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COURSE: HISTOLOGY

ASSIGNMENT

1) Write an Essay on the histological Importance of the Eye in Relation to their cellular function

ANSWER

The Bulb of the eye is divided into three tunics or layers

1. OUTER FIBROUS TUNIC: consisting of the sclera posteriorly and the cornea anteriorly
2. INTERMEDIATE VASCULAR TUNIC: comprising the choroid, ciliary body and iris. Also called Uvea
3. INTERNAL NEURAL TUNIC: consisting of the retina

**FUNCTIONAL IMPORTANCE**

**OUTER FIBROUS TUNIC**

**Sclera:** thick collagenous capsule provides structural support for the eye. It is a point of attachment for extraocular muscles and is in continuity with the conjunctiva

**Cornea:** i) Transparent and avascular ii) directs light to the lens- refractive power twice that of the lens

Layers of the Cornea

* Corneal Epithelium: i)Lined by Non-Keratinised Stratified Squamous ii)Stem cells in basal layer near the limbus undergoes differentiation
* Bowman’s Membrane
* Stroma: i)Corneal Fibroblasts are called Keratocytes ii) Stroma is multilayered with alternating layers of keratocytes and ECM fibrils and proteoglycans
* Descemet’s Membrane
* Corneal Endothelium: Simple cuboidal epithelium mediates hydration and nutrition of the stroma and corneal epithelium

 **UVEA**

 **Choroid:** i) highly pigmented, highly vascular layer interposed between sclera and retina

 ii) Heavily populated by melanocytes

 iii) choriocapillary layer- smaller vessels that supply the retina

 iv) Bruch’s Membrane- Collagen I with an elastic fibre core

**Ciliary Body:** i) thickened portion of uveal tract at the level of the lens

 ii) ciliary zonules connect the ciliary body to the lens, running from the ciliary epithelium to t the lens capsule

 iii) Production of aqueous humour maintains intraocular pressure

 iv) ciliary epithelium- two layers of cells aligned apex to apex

 outer layer- is heavily pigmented and is continuous with the retinal pigment epithelium

 inner layer- is composed of fluid transporting cells and apical cell surface faces

 pigment epithelium

**Iris:** i) regulates pupillary diameter

 ii) posterior surface is lined by pigmented epithelium which is continuous with the pigmented

 epithelium of ciliary body

 iii) pigmented myoepithelium is deep to the pigmented epithelium

 iv) stroma of the iris is a highly vascular fibroblastic CT that contains many melanocytes

**INTERNAL NEURAL LAYER**

**RETINA** – Two main layers

i) Retinal pigment epithelium:

a) simple cuboidal, ion/fluid transporting epithelium rests on Bruch’s membrane

b) apical membrane of RPE cells contact outer segments of rods and cones

FUNCTIONS: i) Produces fluid to nuture rods and cones

 ii) Synthesises melanin

ii) Neural retina: Sensory neuron photoreceptors (rods and cones) plus supporting cells and intergrative neurons

2) Coronavirus can penetrate the body through the eye and implicate the immune system, Briefly discuss the layers of the Retina for Information penetration

ANSWER

LAYERS OF THE RETINA

There are 10 Layers of the Retina, they are listed below

1. **Internal Limiting Membrane:** It is a thin cribriform layer formed by sustentacular fibres. It is a formidable barrier among the layers of the retina.
2. **The Stratum Opticum or Layer of nerve fibres:** It is formed by the expansion of the fibres of the optic nerve; it is thickest near the porus opticus, gradually diminishing toward the ora serrata. As the nerve fibres pass through the lamina cribrosa sclerae, they lose their myelin sheaths and continue onward through the choroid and retina as simple axons.
3. **The Ganglion cell Layer:** consists of a single layer of large ganglion cells, except in the macula, where there are several strata. The cells are somewhat flask-shaped
4. **The inner Plexiform layer:** is made up of a dense reticulum of minute fibrils formed by the interlacement of the dendrites of the ganglion cells with those of the cells of the inner nuclear layer.
5. **The inner Nuclear Layer:** is made up of closely packed cells of which there are three varieties; the bipolar cells, the horizontal cells and the amacrine cell

a) The bipolar cells, by far the most numerous are round or oval and each is prolonged into an inner and outer process

b) The horizontal cells lie in the outer part of the inner nuclear layer and have somewhat flattened cell bodies

c) The amacrine cells are in the inner part of the inner nuclear layer and are so named because it has not yet been shown that they possess axons

 **6) The outer Plexiform layer:** is much thinner than the inner layer but, like it, consists of a dense network of minute fibrils

**7) The outer Nuclear Layer:** like the inner nuclear layer, contains strata of oval cell bodies. The latter are of two types; rod or cone nuclei

**8) External Limiting Membrane:** is formed by the sustentacular cells

**9) The Layer of Rods and Cones (Jacob’s Membrane):** The elements composing this layer are of two types, rods and cones, the former being much more numerous than latter, except in the macula

**10) The Pigmented Layer:** consists of a single stratum of cells. When viewed from the outer surface, these cells are smooth and hexagonal