

Combined recording of GPS positional data and EEG in freely flying homing pigeons reveals lateralised changes of hippocampal electrical activity upon approaching the home loft

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Lesion studies have shown that the pigeon hippocampus is a critical structure for spatial mapping of the home loft area [1,2]. More recently, it was found that the left hemisphere of pigeons appears to play a role in homing mechanisms [7], while studies in caged migratory birds have indicated a possible left-hemispheric predominance of magnetoreception [8]. Since the occurrence of theta rhythm in the EEG has been reported to be associated with navigational behaviour [3-5], we analyzed the EEG of freely flying homing pigeons in relation to the position of the bird as recorded by GPS [6]. This revealed that the proportion of bilateral theta activity was larger in pigeons far from the loft, theta being stronger in the left hemisphere. Upon approaching the home loft area, however, the proportion of theta decreased significantly in the left hemisphere only. These findings corroborate functional lateralization of homing in the pigeon brain, and promise new approaches to analyze brain mechanisms underlying homing and navigation.

Supported by Swiss National Foundation and NCCR Neural Plasticity and Repair

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