

Researchers Report Adult Stem Cell Breakthrough

BY Liz Townsend

Writing in the August 25 issue of *Cell*, Japanese researchers announced they have successfully modified a mouse skin cell into an embryonic-like stem cell, according to *Yomiuri Shimbun*. If the technology can be adapted to humans, the implications for the ongoing debate over the use of embryonic stem cells would be enormous.

"This is very exciting information, since it reveals a roadmap by which pluripotent cells might be obtained for therapeutic purposes, without having to obtain them from embryos," John Lough, a stem cell researcher at the Medical College of Wisconsin, told the *Milwaukee Journal-Sentinel*. "As a result, ethical dilemmas would largely be defused."

Japanese scientists Shinya Yamanaka and Kazutoshi Takahashi of Kyoto University identified four genes needed to transform adult stem cells into "induced pluripotent stem" (iPS) cells. They implanted the genes into a skin cell obtained from a mouse tail.

"In two weeks, the skin cell with the four gene factors developed to take on a similar pattern to embryonic stem cells," *Yomiuri Shimbun* reported. "Its pluripotency was also confirmed as the cell developed heart muscle cells and nerves, and showed signs of a pulse on a culture dish."

"Pluripotency" refers to the ability of the cells to differentiate into any cell type (other than gametes—sperm and ova). Researchers hope this will translate into cures for various serious medical conditions.

Embryonic stem cells are pluripotent, but there are extraordinary ethical and practical considerations preventing their use. The Japanese study brings hope that adult stem cells, which are obtained without killing the donor, could have the same versatility as embryonic cells without the ethical and scientific drawbacks.

Moreover, if the cells are both obtained from and used in the same patient, the problem of a patient's immune system rejecting cells would be solved.

The research is in its very early stages, and more work will be done to see if the findings can be applied to humans. "We'll continue the research and try to make iPS cells from human skin cells," Yamanaka told *Yomiuri Shimbun*, "and then be able to offer regenerative medical treatment using the cell."

The study received lavish praise from an unexpected source.

"This is an astonishing experiment," Prof. Ian Wilmut of Edinburgh University, who led the team that cloned Dolly the sheep, told the *Daily Telegraph*. "Just by the production of four proteins in skin cells from the tail of a mouse, some of the cells were given many of the characteristics of embryo stem cells."

Wilmut added, "Clearly this new approach has a great deal to offer in basic research and may one day be used to produce patient-specific cells without cloning."