

BIRD SENSES

„...,like of an eagle’s.,,

The most important, highly developed sense in birds is the eye. Among the vertebrates, the bird's eye bears the most resemblance to a reptile. Most birds are unable to move their eyeballs. Only they have the *comb* in the eye, whose function may be to feed the retina and detect the polarisation of light.

The eyeballs are very large, accounting for $\frac{1}{4}$ of the weight of the head. The ostrich has the largest eye, with an eyeball 2.5 times the diameter of a human.

Anatomy of the bird eye

Inside the eye is the retina, the part of the retina that extends onto the cornea contains few photoreceptors, so there is almost no light perception. The photoreceptors are responsible for converting light into nerve signals. There are two types: cones and rods. Birds that are active at night have rods in the retina instead of cones, which are responsible for colour vision, and therefore have a much greater light perception than diurnal birds.

Birds have oil droplets inside their cones, which have a role in absorbing UV rays, thus protecting the retina from damage. Another function of the droplets is that they act as tiny eye lenses, focusing light rays onto the light receptors, increasing the retina's sensitivity to light. As the oil droplets contain different colouring agents, their sensitivity to UV light varies depending on their quantity and quality. This is why many bird species are able to detect the detailed patterns of objects based on the UV rays reflected from them. This property can even help in mate selection. It also means that some bird species see the world more colourful than humans.

In a bird's eye, a sharp image is projected onto the entire surface of the retina. This feature is important for birds that orient themselves by star constellations. These birds can see the whole sky in sharp focus at one time.

Position of the eyes

Birds of prey need advanced spatial vision to pinpoint the exact location of their prey. Their eyes are forward-looking and therefore have a small field of vision.

Prey species need to see as much of their environment as possible, so they have a wide field of view, up to 360°, like the common roller. Conversely, the overlap of their field of vision is only a few degrees.

They can change not only the shape of the lens, but also the shape of the cornea. The two eyelids are joined by a nictitating membrane, which keeps the birds' eyes moistened. In aquatic birds, this nictitating membrane acts as a 'contact lens'.