# Researchers find ‘missing link’ stem cells

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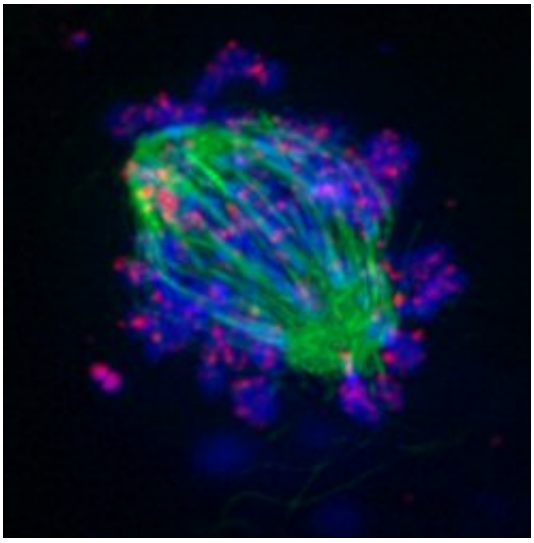

Fluorescently-labelled embryonic stem cells. Credit: J Waters & A Salic/Science Photo Library

A team of scientists at Oxford University has discovered a new type of embryonic stem cell in mice and rats that is the closest counterpart yet to human embryonic stem cells.

The cells are expected to serve as an improved model for human stem cells in studies of regeneration, disease pathology and basic stem cell biology, bringing scientists closer to realising the potential of stem cells in treatments for disease.

The findings, reported in *Nature*, are the result of a collaborative effort

between scientists at the University of Oxford and the National Institutes of Health (NIH) in the USA – a collaboration brought about by the paper's lead author, Paul Tesar, who is a student on NIH and Oxford's joint doctoral programme. Stem cell expert Professor Sir Richard Gardner in Oxford's Department of Zoology is the senior author from Oxford.

Up until now, embryonic stem cells derived in humans and mice had looked different and behaved differently. They had in common their 'pluripotency', or ability to turn into any type of cells, but researchers had found that mouse and human stem cells maintained this state in quite different ways, which required distinct techniques for their growth in culture.

In the new research, the team found that when mouse stem cells were derived from slightly older mouse embryos, they looked very similar to human embryonic stem cells under the microscope and had many of the same properties. Importantly, these new mouse stem cells could be maintained using the same growth factors as those used in the culture of human embryonic stem cells.

The discovery is likely to accelerate understanding of stem cell development and help the derivation of stem cells in other species, including livestock and disease-prone mice used in research, thereby providing better models for researchers involved in stem cell research.

The Oxford paper was published simultaneously with a paper from a team at Cambridge demonstrating independently the same findings. Professor Sir Richard Gardner said: 'Having both studies reach the same conclusions at the same time allows other researchers to use this new information immediately in their research. The fact that both studies made this discovery almost simultaneously is a clear sign of the momentum picking up in stem cell research. We are reaching a critical

mass of understanding about these cells which should enable us to make the most of them in coming years.'

Paul Tesar added: 'It's unusual to have immediate confirmation of your findings: it strengthens both papers.'

The research highlights the strength of the NIH-Oxford Biomedical Research Scholarship programme, which allowed Mr Tesar to split his time between Oxford University and the NIH and provided a link between Dr Ronald McKay, who directs the NIH Stem Cell Unit, and Professor Sir Richard Gardner in Oxford, the two senior authors on the paper.

The NIH, a US government agency, is the largest biomedical research institute in the world, but it is not a degree-awarding institution. Its scholarships programme with Oxford and Cambridge Universities, which started as a pilot in 2001, was its first joint venture with an overseas university. Students on the NIH-Oxford Scholars in Biomedical Sciences Programme work with leading scientists on both sides of the Atlantic, and finish with an Oxford DPhil. Scholars spend roughly half their time at each institution, and are co-mentored by one faculty member at NIH and another at Oxford, who work together on a cutting-edge collaborative project.

'It is unusual for a DPhil student to have a first-author Nature paper,' says Stephen Kennedy, who leads the Oxford side of the programme. 'The achievement, not to mention the importance of the findings themselves, serves to highlight the outstanding quality of the NIH-Oxford scholars. It is also a good example of the role of the programme in transferring knowledge between researchers at the two institutions and fostering strong collaborations, in this case between Professor Gardner and Dr McKay.'

Source: University of Oxford