BBB Seminar (BMED380)

SCAN ME

Thursday, May 23. 14:30 at the BBB, Auditorium 4

The sixth sense: neural circuitry in the retina for magnetoreception in migratory birds

Karin Dedek
University of Oldenburg, Germany

Karin's research is in the field of the molecular basis of sensory biology. Recently a focus has been on the retinal circuitry involved in magnetoreception in night-migratory songbirds.

Night-migratory songbirds, such as European robins (*Erithacus rubecula*), make astounding journeys. They cover thousands of kilometers between their breeding and wintering grounds each year with surprising precision and are even able to find back to their favorite nesting hole or sleeping perch. How they find their way and navigate with such high precision is still not fully understood. Birds likely rely on the Earth's magnetic field to determine the direction in which they want to migrate. Many studies suggest that this "magnetic compass sense" is light dependent and mediated by blue light sensors, called cryptochromes, which are expressed in the retina of night-migratory birds.

The cryptochrome 4a isoform is particularly suited as magnetosensory molecule because it shows a magnetic field effect *in vitro*. It is expressed in double cone photoreceptors. From there, magnetic information is likely sent to higher brain centers by retinal ganglion cells that project to the thalamus. However, the retinal circuitry that mediates magnetic signals from double cones to ganglion cells is not known.

To investigate this, we study the retinal distribution of double cones and the bipolar cells and horizontal cells they are contacting, using immunohistochemistry and reconstructions from serial EM data. We also investigate avian ganglion cells, for example by backtracking from the thalamus. In addition, we work towards electrophysiological measurements of avian double cones and analyze potential interaction partners of cryptochrome 4.

Chairperson: Meg Veruki, Department of Biomedicine