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300 LEVEL
ANA305
SPECIAL SENSES

QUESTIONS

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

ANSWERS

1. The eye is a highly specialized organ of photoreception, that is the conversion of light energy to nerve action potentials. The photoreceptors are modified dendrites of two nerve cells, rod cells and cone cells.

The eye is made up of 3 layers; outer corneoscleral layer, intermediate uveal layer and inner retinal layer.

- a. Corneoscleral layer: forms a tough fibroelastic capsule which supports the eye the posterior five-sixths, the sclera is opaque and insertion of extraocular muscles. Anterior one-sixth is the cornea is transparent. The cornea is the principal refracting medium of the eye and roughly focuses images on the retina. Surface of eye is covered by conjunctiva.
- b. Uveal layer: highly vascularized, made up of choroid, ciliary body and iris.
The iris consists of stromal layer with pigmented fibrovascular tissue and pigmented epithelial cells beneath stroma. Pigmented layer of cells block rays of light and ensures light moves through pupil to reach the retina. Iris divides aqueous chamber to posterior and anterior.
The choroid consists of dense network of blood vessels supplying nourishment to structures of the eye housed in loose connective tissue.
Ciliary body consists of ciliary muscle and ciliary epithelium. The ciliary muscles control accommodation. The ciliary epithelium produces aqueous humor which fills the anterior compartment of the eye.
Lens separate the vitreous and aqueous layer. It has outer capsule, middle cortex and inner nucleus.
- c. Retinal layer: nervous tissue where photons of light convert neurochemical energy via action potentials. It contains pigment cells, photoreceptor cells and nerve fibers. It consists of 10 layers.

2.

- a. Pigmented epithelial cells: forming a single layer resting on Bruch's membrane, which separates them from the choroid.
- b. Photoreceptor layer: made up of rod and cone processes.
- c. Outer limiting membrane: a thin eosinophilic structure.

- d. Outer nuclei layer: densely packed nuclei layer. It contains cell bodies of rod and cone photoreceptor.
- e. Outer plexiform layer: contains synaptic connections between the short axons of the photoreceptor cells and integrating neurons.
- f. Inner plexiform layer: the cell bodies lie here. The integrating neurons make synaptic connections with dendrites of neurons whose axons form the optic tract.
- g. Ganglion cell layer: the cell bodies of the optic tract neurons (retinal ganglion cells) comprise of this layer.
- h. Optic nerve fiber layer: the afferent fibers pass towards the optic disc to form the optic nerve.
- i. Inner limiting membrane: demarcated the innermost aspect of the retina from the vitreous body.