

## Lateralized activation of Cluster N in the brains of migratory songbirds.

*Miriam Liedvogel, Gesa Feenders, Kazuhiro Wada, Nikolaus Troje, Erich D. Jarvis, Henrik Mouritsen*

Cluster N is a cluster of forebrain regions found in night-migratory songbirds that shows high activation of activity-dependent gene expression during night-time vision. We have suggested that Cluster N may function as a specialized night-vision area in nightmigratory birds and that it may be involved in processing light-mediated magnetic compass information. Here, we investigated these ideas. We found a significant lateralized dominance of Cluster N activation in the right hemisphere of European robins (*Erithacus rubecula*). Activation predominantly originated from the contralateral (left) eye. Garden warblers (*Sylvia borin*) tested under different magnetic field conditions and under monochromatic red light did not show significant differences in Cluster N activation. In the fairly sedentary Sardinian warbler (*Sylvia melanocephala*), which belongs to the same phylogenetic clade, Cluster N showed prominent activation levels, similar to that observed in garden warblers and European robins. Thus, it seems that Cluster N activation occurs at night in all species within predominantly migratory groups of birds, probably because such birds have the capability of switching between migratory and sedentary life styles. The activation studies suggest that although Cluster N is lateralized, as is the dependence on magnetic compass orientation, either Cluster N is not involved in magnetic processing or the magnetic modulations of the primary visual signal, forming the basis for the currently supported light-dependent magnetic compass mechanism, are relatively small such that activity-dependent gene expression changes are not sensitive enough to pick them up.