

Eye (visual system)



What does this tissue do?

Eye works with our brain to tell us the size, shape, colour, and texture of an object, its position, if it's stationary or moving and how fast and in what direction it moves.

Main parts:

Sclera is the protective layer, tough, fibrous tissue surrounds the eyeball and attaches to the cornea.

Conjunctiva a clear skin layer that protects the eye from becoming dry.

Cornea the clear front surface of the eye, focusing with aqueous humor (watery fluid) light into the eye.

Choroid the middle layer that contains blood vessels.

Iris coloured circular membrane, controls the amount of light entering the eye through the pupil (black circle)

Lens focuses the light further, sending the light rays through the vitreous humor and onto the retina.

Vitreous Humor jelly-like material, supports the round shape of the eye.

Retina a soft, light-sensitive layer of nervous system tissue.

Optic nerve carries signals from the retina to the brain, which interprets them as visual images.

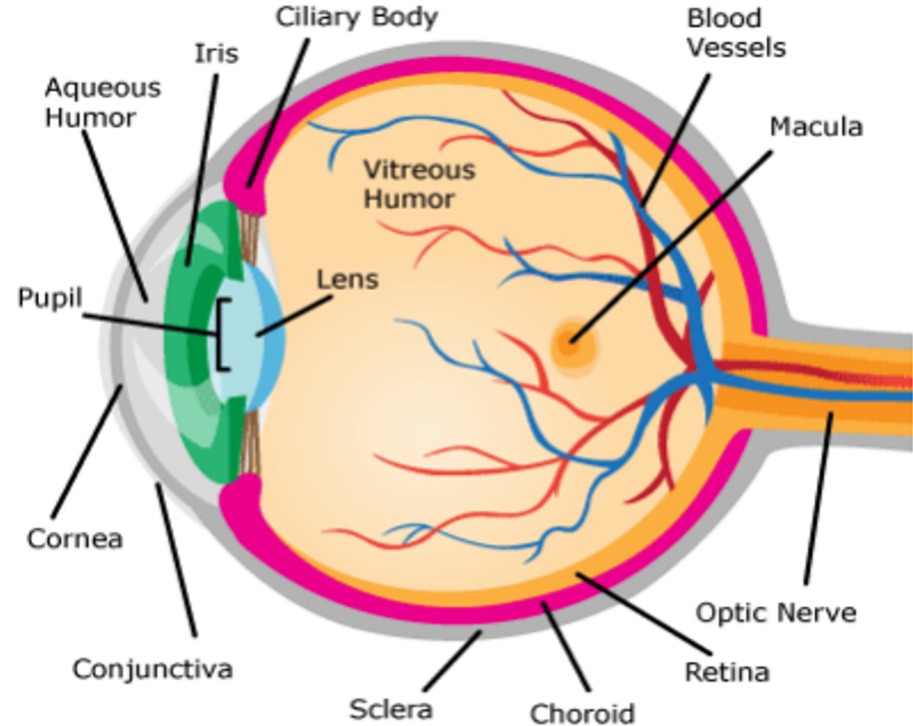




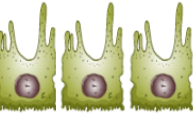


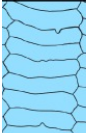
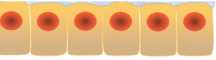

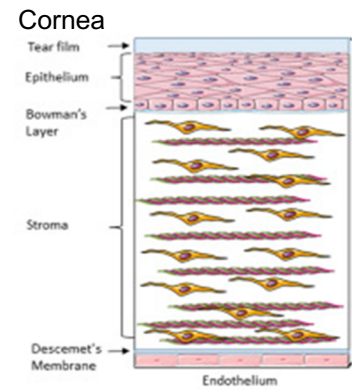
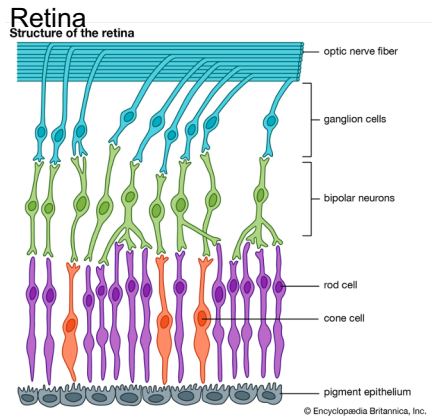
Illustration	Key cell types	Abundance	Function	Special features	Super powers
 Rod cell Cone cell	photoreceptor cells; rods and cones	Very common (120 million rod cells, and 6 million cone cells in human retina)	visual phototransduction	two main types of light-sensitive cell in retina	convert light into nerve impulses; Rods are extremely sensitive; provide twilight vision Cones less so; bright light and colour vision
	ganglion cell	Common (over a million in human retina)	process visual information	The axons of those neurons exit the eye, creating optic nerve carrying the nerve impulses to the brain	ganglion cell axon is amazingly long
	Retinal Pigment Epithelial cell (RPE)	Common	Builds pigmented cuboidal cell layer just outside the neurosensory retina that nourishes photoreceptors	maintains retinal homeostasis, and so preserves our sight	Multifunctional; storing cleaning feeding protecting
	corneal epithelial cells: basal, wing and squamous	common	Covers the front of the cornea, creating multilayer barrier to protect the cornea, stopping the free flow of fluids from the tears, and prevents bacteria from entering the epithelium and corneal stroma.	The layers of the epithelium are constantly undergoing mitosis	ability to repopulate
	Corneal keratocytes (corneal fibroblasts)	common	maintain the health and clarity of the stroma	residing in the stroma, collagen synthesis	

Illustration	Key cell types	Abundance	Function	Special features	Super powers
	Lens fibers	common	form the bulk of the lens	Firmly packed, long, thin, transparent cells. Mature lens fibers have no organelles or nuclei	
	lens epithelium	common	Maintains homeostasis of the lens	synthesis collagen, give rise to new lens fibers	
	corneal endothelium	common	maintain the health and clarity of the stroma	builds a single layer of closely interdigitating hexagonal cells, that secretes collagen that forms lens capsule	

Cells in the eye are arranged in layers as shown here (reproduced from Encyclopedia Britannica)



Lens

DEFINITIONS

SCIENTIFIC TERM	DESCRIPTION
visual phototransduction	Process by which light is converted into electrical signals in the photoreceptor cells in the retina of the eye.
homeostasis	The ability of the organism, cell, tissue to maintain healthy balance in response to internal and external changes.
mitosis	Type of cell division that results in two daughter cells each having the same number and kind of chromosomes as the parent nucleus, typical of ordinary tissue growth.
corneal stroma	Represents about 85-90% of corneal thickness, positioned between the epithelium and the inner endothelium. Composed of organized collagen, which maintains transparency.
organelles	Subcellular structures that has one or more specific jobs to perform in the cell, for example the nuclei , which store genetic information
Lens capsule	Smooth, transparent basement membrane that completely surrounds the lens, consisting of extracellular macromolecules, like collagen.