

МАТЕРИАЛЫ КОНФЕРЕНЦИИ
И ШКОЛЫ

SEARCHING FOR MAGNETORECEPTION IN THE AVIAN RETINA
BY ELECTRORETINOGRAPHIC METHOD

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Introduction. Birds use the Earth magnetic field (MF) for orientation and navigation. Much indirect evidence suggests that avian magnetic compass is light-sensitive, wavelength-sensitive and is localized in the retina. Hypothetically, the primary sensory molecule for MF perception are cryptochromes found in the retina. We studied whether MF modulates visual signals in the avian retina.

Methods. Material was the retina of pigeons and European robins. Retinal activity was recorded by electroretinography (ERG) *ex vivo*. Light flashes were applied under two directions of MF (perpendicular and parallel to retinal plane). We used blue (470 nm) and red (630 nm) stimuli given the fact that birds orientate under blue and green light, but not under red light. In pigeon, one preparation was equal to retina of whole eye; in European robin, we separately analyzed nasal, dorsal, temporal and ventral part of the retina.

Results. In pigeon, MF direction has small but statistically significant effect on amplitude of half-saturating responses to blue, but not red flashes. Additional study with photoreceptor (PR) response extraction using the same protocol shown that in pigeon MF direction does not affect the amplitude of isolated PR response (to both blue and red stimuli). In European robin, result observed in pigeon reproduced for nasal part of the retina only.

Summary. We show that MF direction can modulate response of the avian retina to blue, but not red flashes. This result is in a good agreement with behavioural data showing successful orientation of birds in MF under blue but not under red illumination. ERG method allows to record total response of the retina, and we could not exclude that sensory mechanism function in the selected cells of the the retina. This could explain why we observed the modest effect.

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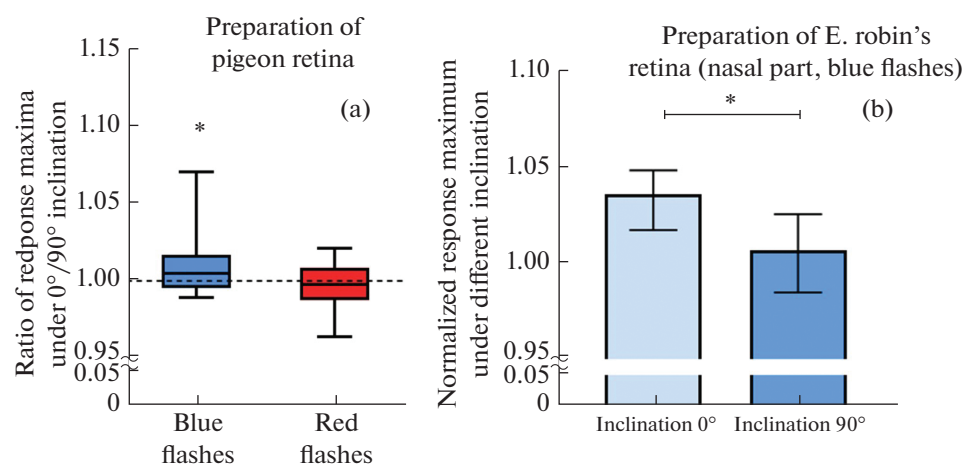


Fig. 1. Changes of the amplitude of the avian electroretinographic responses to blue and red light flashes under changes of MF direction.