

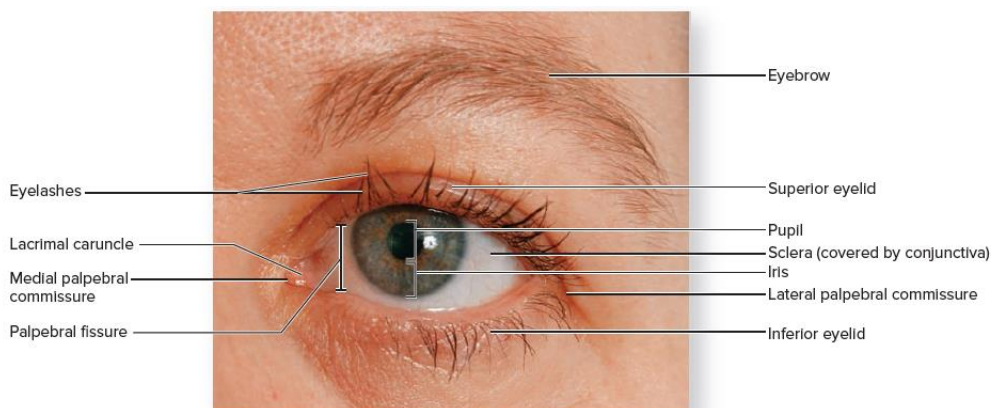
SPECIAL SENSES – Textbook and Lecture Slides

THE EYE

The importance of the eye in humans is evidenced by the innervation of the eyeball. 70% of sensory receptors contained in the human body are found in the eyeball and 40% of the cerebral cortex is involved in visual processing. The eyeball serves to detect light and not only does it have several modifications that enable it to efficiently accomplish this role, but it is assisted by the accessory eye structures which surround the eyeball. The eyeball is about 25mm in diameter and of spherical shape, it is positioned closer to the lateral orbital wall and roof and is not housed entirely within the orbit (it projects) and only 1/6th of it is visible from frontal views.

EXTERNAL ACCESSORY STRUCTURES

The **eyebrows** are slightly curved rows of thick, short hairs at the superior edge of orbit of the eye along the supraorbital ridge. They function primarily to prevent sweat from dripping into open eyes.

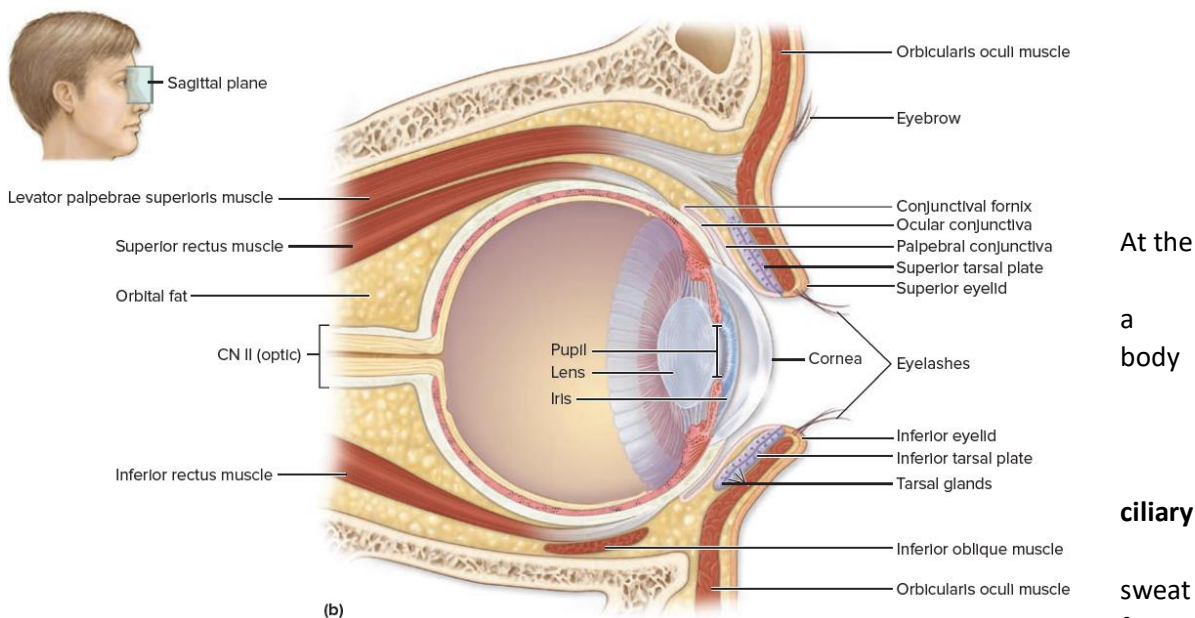


Eyelashes extend from the margins of the eyelids and prevent large foreign objects from coming into contact with the anterior surface of the eye.

The **eyelids** (palpebrae) form the moveable anterior protective covering over the surface of the eye. Each eyelid is formed by a fibrous core (**tarsal plate**), tarsal muscles, tarsal glands, the palpebral part of the orbicularis oculi muscle, the palpebral conjunctiva and a thin covering of skin.

Tarsal glands are sebaceous glands that produce secretion to prevent tear overflow from the open eye and keep the eyelids from adhering together. The eyelids' free margins are separated by a central **palpebral fissure**.

The eyelids are united at the **medial and lateral palpebral commissures**. The medial commissure is small reddish called the **lacrimal caruncle** that houses the **glands** (modified glands that the thick secretory products that contribute to the gritty, particulate material around the eyelids after awakening).



At the
a
body

ciliary
sweat
form

(b)

CONJUNCTIVA

A specialised stratified columnar epithelium termed **conjunctiva** forms a continuous lining over the external, anterior surface of the eye (**ocular conjunctiva**) and the internal surface of the eyelid (**palpebral conjunctiva**). The space formed by the junction of the ocular conjunctiva and the palpebral conjunctiva is the **conjunctival fornix**. The conjunctiva contains numerous goblet cells, which lubricate and moisten the eye. It also contains many blood vessels which supply nutrients to the avascular sclera of the eye as well as the abundant nerve ending that detect foreign objects as they contact the eye.

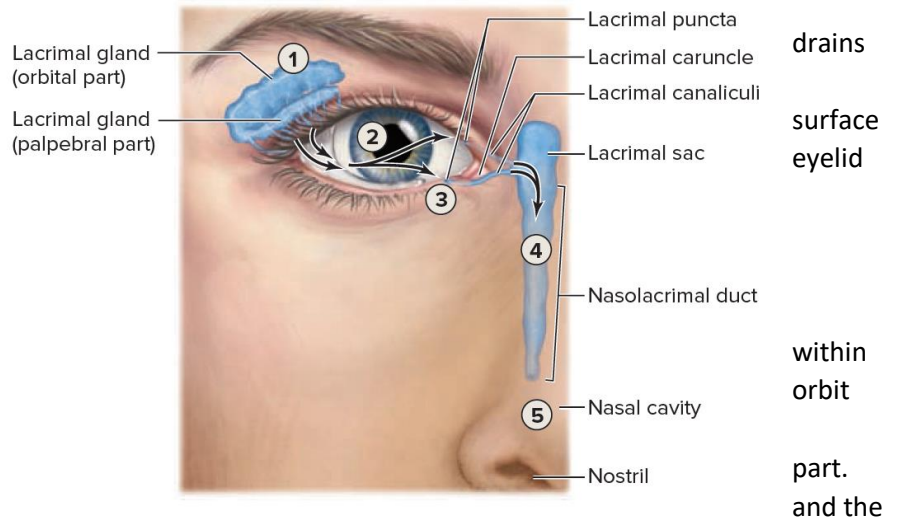
LATERAL APPARATUS

Each eye is associated with a **lacrimal apparatus** that produces, collects and lacrimal fluid (tears) from the eye. Lacrimal fluid lubricates the anterior of the eye to reduce friction from movement; continuously cleanses and moistens the eye surface and helps prevent bacterial infection because it contains **lysozyme** (an antibiotic-like enzyme). A **lacrimal gland** is located the superolateral depression of each and is composed of an orbital or superior part and a palpebral or inferior part. The gland continuously produces tears

blinking motion of eyelids washes the lacrimal fluid released from excretory over the eyes. Gradually, lacrimal fluid transferred to the lacrimal caruncle at medial surface of the eye. On the superior and inferior sides of the **lacrimal caruncle** are two small openings (**lacrimal puncta**). Each lacrimal punctum has a **lacrimal canaliculus** that drains lacrimal fluid into a rounded lacrimal sac. Finally, a **nasolacrimal duct** receives the fluid from the lacrimal sac. This duct, which is along the lateral side of the nose, delivers the drained fluid into the nasal cavity, where it mixes with mucus.

The lacrimal apparatus consists of the structures which help keep the surface of the eyeball moist. Lacrimal gland produces lacrimal fluid which is spread across the eyeball during blinking. The fluid drains into the lacrimal puncta

and lacrimal canaliculi to lacrimal sac where the passes to the nasal cavity the nasolacrimal duct.



- ① Lacrimal fluid (tears) is produced in the lacrimal gland.
- ② Lacrimal fluid is dispersed across eye surface when we blink.
- ③ Lacrimal fluid enters the lacrimal puncta, drains into the lacrimal canaliculi, and collects in the lacrimal sac.
- ④ Lacrimal fluid from the lacrimal sac drains through the nasolacrimal duct.
- ⑤ Lacrimal fluid enters the nasal cavity.

drains
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within
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