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Histological importance of the eye in relation to their cellular functions

Eyes are highly developed photosensitive organs for analyzing the form, intensity and color of light reflected from objects and providing the sense of sight. The eyeballs are protected in the orbit of the skull by adipose cushions. They consist of an externally tough fibrous, globe that maintains its overall shape. Internally the eye is made up of transparent tissue that refract light to focus the image ,a layer of photosensitive cells, and a system of neurons that collect, process, and transmit visual information to brain.

Each eye is composed of three concentric layers

1. FIBROUS TUNIC LAYER

STRUCTURE COMPONENT FUNCTION

|  |  |  |
| --- | --- | --- |
| SCLERA | Dense irregular connective tissue | .Supports eye shape  .Protects delicate internal structure  .Extrinsic eye muscle attachment site |
| CORNEA | Two layers of epithelium with organized connective tissue in between | .Protects anterior surface of the eye  .Refracts incoming light |

2.VASCULAR TUNIC OR UVEA LAYER

|  |  |  |
| --- | --- | --- |
| CHOROID | Areolar connective tissue highly vascularized | .Supllies nourishment to the retina  .Pigment absorbs extraneous light |
| CILLARY BODY | Cillary smooth muscle and cillary processes;covered with a secretory epithelium | .Holds suspensory ligaments that attach to the lens and change lens shape for far and near vision  .Epithelium secretes aqueous humor |
| IRIS | Two layers of smooth muscle(sphincter pupillae and dilator pupillae)and connective tissue,with a central pupil | Controls pupil diameter and thus the amount of light entering the eye |

1. RETINA LAYER

|  |  |  |
| --- | --- | --- |
| PIGMENTED LAYER | Pigmented epithelial cells | .Absorbs extraneous light  .Provides vitamin A photoreceptor cells |
| NEURAL LAYER | Photoreceptors,bipolar neurons,ganglion cells and supporting Muller cells | Detects incoming light rays;light rays are converted to nerve signals transmitted to the brain |

Corona virus can penetrate the body through eye and implicate the immune system.

It’s thought that coronavirus spreads from person to person mainly through airborne “respiratory droplets” produced when someone coughs or sneezes, much like the flu virus spreads, the CDC says. These droplets can land in the mouths or noses of people who are nearby, and possibly be inhaled into the lungs.

These droplets also can be spread to your eyes when you touch your face and then your eyes with unwashed hands. The coronavirus might enter your body through the conjunctiva and then spread throughout your body through blood vessels within the conjunctiva.

The conjunctiva is the clear, thin membrane that covers part of the front of the eye as well as the inner part of the eyelids.

Some evidence suggests conjunctivitis, which most of us know as pink eye, could be a symptom of COVID-19.

Conjunctivitis is an inflammation of the membrane covering the eyeball. It is often referred to as “pink eye.” Conjunctivitis often presents as an infected, red, “wet and weepy” eye.

Viral conjunctivitis is known to present with upper respiratory infections (colds, flus, etc.) and may be a symptom of the COVID-19 virus. A recent study of hospitals across China, published in the New England Journal of Medicine, found “conjunctival congestion” or red, infected eyes in nine of 1,099 patients (0.8%) with a confirmed diagnosis of coronavirus. Mucous membranes throughout the body are the most susceptible areas for virus transmission.

briefly discuss the layers of retina for information penetration.

Between the virtreous body and the choroid,the retina can usuallybe seento consist of nine neural layers and a pigmented layer; following the path of light these are:

The retina can be divided into 10 layers including

1. the inner limiting membrane (ILM); a babsement memerane covered by expanded process of muller cells, which are not distinguishable in routine preparations

(2) the nerve fiber layer (NFL);containing the ganglionic cell axons that converge at the optic disc and form the optic nerve

(3) the ganglion cell layer (GCL);containing cell bodies of the ganglionic cell and thicker near the retinas center than its pheriphery

(4) the inner plexiform layer (IPL); containing fibres and synapses of the ganglionic cells and bipolar neurons of the next layer

(5) the inner nuclear layer (INL);with the cell bodies of several types of bipolar neurons which begin to integrate signals from the rod and cone cells.

(6) the outer plexiform layer (OPL);containing fibres and synapses of bipolar neurons and rods and cone.

(7) the outer nuclear layer (ONL);with the cell bodies and photosensitive rod and cones

(8) the outer limiting membrane (OLM);a line formed by junctional complexes holding the rod and cone cells to the intervening muller cels.

(9) the rod and cone layer(RCL); which contains the outer segments of these cells where the photoreceptors are located

(10) the non neural pigmented layer(PL), which has several supportive functions important for the function and maintenance of neural retina