US scientists make embryonic stem cells from adult skin

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A researcher works on stem cells at a stem cell institute in Farmington, Connecticut, on August 27, 2010

For the first time, US researchers have cloned embryonic stem cells from adult cells, a breakthrough on the path towards helping doctors treat a host of diseases.

The embryonic stem cells—which were created by fusing an adult skin

cell with an egg cell that had been stripped of genetic material—were genetically identical to the donors.

The hope is that cloned embryonic stem cells, which are capable of transforming into any other type of cell in the body, could be used in patient-specific regenerative therapy to repair or replace an individual's organs damaged by diseases including cancer, heart disease and Alzheimer's disease.

The team of researchers, led by Robert Lanza, of the Massachusetts-based company Advanced Cell Technology, used a technique that had succeeded last year with infant skin cells.

But Lanza's team, funded in part by the South Korean government, used cells from a 35-year-old man and a 75-year-old man.

This is a significant step forward, the researchers wrote in the study published Thursday in the journal *Cell Stem Cell*.

"For many cell types, reprogramming is more difficult for adult cells than for fetal/infant cells, presumably at least in part because (they are) ... further removed from the pluripotent state" in which the cells can develop into different types, the study said.

Yet adults are more likely than infants to need regenerative therapy, the authors wrote, noting that "the incidence of many diseases that could be treated with pluripotent cell derivatives increases with age."

One advantage of this approach is that it does not use fertilized embryos to obtain stem cells, a technique that raises major ethical issues because the embryo is destroyed.

But critics, including the Catholic Church, believe it presents a slippery

slope that could lead to cloning of human beings, a suggestion scientists deny.

Since the birth of Dolly the sheep in 1996 in the United Kingdom, the first cloned animal, researchers have cloned some 20 species including goats and rabbits, but never monkeys or primates whose biology and reproduction is more complex.

Years of research on monkey cells using the same technique have not successfully produced any monkey clones.

More information: Human Somatic Cell Nuclear Transfer Using Adult Cells, *Cell Stem Cell,* dx.doi.org/10.1016/j.stem.2014.03.015