Pigeons' navigation skill not down to iron-rich beak cells: study

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Pigeon

The theory that pigeons' famous skill at navigation is down to iron-rich nerve cells in their beaks has been disproved by a new study published in *Nature*.

The study shows that iron-rich cells in the pigeon beak are in fact specialised white blood cells, called macrophages. This finding, which shatters the established dogma, puts the field back on course as the search for magnetic cells continues.

"The mystery of how animals detect magnetic fields has just got more mysterious" said Dr David Keays who led the study.

Dr Keays continued: "We had hoped to find magnetic nerve cells, but unexpectedly we found thousands of macrophages, each filled with tiny balls of iron."

Macrophages are a type of white blood cell that play a vital role in defending against infection and re-cycling iron from red blood cells. They're unlikely to be involved in magnetic sensing as they are not excitable cells and cannot produce electrical signals which could be registered by neurons and therefore influence the pigeon's behaviour.

Dr Keays's lab, based at the Institute of Molecular Pathology in Vienna, worked together with Dr Shaw from the University of Western Australia, and Drs Lythgoe and Riegler from the UCL Centre for Advanced Biomedical Imaging in London.

"We employed state-of-the-art imaging techniques to visualise and map the location of iron-filled cells in the pigeon beak" said Dr Mark Lythgoe.

The search for the actual mechanism that allows migratory birds, and many other animals, to respond to the Earth's magnetic field and navigate around their environment remains an intriguing puzzle to be solved.

"We have no idea how big the puzzle is or what the picture looks like, but today we've been able to remove those pieces that just didn't fit," said Dr Keays.

More information: 'Clusters of iron-rich cells in the upper beak of pigeons are macrophages not magnetosensitive neurons' is published online in *Nature* today. DOI: 10.1038/nature11046