

## **MEDIA RELEASE**

*Embargoed until 00.00 BST, Tuesday 16<sup>th</sup> August*

### **Stem cells open the door to greater understanding of neurological diseases**

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Scientists at the Universities of Edinburgh and Milan have developed a new technique to grow pure brain stem cells, which may be used to model diseases of the nervous system and develop new drugs to treat these diseases. This research is published online this week, in open-access journal PLoS Biology<sup>(\*)</sup>.

In the body, stem cells divide to produce both copies of themselves and other, more specialised, cell types. Until now, scientists had not been able to sustain the ability of neural stem cells to produce copies of themselves when grown in a dish. This meant that the population of cells in the dish would always become mixed, with only a few stem cells and many more specialized cells. By changing the growth conditions for the cells, the Edinburgh and Milan labs have for the first time established pure stem cell divisions, thus avoiding the unwanted differentiated cells.

Says researcher Luciano Conti: "We applied techniques developed to control the behaviour of embryonic stem cells to our neural stem cells. The knowledge we already have about embryonic stem cells helped us to understand and control these more specialized stem cells." The scientists have replicated their initial findings with mouse cells, using human stem cells.

The research teams made different cell types of the nervous system from the neural stem cells. All were in perfect working order, suggesting that the neural stem cells can be used to generate, and study in detail, the cells that are affected in neurodegenerative disorders, like Huntington's and Parkinson's disease. Researchers will then be able to study the cellular and molecular processes that go wrong in disease - a crucial first step in developing effective, safe therapies.

Drugs that are being developed to interfere with the onset and/or progression of the disease may now be tested on the neural stem cells, or on specific cell types made from them. Such an approach will reduce the number of animals used in this type of research.

The researchers also feel that their work may be a step in the right direction for using stem cells to replace damaged tissue. "The purity of the cells, and the fact that they do not make tumours, means they should be valuable for studying the potential of transplantation to repair damage," says Steve Pollard, one of the Edinburgh researchers.

Professor Austin Smith, leading the Edinburgh team, believes that sharing information and knowledge is critical to take stem cell research forward. "Collaboration with our colleagues in Milan, through the EuroStemCell project, made our breakthrough possible. We have published in an open-access journal and included comprehensive practical protocols so that other researchers can replicate and advance this work."

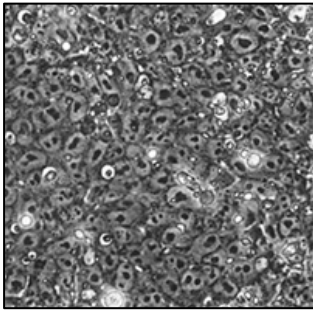
This research was supported by EuroStemCell, the BBSRC, the MRC and The Wellcome Trust.

**- MORE -**

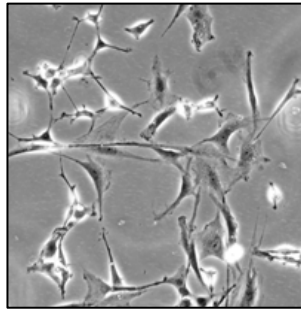
(\*)Luciano Conti, Steven M. Pollard, Thorsten Gorba, Erika Reitano, Mauro Toselli, Gerardo Biella, Yirui Sun, Sveva Sanzone, Qi-Long Ying, Elena Cattaneo and Austin Smith (2005). Niche-independent symmetrical self-renewal of a mammalian tissue stem cell. *PLoS Biology* **3(9)**: e283.

PRESS ONLY PREVIEW OF THE ARTICLE:

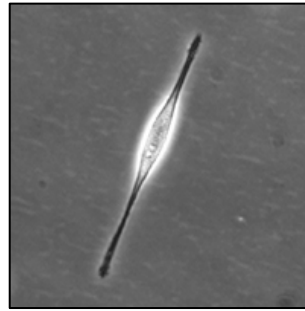
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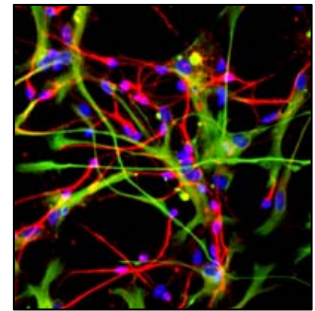
A colony of embryonic stem cells. These cells can make all the cells in the human body...



...including neural stem cells.



A single neural stem cell can make all the cell types of the nervous system...



...like neurons (red) and astrocytes (green), in the adult brain.

**Additional high-resolution images (black and white or full colour), as well as time-lapse sequences, are available on request.**

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#### Notes to Editors:

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**The Institute for Stem Cell Research (ISCR)** is a multidisciplinary research institute focused on molecular, cellular and developmental biology of stem cells. The ISCR's mission is to acquire an understanding of the mechanisms of stem cell self-renewal and differentiation processes and to provide scientific foundations for the application of cell replacement therapies in the treatment of human disease and injury. Further information on the ISCR is available at [www.iscr.ed.ac.uk](http://www.iscr.ed.ac.uk).

**EuroStemCell** is a four-year Integrated Project of the European Union's Sixth Framework Programme, and will receive up to €11.9 million in funding from the EU. The 24 participating laboratories are from Scotland, England, Sweden, France, Denmark, Italy, Germany, and Switzerland. They comprise universities, research institutes and 3 biotechnology companies. EuroStemCell's mission is to build the scientific foundations required to take stem cell technology to the clinic. Further information on EuroStemCell is available at [www.eurostemcell.org](http://www.eurostemcell.org)

**European Union's Sixth Framework Programme (FP6).** The Framework Programme is the main European instrument for research funding in Europe. FP6 aims to contribute to a true 'European Research Area' (ERA). At the Lisbon summit in March 2000, EU governments called for a better use of European research efforts through the creation of an internal market for science and technology – a 'European Research Area'. FP6 is the financial instrument to help make ERA a reality.

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## **Stem cells glossary**

**Stem cell** - unspecialized cell that has the ability to multiply without limit, and can also give rise to specialized cell types in the body.

**Embryonic stem cell** - Stem cell originating from the early embryo that has the potential to make most cell types both in the body and in the laboratory.

**Neural stem cell** – Stem cell found in the brain. Has the ability to make all the different cells of the nervous system: neurons, astrocytes, oligodendrocytes.

**Adult stem cell** - Undifferentiated cell found in a specialized tissue (i.e. bone marrow, skin, muscle etc.). Has the ability to make a limited range of specialised cell types.

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