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NEURO HISTOLOGY ASSIGNMENT

1. The layer of the eye dqistinct functions which coalesce to create a unified, perceptual experience. The essential role of the external eye structure is:

* To protect the delicate tissue of the inner eye.
* The eyelid prevents foreign bodies from entering the inner eye and help refresh and distribute tear film by blinking.
* Eyelashes are finely sensitive to touch and warn the eye of possible debris and particles that may cause injury.
* The inner part of the eye has primarily structural and visual functions. It is stated clearly in relation to their cell functions below.

|  |  |  |
| --- | --- | --- |
| **Structures** | **Components** | **Function** |

**Fibrous Tunic (External Layer)**

|  |  |  |
| --- | --- | --- |
| Sclera | Dense irregular connective tissue | Support eye shape  Protect delicate internal structures  Extrinsic eye muscle attachment site |
| Cornea | Two layers of epithelium with organized connective tissue in between | Protect anterior surface of the eye  Refracts (bends) incoming light |

**Vascular Tunic (Middle layer)**

|  |  |  |
| --- | --- | --- |
| Choroid | Areolar connective tissue: highly vascularized | Supplies nourishment to retina  Pigment absorbs extraneous light |
| Ciliary body | Ciliary smooth muscles and ciliary processes: covered with secretory epithelium | Holds suspensory ligaments that attach to the lens shape for far and near vision  Epithelium secretes aqueous humor |
| Iris | Two layers of smooth muscles (sphincter pupillae and dilator pupillae) and connective tissues, with a central pupil | Control pupil diameter and thus the amount of light entering the eye |

**Retina (Inner Layer)**

|  |  |  |
| --- | --- | --- |
| Pigment Layer | Pigmented epithelial cells | Absorb extraneous light  Provides vitamin A for photoreceptor cells |
| Neural layer | Photoreceptors, bipolar neurons, ganglion cells and supporting muller cells | Detects incoming light rays: light rays are converted to nerve signals and transmitted to the brain |

**2. The unique structure of the human eye as well as exposure of the eye directly to the environment renders it vulnerable to a number of uncommon infectious diseases caused by fungi and parasites. Host defenses directed against these microorganisms, once anatomical barriers are breached, are often insufficient to prevent loss of vision. Therefore, the timely identification and treatment of the involved microorganisms are paramount. The anatomy of the eye and its surrounding structures is presented with an emphasis upon the association of the anatomy with specific infection of fungi and parasites. For example, filamentous fungal infections of the eye are usually due to penetrating trauma by objects contaminated by vegetable matter of the cornea or globe or, by extension, of infection from adjacent paranasal sinuses. Fungal endophthalmitis and chorioretinitis, on the other hand, are usually the result of antecedent fungemia seeding the ocular tissue. Candida spp. are the most common cause of endogenous endophthalmitis, although initial infection with the dimorphic fungi may lead to infection and scarring of the chorioretina. Contact lens wear is associated with keratitis caused by yeasts, filamentous fungi, and Acanthamoebae spp. Most parasitic infections of the eye, however, arise following bloodborne carriage of the microorganism to the eye or adjacent structures. The layer of the retina responsible for penetration of viruses are listed below:**

**LAYERS OF RETINA**

**The vertebrate retina has ten distinct layers From closest to farthest from the vitreous body:**

**1. Inner limiting membrane – basement membrane elaborated by Müller cells.**

**2. Nerve fibre layer – axons of the ganglion cell bodies (note that a thin layer of Müller cell footplates exists between this layer and the inner limiting membrane).**

**3. Ganglion cell layer – contains nuclei of ganglion cells, the axons of which become the optic nerve fibres, and some displaced amacrine cells.**

**4. Inner plexiform layer – contains the synapse between the bipolar cell axons and the dendrites of the ganglion and amacrine cells.**

**5. Inner nuclear layer – contains the nuclei and surrounding cell bodies (perikarya) of the amacrine cells, bipolar cells, and horizontal cells.[2]**

**6. Outer plexiform layer – projections of rods and cones ending in the rod spherule and cone pedicle, respectively. These make synapses with dendrites of bipolar cells and horizontal cells.In the macular region, this is known as the Fiber layer of Henle.**

**7. Outer nuclear layer – cell bodies of rods and cones.**

**8. External limiting membrane – layer that separates the inner segment portions of the photoreceptors from their cell nuclei.**

**9. Inner segment / outer segment layer – inner segments and outer segments of rods and cones. The outer segments contain a highly specialized light-sensing apparatus.**

**10. Retinal pigment epithelium – single layer of cuboidal epithelial cells (with extrusions not shown in diagram). This layer is closest to the choroid, and provides nourishment and supportive functions to the neural retina, The black pigment melanin in the pigment layer prevents light reflection throughout the globe of the eyeball; this is extremely important for clear vision.**