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**COURSE CODE: ANA 305**

**COURSE TITLE: HISTOLOGY OF SPECIAL SENSE AND NEUROHISTOLOGY**

**QUESTIONS**

1. Write an essay on the histological importance of eye in relation to their cellular functions.
2. Corona virus can penetrate the body through eye and implicate the immune system, briefly discuss the layers of the retina for information penetration.

**HISTOLOGICAL IMPORTANCE OF THE EYE**

The eye is composed of different layers and different cells essential for its function and the understanding of certain disease pathophysiology and therapeutic approaches. The eye could be described as a series of overlapping layers of tissue. The external structures of the eye include; the eyelashes, lids, muscles, accessory glands and conjunctiva. The internal structures include; the sclera, cornea, iris, ciliary body, choroid and retina. As listed, they all have varying functions, which constitute the functions and histological importance of the eye.

The essential role of the external structures of the eye is to protect the delicate tissues of the internal eye. The eyelid prevents foreign bodies from entering the inner eye and aids in refreshing and distributing the tear film by blinking. The eyelashes are sensitive to touch hence they warn the eye of possible dirt and particles that can cause injury. The internal structures have both structural and visual functions.

The cornea serves a protective role and two-third of the eye’s refractive property is controlled by the cornea and the remaining one-third of refraction is done by the lens. The lens is functionally adjustable through the actions of the zonula fibers that connect the ciliary muscles and the lens, and the ciliary muscles. As rays of light bend through the cornea and lens at the end of the visual process, the photon energy is converted to neurochemical action potentials by cells of the retina, which then sends information to the brain via the optic nerve.

The uvea of the eye, which consists of the iris, ciliary body and choroid, is a crucial mediator of nutrition and gas exchange, as blood vessels course through the ciliary body and iris. The choriopapillaris in the posterior eye helps to support the retina. The abundant blood supply in the uvea could be impaired in uveitis, as inflammatory mediators enter the eye through this vascular network.

**LAYERS OF THE RETINA**

The retina is located at the back of the eye and is essential for all vision. Each layer of cells in the retina serves different purposes and it consists of the choroid, retinal pigment epithelium, photoreceptors, horizontal cells, ganglion cells, bipolar cells.

The choroid is made up of blood vessels that supply oxygen and nutrients to the retina. Choroideremia, could be caused by a defect in the CHM gene, leaky blood vessels can expand in the retina causing wet age-related macular degeneration and diabetic retinopathy.

The retinal pigment epithelium is the single layer of cells that provide essential nutrition and waste removal for the photoreceptor cells. Accumulation of waste can lead to age-related macular degeneration and stargardt disease.

The photoreceptors consist of the rods and cones that convert light into electrical signals. Rods aid in night and peripheral vision. Cones which are more concentrated in the macula prove central and color vision. Death of the rods can cause vision loss called retinitis pigmentosa while, age-related macular degeneration is the loss of central vision.

The horizontal cells are connected to the photoreceptors that surround the bipolar-connected photoreceptors and aid in integration and regulating of the input from multiple photoreceptor cells, increasing visual acuity.

The bipolar cells take the electrical information from the photoreceptor cells passing it along the other retinal cells.

The ganglion cells extend to form an optic nerve that conveys information to the brain and take electrical information from the bipolar cells and process it to determine shapes, contrast and color. Glaucoma vision loss results from high intraocular pressure that affects the optic nerve, interrupting the signals to the brain.