

retina

retina, layer of nervous tissue that covers the inside of the back two-thirds of the eyeball, in which stimulation by light occurs, initiating the sensation of vision. The retina is actually an extension of the brain, formed embryonically from neural tissue and connected to the brain proper by the optic nerve.

The retina is a complex transparent tissue consisting of several layers, only one of which contains light-sensitive photoreceptor cells. Light must pass through the overlying layers to reach the photoreceptor cells, which are of two types, rods and cones, that are differentiated structurally by their distinctive shapes and functionally by their sensitivity to different kinds of light. Rods predominate in nocturnal animals and are most sensitive to reduced light intensities; in humans they provide night vision and aid in visual orientation. Cones are more prominent in humans and those animals that are active during the day and provide detailed vision (as for reading) and colour perception. In general, the more cones per unit area of retina, the finer the detail that can be discriminated by that area. Rods are fairly well distributed over the entire retina, but cones tend to concentrate at two sites: the fovea centralis, a pit at the rear of the retina, which contains no rods and has the densest concentration of cones in the eye, and the surrounding macula lutea, a circular patch of yellow-pigmented tissue about 5 to 6 mm (0.2 to 0.24 inch) in diameter.

When light enters the eye, it passes through the cornea and the lens and is refracted, focusing an image onto the retina. Light-sensitive molecules in the rods and cones react to specific wavelengths of light and trigger nerve impulses. Complex interconnections (synapses) between and within retinal cell layers assemble these impulses into a coherent pattern, which in turn is carried through the optic nerve to the visual centres of the brain, where they are further organized and interpreted.

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