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MATRICULATION NUMBER: **17/MHS01/039**

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**HISTOLOGICAL IMPORTANCE OF THE EYE IN RELATION TO THEIR CELLULAR FUNCTIONS**

Our eyes may be small, but they provide us with what quite a number of people consider to be the most important of all senses – **VISION**.

Anatomically, the eye can be viewed as a series of overlapping layers of tissue.

External structures of the eye include the eyelashes, lids, muscles, accessory glands and conjunctiva.

The internal structures of the eye consist of three layers of tissue arranged concentrically:

* The sclera and cornea make up the exterior layers
* The uvea is the vascular layer in the middle, subdivided into the iris, ciliary body and choroid.
* The retina constitutes the innermost layer and is made up of nervous tissue.

The layers of the eye perform distinct functions which coalesce to create a unified, perpetual experience. The essential role of the external eye is to protect the delicate tissue of the internal eye. The eyelid prevents foreign bodies from entering the inner eye and helps refresh and distribute the tear film by blinking. Eyelashes are finely sensitive to touch and warn the eye of possible debris and particles that may cause injury.

Internal parts of the eye have primarily structural and visual functions. Vision occurs when light enters the eye through the pupil. The cornea serves a protective role and is responsible for two-thirds of the refractive properties of the eye. The remaining one-third of refraction is performed by the lens, which is functionally adjustable through the action of zonular fibers and ciliary muscles. At the end of the visual process, as rays of light bend through the cornea and lens, photon energy is converted to neurochemical action potentials by millions of specialized cells of the retina, known as rods and cones, which then send electrical impulses to be processed by the brain, via the optic nerve.

The uvea of the eye is a crucial mediator of nutrition and gas exchange, as blood vessels course through the ciliary body and iris, while the choriocapillaries in the posterior eye help support the retina. This abundant blood supply is implicated in uveitis, as inflammatory mediators enter the eye through this vascular network.

Although they do not directly contribute to sight, other specialized cells in the eye, discovered in 1991, are the photosensitive retinal ganglia which assist in cardiac rhythms and papillary reflex.

Also, an important function of the eye is to produce tears. Tears are important in maintaining healthy eyes. They nourish and lubricate the surface of the eye, as well as wash away debris. A normal tear consists of water, oil and mucus.

**THE LAYERS OF THE RETINA**

The retina, the innermost tunic of the eye, develops with two fundamental sub-layers from the inner and outer layers of the embryonic optic cup.

Beginning with the innermost layer (closest to the vitreous) and proceeding outwards towards the choroid and sclera, the layers of the retina are as follows:

**The inner limiting membrane** is the boundary between the retina and vitreous body. It is formed by astrocytes and the foot places of Müller cells together with a basal lamina.

**The nerve fiber layer** is the layer of optic nerve fibers consisting of ganglion cell axon fibers, which course towards the optic nerve head.

**The ganglion cells layer** consists of nuclei of ganglion cells, the axons of which become the optic nerve fibers for messages. They are also some displaced amacrine cells within this layer. Additionally, this layer also contains the non-rod and non-cone photoreceptors, the photosensitive ganglion cells, which are important for reflexive purposes to bright daylight.

**The inner plexiform layer** contains the synapses between dendrites of ganglion cells and amacrine cells and the axons of bipolar cells.

**The inner nuclear layer** contains the nuclei of horizontal, bipolar and amacrine cells. The inner nuclear layer is thicker in the central area of the retina compared with peripheral retina because of a greater density of cone-connecting second-order neurons (cone bipolar cells) and smaller and more closely-spaced horizontal and amacrine cells.

**The outer plexiform layer** contains the rod and cone projections, horizontal cell dendrites and bipolar cell dendrites. Synapses among these structures occur within this layer. In the macular region, this layer is termed the fiber layer of Henie. The outer plexiform layer is also known as the outer synaptic layer.

**The outer nuclear layer** consists of the cell bodies of the retinal rods and cones. In the peripheral retina, the rod cell bodies outnumber the cone cell bodies, whereas the reverse is true for the central retina.

**The outer limiting membrane** is the layer that separates the inner segment portions of the photoreceptors from their cell nuclei.

**The rod and cone layer** (bacillary layer) contains the inner and outer segments of the rod and cone photoreceptors cells.

**The pigment epithelium** is the most external layer of the retina. It abides on the choroidal layer of the eye. It contains a single of cuboidal-supporting cells for the neural portion of the retina. These cells contain melanin, which absorbs light and decreases light scatter within the eye.