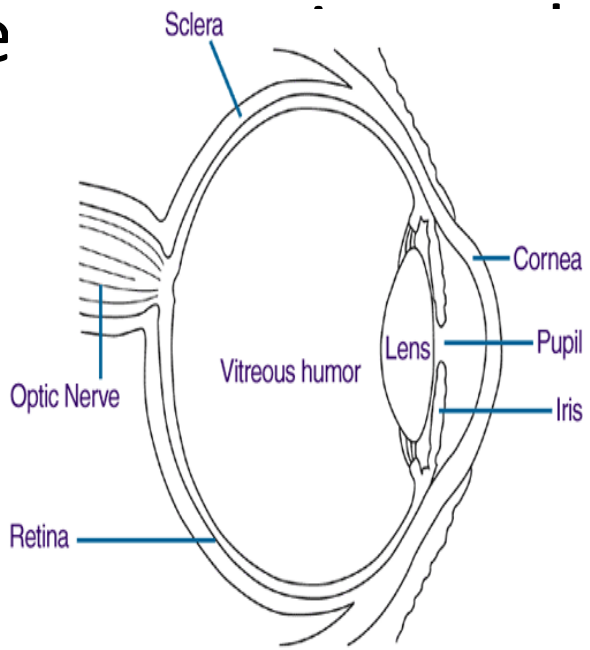
- Both are situated behind the cornea.
- The Iris is the dark, pigmented (colorful) part of the eye.
- The iris has a muscles that controls how much light pass through the pupil.
- Circular muscles of the iris are constrictor muscles of the pupil and longitudinal muscles of the iris are dilator muscles of the pupil.
- These muscles receive their parasympathatic innervation from occulomotor, while their sympathatic from cranial cervical ganglia

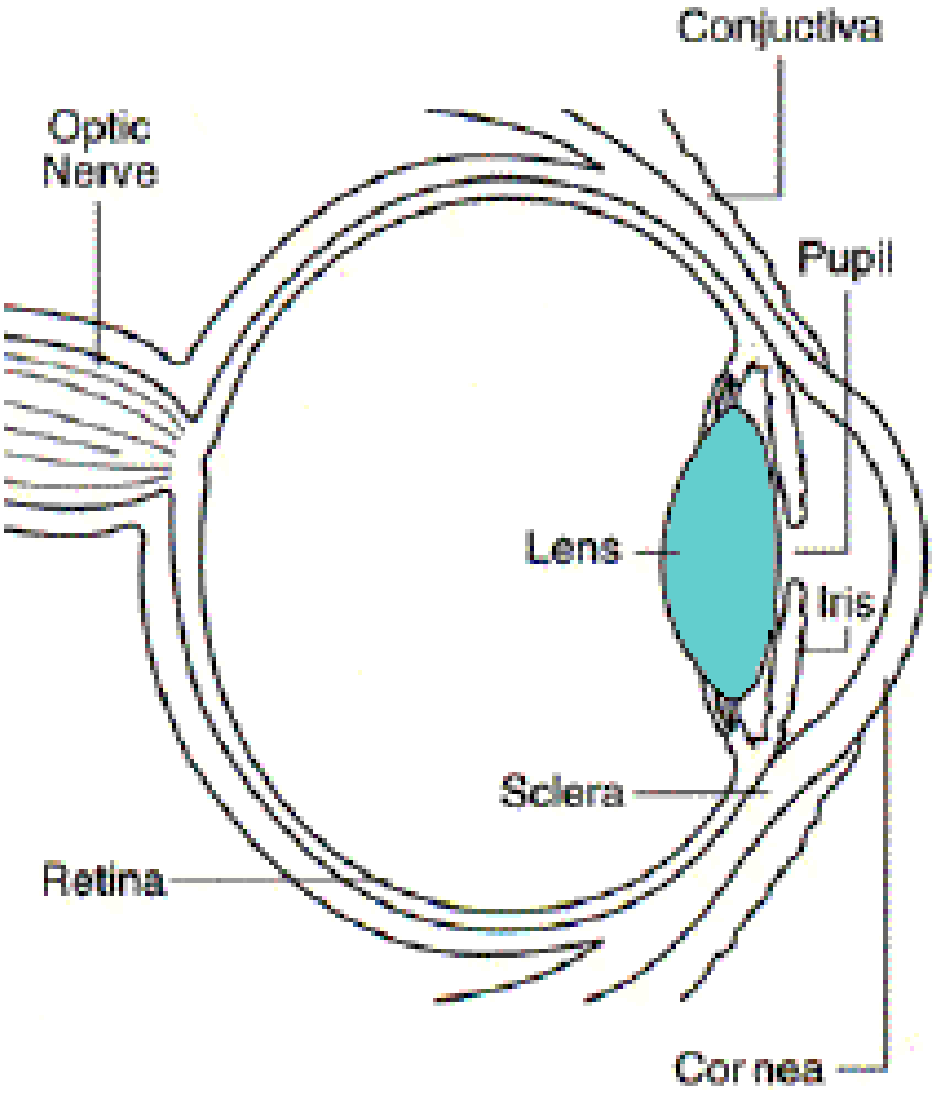
Iris and Pupil

- The pupil is the black circle in the center of the iris, and it lets light enter the eye.
- The pupils will get smaller when a light shines near them and they'll open wider when the light is gone.
- If the pigment is more, the pupil is dark.
- If the pigment is less, the pupil is blue or green.
- If the is no pigment, the pupil is red due to blood vessels.

Anterior chamber

- It is between the posterior aspect of the cornea and anterior aspect of the iris.
- It is filled with a special serous transparent fluid called aqueous humor that gives the eye oxyge glucose to keep it healthy.




Conjuctiva
Optic Nerve
Pupil
Lens
Iris
Sclera
Retina
Cornea

Lens

- It is Biconvex, clear and colorless (transparent) structure with spherical surfaces situated behind the iris.
- It is the critical part of the imaging process.
- The lens is suspended e by a bunch of fibers. These fibers are attached to a muscle called the ciliary muscle, which can change the shape of the lens. This range of change varies from person to person.
- Its function is to focus light rays on the back of the eyeball that is called the retina.

Lens

- When we see from long distance , the lens is flat.
- When we see from short distance, the lens is convex.
- The lens gives the detailed information about the size, shape, and color of an object.

Posterior chamber

- It is between the posterior aspect of the iris and anterior aspect of the lens, suspensory ligament and ciliary body.
- It is filled with a special serous transparent fluid called aqueous humor that gives the eye oxygen, protein, and glucose to keep it healthy. This fluid is secreted in the posterior chamber and drained in the anterior one.
- It is separated from the anterior chamber by iris, and connected with it through the pupil.

Vitreous body (Vitreous chamber)

- It is situated behind the lens, between the posterior aspect of the lens and the retina.
- It forms two thirds of the eye's volume and gives the eye its shape.
- It is filled with a clear, jelly-like material called the vitreous humor to prevent retinal detachment.
- Normally, when the light passes through the lens, it shines straight through the vitreous humor to the back of the eye.

Retina

- It is the most caudal part of the eye, after the vitreous body.
- It holds millions of special cells that are most sensitive to light. These cells are called **Rods** (120 million) and **Cones** (7 million).
- It takes the light received by the eye and changes it into nerve signals so the brain can understand what the eye is seeing.

Retina

Rods and Cones

- The rods and cones of the retina change the colors and shapes you see into millions of nerve messages. Then, the optic nerve carries those messages from the eye to the brain.

Rods

- Rods see in black, white, and shades of gray and tell us the form or shape that something has.
- Rods can't tell the difference between colors, but they are super-sensitive.
- Rods allowing us to see when it's very dark.
-

Cones

- Cones sense colors and they need more light than rods to work well.
- The retina has three types of cones (red, green, and blue) to help you see different ranges of color. Together, these cones can sense combinations of light waves that enable our eyes to see millions of colors.

Fovea and Peripheral vision

- Fovea is the area near the center of the retina, where the detectors are packed tightly and details of the image are distinguished easily.
- Light that enters eye from the side does not fall on the fovea, but on the part of the retinal where there are fewer detectors. This explains why peripheral vision is limited.
- The placement and number of cones in retina limit how well you see colors in your peripheral vision.

Muscles of the eye

1. Intrinsic muscles:

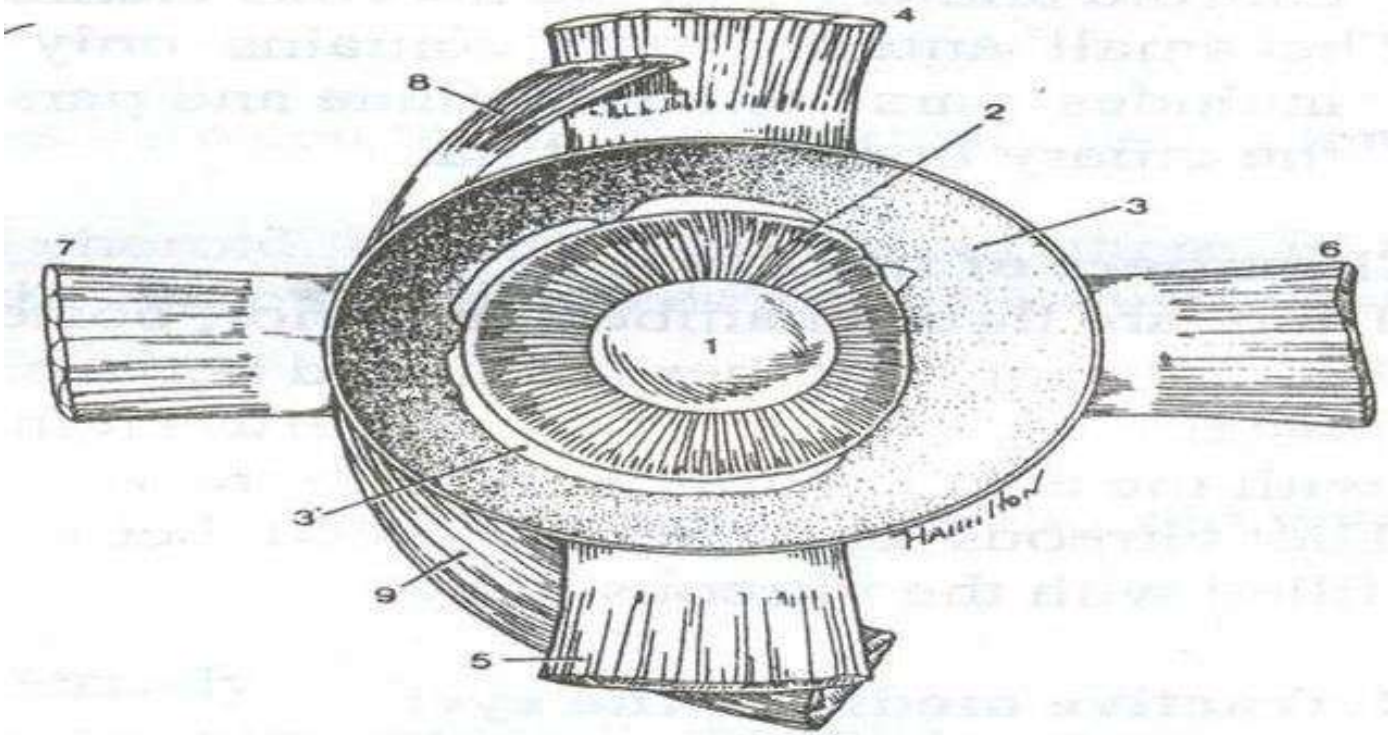
a. Ciliary muscles.
b. Dilator muscles of the pupil.
c. Constrictor muscles of the pupil.

Muscles of the eye

2. Extrinsic muscles:

a. Dorsal rectus muscle.
b. Ventral rectus muscle.
c. Medial rectus muscle.
d. Lateral rectus muscle.
e. Dorsal oblique muscle.
f. Ventral oblique muscle.
g. Retractor bulbi muscle.
h. Levator palpebrae superioris muscle.
i. Levator anguli oculi medialis muscle.
j. Orbicularis occuli muscle.

Muscles of the eye



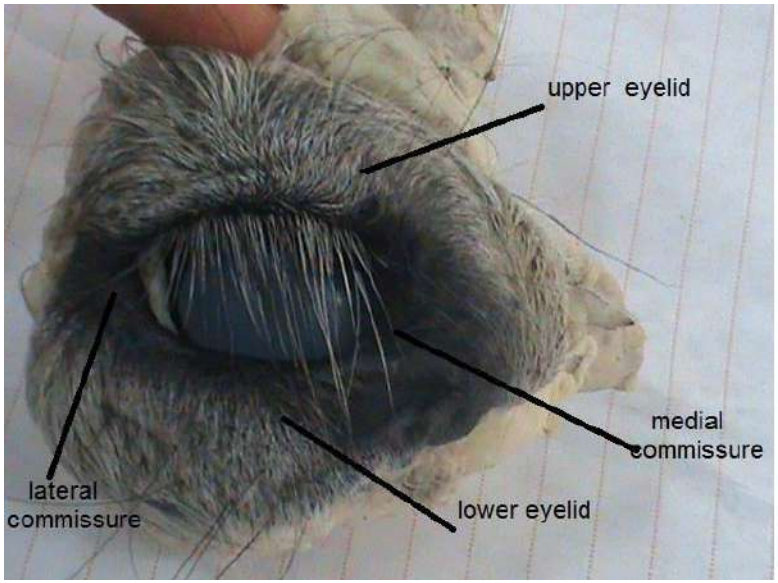
Anterior half of the left equine eye, viewed from behind.

1, Lens; 2, ciliary body; 3, choroid covered by pigmented outer layer of retina; 3′, remnants of inner nervous layer of retina which has been removed; 4–7, dorsal, ventral, medial, and lateral rectus muscles; 8, 9, dorsal and ventral oblique muscles.

Associated structure of the eyeball

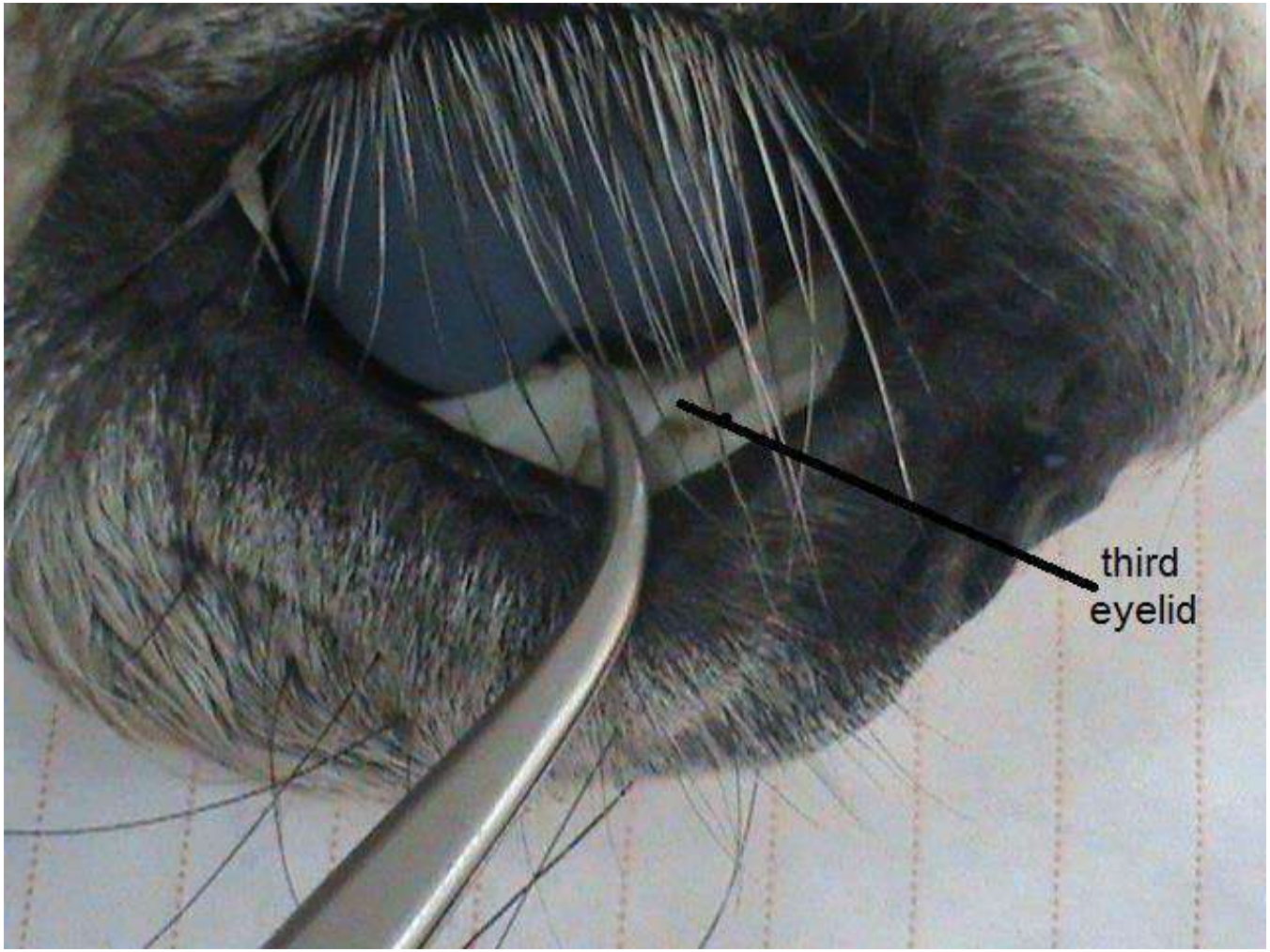
1. Eyelids (Palpebra):

a. Upper eyelid.
b. Lower eyelid.
c. Lateral canthus.
d. Medial canthus.
e. Palpebral fissure.



2. Third eyelid (Nictitating membrane):

- It Presents ventromedially.
- It carries cartilage.
- It is well developed in camel and birds, rudimentary in other animals.


third
eyelid

Associated structure of the eyeball

3. Conjunctiva:

- It is a thin layer of mucous membrane.
- That is covering sclera is called palbar conjunctiva, while that is lining eyelids is called palpebral conjunctive.

4. Fornix:

- It is the area of transition of palpebral conjunctiva to palbar conjunctiva.
- Thus, there are dorsal and ventral fornix.

Associated structure of the eyeball

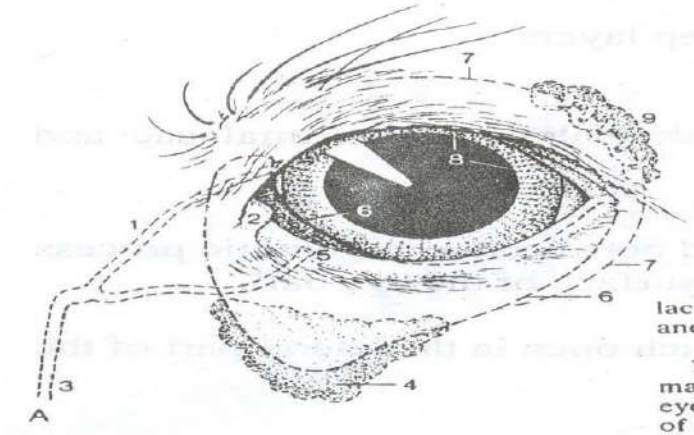
5. Conjunctival sac:

- It is a sac formed between palbar and palpebral conjunctiva when the eye is closed.
- Thus, there are dorsal and ventral conjunctival sacs.

6. Periorbital fat:

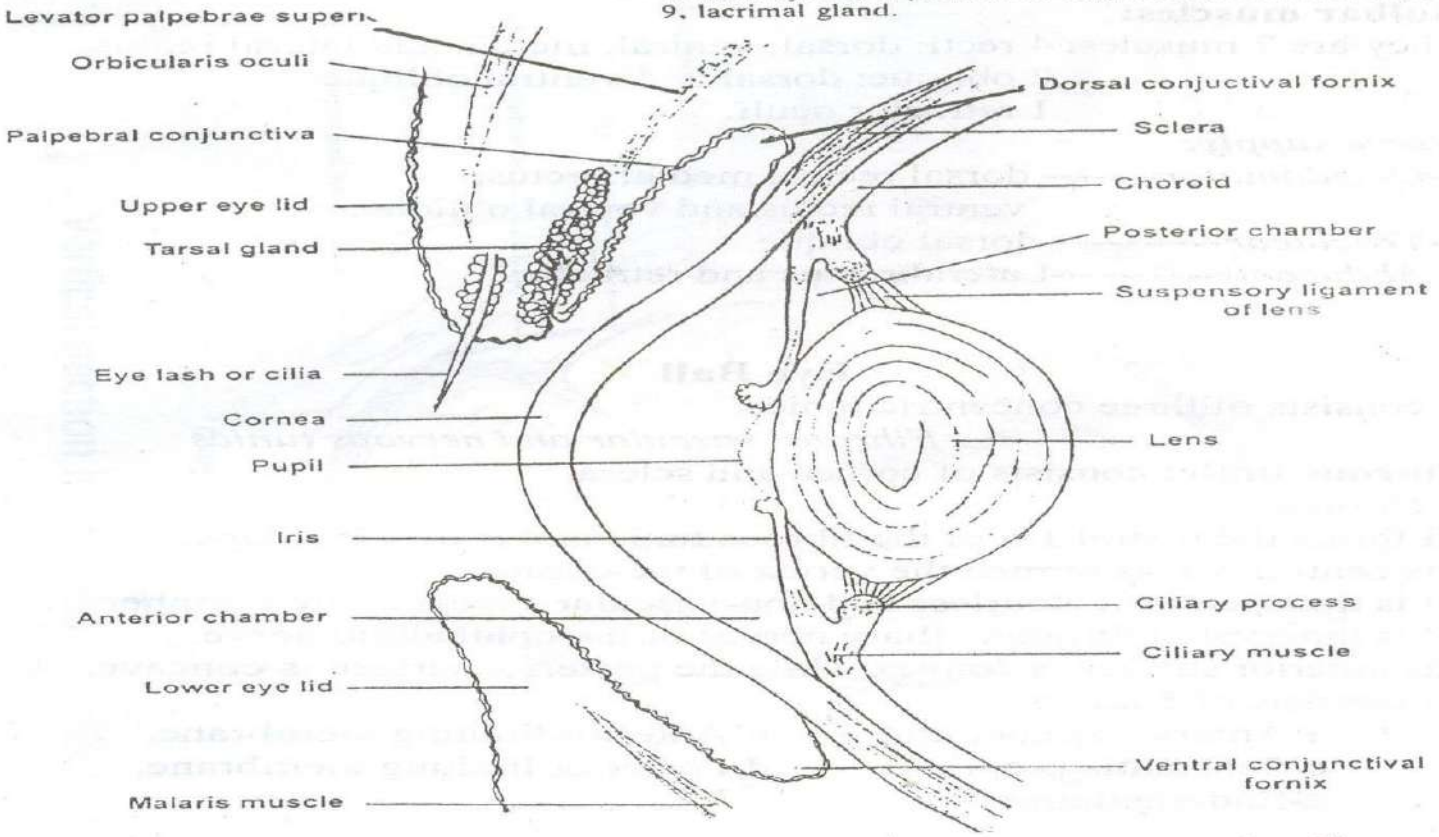
- It acts as a cushion for the eyeball.

7. Lcrimal gland: It presents dorsomedially.



A, Left eye of dog showing third eyelid and lacrimal apparatus. *B*, Isolated cartilage of the third eyelid and associated glands of a pig.

1, Upper canaliculus; 2, lacrimal caruncle; 3, nasolacrimal duct; 4, gland of third eyelid; 4', deep gland of third eyelid; 5, punctum lacrimale; 6, third eyelid; 6', cartilage of third eyelid; 7, position of conjunctival fornix; 8, pupil; 9, lacrimal gland.



Eye lids and anterior part of the eye ball

Lacrimal apparatus

1. Secretory part:

a. One lacrimal gland.
b. Lacrimal ducts.

2. Excretory part:

a. Two lacrimal puncta.
b. Two lacrimal canaliculi.
c. One lacrimal sac.
d. One nasolacrimal duct.
e. One nasal punctum.

Blood supply of the eye

External ophthalmic artery:

a. Anterior ciliary arteries which supply conjunctiva, eyelids, sclera, limbus and ciliary muscles.

b. Posterior ciliary arteries which supply ciliary body, iris and choroid.

Nerve supply of the eye

a. Optic nerve.
b. Occulomotor nerve.
c. Trochlear nerve.
d. Abducent nerve.
e. Ophthalmic branch of trigeminal nerve.
f. Auriculopalpebral and dorsal buccal branches of facial nerve.