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# Media Release

## 'Glow in the dark' red blood cells made from human stem cells

**EMBARGOED UNTIL 3.00am 24 August 2009, Melbourne Australia:**

Victorian stem cell scientists from Monash University have modified a human embryonic stem cell (hESC) line to glow red when the stem cells become red blood cells. The modified hESC line, *ErythRED*, represents a major step forward to the eventual aim of generating mature, fully functional red blood cells from human embryonic stem cells.

The research, conducted by a team led by Professors Andrew Elefanty and Ed Stanley at the Monash Immunology and Stem Cell Laboratories that included scientists at the Murdoch Children's Research Institute, was published in today's issue of the prestigious journal, *Nature Methods*. The work, funded by the Australian Stem Cell Centre (ASCC), will help scientists to track the differentiation of embryonic stem cells into red blood cells.

Whilst hESCs have the potential to turn into any cell type in the body, it remains a scientific challenge to reliably turn these stem cells into specific cell types such as red blood cells. The development of the *ErythRED* embryonic stem cell line, which fluoresces red when haemoglobin genes are switched on, is an important development that will help researchers to optimise the conditions that generate these cells.

Professor Joe Sambrook, Scientific Director of the ASCC said that "The elegant work of the Elefanty-Stanley group unlocks the entrance to the long sought and elusive differentiation pathway that leads to expression of adult haemoglobin genes"

"Not only will the ErythRED cell line lead to more efficient creation of red blood cells from human embryonic stem cells, but these cells are a crucial tool for monitoring the behaviour of the cells when transplanted into animal models" said Professor Andrew Elefanty.

The research was supported by the Australian Stem Cell Centre, the Juvenile Diabetes Research Foundation and the National Health and Medical Research Foundation.

### Ends

The abstract and full publication (subscription only) can be found online at: <http://dx.doi.org/10.1038/NMETH.1364>

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### **About the project**

The project was developed in the Embryonic Stem Cell differentiation Laboratory, headed jointly by Professor Andrew Elefanty and Professor Ed Stanley at Monash University. The laboratory has focused on human embryonic stem cell differentiation along mesodermal (blood, endothelium and heart) and endodermal (pancreas) lineages. The group has made significant contributions to the field in the culture of human embryonic stem cells. They have developed a robust system for the efficient differentiation of human embryonic stem cells, complemented by the development of an animal product free medium in which human embryonic stem cell differentiation can be reproducibly directed to different lineages by the inclusion of specific growth factors. The group has generated genetically modified human embryonic stem cells lines in which fluorescent reporters have been introduced into key gene loci that allow objective monitoring of in vitro differentiation of embryonic stem cells in a logical, step-wise fashion.

A major goal of their work is to regulate human embryonic stem cell differentiation in order to understand human development, to generate tools for drug discovery, and eventually to provide a source of cells for therapy.

### **About Professor Ed Stanley**



Professor Ed Stanley is (with Professor Elefanty) Joint Laboratory Head of the Embryonic Stem Cell Differentiation Laboratory of the Monash Immunology and Stem Cell Laboratories. Professor Stanley completed his PhD at the Ludwig Institute for Cancer Research in Melbourne before traveling to the National Institute for Medical Research, Mill Hill, London to undertake post-doctoral studies. During this time he was awarded a Human Frontiers in Science Organization Fellowship and a C.J. Martin Fellowship. Following his stay in London, Professor Stanley returned to the Walter and Eliza Hall Institute (WEHI) of Medical Research in Melbourne to continue his postdoctoral training in developmental biology. In 2000 he was appointed head of the gene targeting facility at WEHI. In 2002 he and Professor Elefanty formed the Embryonic Stem Cell Laboratory at Monash University.



### **About Professor Andrew Elefanty**

Professor Andrew Elefanty is the Joint Laboratory Head of the Embryonic Stem Cell Differentiation Laboratory of the Monash Immunology and Stem Cell Laboratories. Professor Elefanty trained as a physician in medical oncology and completed a PhD in leukaemogenesis under the supervision of Professor Suzanne Cory at the Walter and Eliza Hall Institute of Medical Research in 1992. He was awarded an NHMRC Neil Hamilton Fairley travelling fellowship and a Roche travelling fellowship from the Royal Australasian College of Physicians in 1993, taking up a position at the National Institute for Medical Research in London in the laboratory of Professor Frank Grosveld, studying aspects of blood cell development. He returned to the WEHI in 1995 as a Special Fellow, Head of the Developmental Haematopoiesis laboratory. In 2002 he and Professor Stanley formed the Embryonic Stem Cell Laboratory at Monash University.

### **About the ASCC**

The Australian Stem Cell Centre was founded to capitalise on Australia's significant strengths in the field of stem cell research. The ASCC was selected in 2002, in a competitive bid process, as Australia's Biotechnology Centre of Excellence, an initiative of the Australian Government. The Centre provides a unique national resource for stem cell researchers to deliver outcomes that benefit the

wider Australian biotechnology industry and will ultimately contribute innovative solutions to human health challenges.

The Centre was established with the financial and in-kind support of a number of institutions of which the current voting Members, who retain ultimate oversight of the Centre, are: Monash University, University of Queensland, Howard Florey Institute and University of Adelaide. The additional Stakeholder institutes are: University of Melbourne, Baker IDI, Murdoch Children's Research Institute, Victor Chang Cardiac Research Institute and Mater Medical Research Institute.

The ASCC is governed by a Board of Directors with independent scientific oversight and support from an eminent Scientific Advisory Board.

Total funding of \$100 million has been awarded to the ASCC by the Australian Government and is administered by the Australian Research Council and the Department of Innovation, Industry, Science and Research. The funding is provided in instalments from 2002 to 2011. To complement Australian Government funding, the State Government of Victoria's Science Technology and Innovation program awarded the Australian Stem Cell Centre a further \$11 million to support key infrastructure in Victoria.

Together the ASCC and partnering organisations support a critical mass of Australian stem cell research that is internationally competitive. The ASCC currently funds research at leading institutes and universities in Victoria, Queensland, South Australia and New South Wales with the major hubs of activity centred in Victoria and Queensland.