IN THE NEWS

Stem cell breakthrough

A team of British scientists has become the first in the world to create pure nerve stem cells from human embryonic stem cells.

It is hoped that the cells, which were grown at Stem Cell Sciences in Edinburgh, UK, by a group led by Professor Austin Smith, will allow further progress in the development of treatments for neurological disorders such as Parkinson's disease and Alzheimer's disease. The availability of pure nerve stem cells could also lead to a reduction in animal testing in this field.

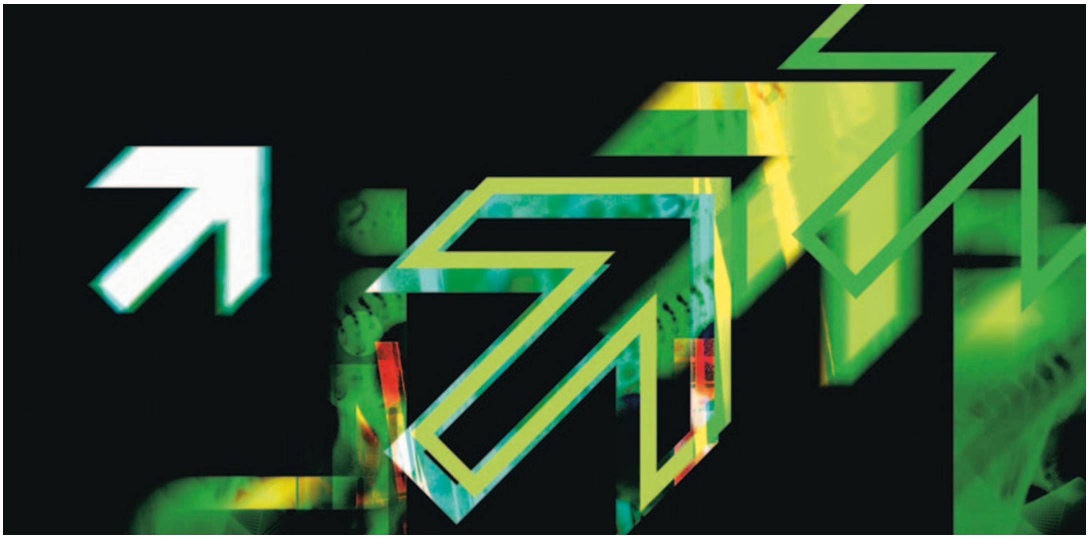
Dr Steven Pollard, one of the researchers, said, "This is incredibly exciting in terms of curing disease. We may be able to create the disease in a dish. If we do that, we'll be able to better understand the disease and also to test drugs" (*BBC News Online*, 16 August 2005).

Dr Tim Allsopp, Chief Science Officer at Stem Cell Sciences, added, "The remarkable stability and purity of the cells is something unique in the field of tissue stem cells and a great step forward" (*The Guardian*, 16 August 2005).

It is possible that such stem cells could one day be used to grow replacement brain tissue for patients with degenerative brain diseases.

However, some scientists have greeted the news with caution. Neville Cobb of the Wellcome Trust for Cell Biology at Edinburgh University warned that it would be irresponsible to give patients and their families false hopes, saying, "It is a huge leap from expanding stem cells in culture to rebuilding the brain of a patient with Alzheimer's disease" (*The Scotsman*, 17 August 2005).

Sarah Archibald



BEHAVIOURAL NEUROSCIENCE

Lighting up the direction

Migratory animals use different mechanisms to sense the Earth's magnetic field for homing and navigation. Writing in *Current Biology*, a team led by Wolfgang Wiltschko shows that bright coloured light makes migratory birds switch to a magnetic orientation strategy that is also used by lobsters and salmon. In a companion paper, the researchers report the intriguing finding that chickens can be trained to orient using magnetic cues.

There are two main types of magnetic compass found in certain animals. An 'inclination compass', which is used by birds and sea turtles, defines 'poleward' as the direction along the Earth's surface, in which the angle between the vertical component of the magnetic field and the gravity vector is smallest. By contrast, a 'polarity compass', which is used by lobsters and salmon, determines north using the horizontal component of the magnetic field.

The inclination compass is thought to involve magnet-sensitive chemical reactions triggered by specialized photopigments on the retina on light absorption. Changes in magnetic fields can affect these chemical reactions, which, in turn, alter neuronal activity.

In the first study, the researchers analysed how the ability of migratory robins to orient could be affected by light intensity. Under low-intensity turquoise light in the local geomagnetic field, the robins showed normal migratory behaviour, with southerly headings in autumn and northerly headings in spring. However, under high-intensity turquoise light the robins preferred northerly headings in both seasons.

This unexpected finding prompted the researchers to characterize the birds' orientation mechanism under high-intensity light in a manipulated magnetic field. Interestingly, inverting the horizonal, but not the vertical, component of the magnetic field reversed the robins' heading, which indicates that the birds might have switched to a polarity compass.

This is further supported by the fact that an oscillating magnetic field, which is known to affect inclination compasses, disoriented the robins under low-intensity light, but did not change their fixed-direction headings under high-intensity light. The authors conclude that birds might have at least two magnetoreception mechanisms that are used under different conditions.

Despite birds' innate orientation systems, it has not been possible to train them to move in a certain direction in the laboratory using a food reward. Wiltschko *et al.* conjectured that, in nature, birds do not use magnetic signals to find food, and tests involving such a stimulus might be alien to them. Instead, the researchers trained domestic chicks to locate a hidden social reward, and found that their ability to orient in the test arena was affected by magnetic fields.

This second study is the first demonstration of a conditioned magnetic compass response in an avian species, and suggests that the ability to orient using magnetic cues has been retained despite thousands of years of domestication.

Jane Qiu

References and links

ORIGINAL RESEARCH PAPERS Wiltschko, R. *et al.* Two different types of light-dependent responses to magnetic fields in birds. *Curr. Biol.* **15**, 1518–1523 (2005) | Freire, R. *et al.* Chickens orient using a magnetic compass. *Curr. Biol.* **15**, R620–R621 (2005)

FURTHER READING Johnsen, S. & Lohmann K. J. The physics and neurobiology of magnetoreception. *Nature Rev. Neurosci.* **6**, 703–712 (2005)

WEB SITE

Wiltschko's laboratory: http://216.239.39.104/translate_c?hl=en&u=http://www.bio.uni-frankfurt.de/akpoev/&prev=/search%3Fq%3DWolfgang%2BWiltschko%2BANd%2BZoologisches%2BInstitut%26hl%3Den%26lr%3D%26sa%3DG