

Post doc position: Cellular and molecular bases of the animal magnetic sense

Over the past fifty years, a good wealth of behavioural experiments has suggested that animals are able to sense the geomagnetic field in order to perform long distance migrations and other navigational tasks. Besides, magnetoreception has also been suggested as a "Zeitgeber" for endogenous rhythms. However, the mechanisms by which specialized cells convert magnetic field changes into an electrical signal transmitted to the central nervous system, remain unknown.

The most recent observations in the field favor two hypotheses: a light-dependent reaction and the presence of ferromagnetic material e. g. magnetite (Fe_3O_4). Although, the site of light-dependent magnetoreception seems well established, several locations have been proposed for the magnetite-containing organ/cell: i) it has been shown that trout olfactory epithelium possesses cells containing magnetic material, an observation recently confirmed and refined by our group. ii) the presence of superparamagnetic magnetite within nerve terminals in pigeon upper beak, a report that has been recently called into question . iii) the presence of a magnetite-based system within the lagenal system of birds. iv) finally, several other organs have been proposed to harbor magnetite (fish lateral line, the eye) making the search for magnetoreceptor cells difficult.

Focusing on simpler animals in order to facilitate the detection of these cells, we have established an animal model of magnetoreception using planarians (*Dugesia dorotocephala*). We have demonstrated that these animals use the vertical component of the magnetic field in order to perform navigational task. Besides lesion experiments seem to suggest that the magnetoreceptor cells are not located within the cephalic region but more in an area located between the cephalic region and the beginning of the pharynx. The aim of the proposed project is therefore to dissect the molecular pathway involved in magnetoreception using a combination of behavioral/electrophysiological/molecular biology tools.

I am looking for a highly motivated post doc candidate eligible for Fyssen post-doctoral funding (<http://www.fondationfyssen.fr/en/post-doctoral-study-grants/>). Experience in one of these fields is requested: sensory physiology, electrophysiology, molecular biology. Interested candidate should contact Dr H. Cadiou: cadiou@unistra.fr <http://www.usias.fr/en/projects/projects-2013/magnetic-sense/>