

Great balls of iron: Researchers uncover clue to bird navigation

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(Phys.org) —Every year millions of birds make heroic migratory journeys across oceans and continents guided by the Earth's magnetic field. How they detect those magnetic fields has puzzled scientists for decades.

But now a collaboration between the Keays lab at the Institute of [Molecular Pathology](#) (IMP) in Vienna and researchers at The University of Western Australia's Centre for Microscopy, Characterisation and Analysis (CMCA) has added some important pieces to the puzzle.

Their work, published today in the online version of *Current Biology*, reports the discovery of iron balls in sensory neurons. These [neural cells](#),

called [hair cells](#), are found in the ear and are responsible for detecting sound and gravity. Remarkably, each cell has a single iron ball, and it's in the same place in every cell.

"It's very exciting. We find these iron balls in every bird, whether it's a pigeon or an ostrich, but not in humans," said Mattias Lauwers, the IMP researcher who discovered the balls.

CMCA research associate Dr Jeremy Shaw, who has studied iron in a range of animals from molluscs to humans, said it was an astonishing finding.

"Despite decades of research, these conspicuous balls of iron had never been observed previously," Dr Shaw said. "Nature keeps surprising us with the various ways iron can be utilised by animals."

Dr Shaw and fellow CMCA researcher Professor Martin Saunders, both of whom specialise in the use of analytical [electron microscopy](#), helped to analyse the new iron structures and to describe them in the paper.

The finding builds on previous work by the Keays lab and the CMCA which last year showed that iron-rich cells in the beak of pigeons - previously believed to be the [magnetic sensors](#) - were really just blood cells.

"These cells are much better candidates, because they're definitely neurons," said IMP researcher and group leader, Dr David Keays. "But we're a long way off understanding how magnetic sensing works - we still don't know what these mysterious iron balls are doing.

"Who knows? Perhaps they are the elusive magnetoreceptors. Only time will tell."

Provided by University of Western Australia

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