

Anatomy and Physiology of the Eye

Anatomy of the Eye

Conjunctiva:

Mucous membranes that line the eyelids and cover the eyeball. It prevents foreign objects from going behind the eye.

Cornea:

The transparent outer, front layer of the eye that refracts and focuses incoming light onto the lens.

Sclera:

The opaque, fibrous, protective outer layer (the "white of the eye") where light cannot pass through. The six extraocular muscles attach here to control eye movement.

Iris:

The colored part of the eye that controls the size of the pupil through muscle contraction and relaxation, thereby regulating the amount of light that reaches the retina.

Lens:

A transparent, biconvex structure made of layers that changes shape (a process called accommodation) to focus on near or distant objects.

Retina:

The light-sensitive layer at the back of the eye containing photoreceptor cells (rods and cones). The Fovea, in the central retina, is rich in cone cells for sharp, detailed color vision. The periphery is dominated by rod cells, which are most sensitive to light and motion.

Optic Disc:

The point where blood vessels enter/leave and the optic nerve exits the eye, carrying visual information to the brain. It contains no photoreceptors, creating a natural blind spot.

Movements of the Eye

Extraocular Muscles:

Six muscles attached to the sclera that are responsible for rotating the eye and holding it in place within the orbit.

Saccadic Movements:

Rapid, jerky, and voluntary shifts in gaze that allow the eyes to move between different points of interest in the visual field.

Pursuit Movements:

Smooth, continuous eye movements that maintain focus on a moving object, allowing the brain to track it accurately.

Organization of the Retina

Visual Information Flow:

Information flows sequentially through layers of cells in the retina before being sent to the brain.

The path is:

1. Photoreceptor Cells (Rods & Cones) → 2. Bipolar Cells → 3. Retinal Ganglion Cells → Brain (via Optic Nerve).

Light Path:

Notably, light must pass through the layers of retinal ganglion cells and bipolar cells before it can reach the photoreceptor proteins at the very back of the retina to be detected.