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QUESTIONS:

1. Write an essay on the histological importance of eye in relation to their cellular function.

2. Coronavirus can penetrate the body through the eye and implicate the immune system, briefly discuss the layers of retina for information penetration

ANSWERS:

1. Eyes are highly developed photosensitive organs for analyzing the form, intensity and color of light reflected from objects and providing the sense of sight. From an anatomical view, the eye can be viewed as a series of overlapping layer of tissue. The eye is composed of three concentric layers:

1. A tough external fibrous layer consisting of the sclera and the transparent cornea.
2. A middle vascular layer that includes the choroid, ciliary body and iris.
3. An inner sensory layer which compose of the retina, the lens, and vitreous body.

The external structure of the eye includes two major regions, the posterior sclera and the anterior cornea joined at the limbus.

CONJUCTIVA: lines the inner part of the eyelid.

TEARFILM: consist of aqueous, mucus and oily secretions.

ACCESSORY GLAND: made up of lacrimal gland.

MUSCLE: Orbicularis oculi etc.

EYELID: a mobile layer made up of skin and also muscular tissues, it covers the eyeball.

The fibrous tunic (external layer):

* SCLERA: dense irregular connective tissue. Supports the eye shape. Protects delicate internal structures. Extrinsic eye muscles attachment site.
* CORNEA: a transparent and completely avascular. Two layers of epithelium with organized connective tissue in between. Protects anterior surface of the eye. Refracts incoming light.
* The vascular tunic (middle layer):
* CHOROID: located in the posterior two-thirds of the eye, the choroid consists of loose, well vascularized connective tissue and contains numerous melanocytes. Supplies nourishment to retina. Pigment absorbs extraneous light.
* IRIS: the most anterior extension of the middle uveal layer which covers part of the lens, leaving a round central pupil. Controls pupil diameter and thus the amount of light entering the eye.
* CILLIARY BODY: ciliary smooth muscle and ciliary processes; covered with a secretory epithelium. Holds suspensory ligaments that attach to the lens and change the lens shape for far and near vision.
* The inner sensory layer:
* LENS: is a transparent biconvex structure suspended immediately behind the iris, which focuses light on the retina. Separates aqueous and vitreous chamber.
* VITREOUS BODY: occupies the large vitreous chamber behind the lens. It consists of a transparent, gel-like connective tissue that is 99% water (vitreous humor), with collagen fibrils and hyaluronate, contained within an external lamina called the vitreous membrane. It separates the retina and the lens.
* RETINA: the innermost tunic of the eye, develops with two fundamental sublayers from the inner and outer layers of embryonic optic cup. Pigmented layer; pigmented epithelial cells. It absorbs extraneous light and provides vitamin A for photoreceptors cells. Neural layer; photoreceptors, bipolar neurons, ganglion cells, and supporting Muller cells.

2. the retina can be divided into 10 layers. It’s the innermost light sensitive layers of tissues of the eye of most vertebrae. Tree major layers contain the nuclei of the interconnected neurons;

* Outer nuclear layer: contains cell bodies of photoreceptors
* Inner nuclear layer: contains the nuclei of various neurons notably the bipolar cells, amacrine cells and horizontal cells, all of which make specific connections with other neurons and integrate signals from rods and cones over a wide area of retina.
* Ganglionic layer has neurons with much longer axons. These axons make up the nerve fiber layer and converge to form the optic nerve which leaves the eye and passes to the brain.

Between the three layers with cell nuclei are two fibrous or plexiform regions containing only axons and dendrites connected by synapses.

* The outer plexiform layer includes axons of the photoreceptors and dendrites of association neurons in the INL.
* Inner plexiform layer consists of axons and dendrites connecting neurons of the INL with the ganglion cells.

Muller cells also organize two boundaries that appear as very thin layer within the retina.

* Outer limiting layer is a faint but well defined series of tight adherent junctions that form at the level of the rod and cone inner segments between the photoreceptors and Muller cells processes.
* Inner limiting layer consists of terminal expansion of other Muller cell processes the covers the collagenous membrane of the vitreous body.

**The inner limiting membrane**: this is the basement membrane elaborated by the Muller cells.

**The nerve fiber layer**: these are axons of the ganglion cell bodies.

**Outer segment layer**: made up of highly specialized light sensing apparatus.

When corona comes to transmission through the eyes, AOA indicates the virus may enter your body through the conjunctiva and the spread throughout the body through blood vessels within the conjunctiva.

The conjunctiva is the clear, thin membrane that covers part of the eye as well as the inner part of the eyelids. When the virus is dropped into the eye, liquid is partially absorbed by the cornea and conjunctiva, but mostly drained into the nasal cavity through the nasolacrimal duct and then transferred towards the lower part of respiratory tract. This allows pathogens exposed to the eye to be transferred to the respiratory tract and the gastrointestinal mucosa.