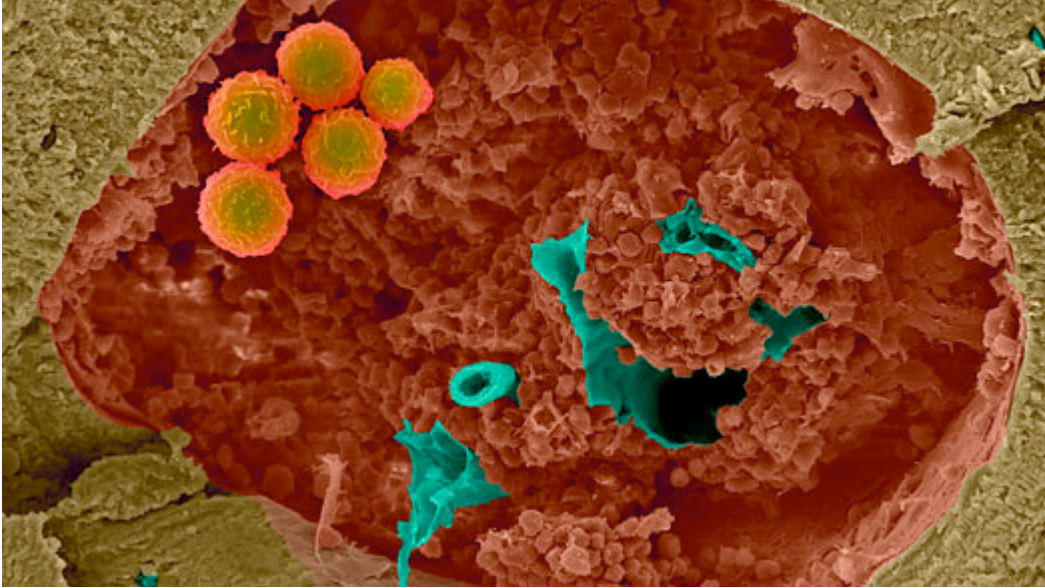


Researchers Hail Stem Cells Safe for Human Use

By ALICE PARK Thursday, May. 28, 2009



This adult human hematopoietic stem cell gives rise to specialized blood cells

Stem-cell science is a fast-moving field. Just three years since a Japanese researcher first reprogrammed ordinary skin cells into stem cells without the use of embryos, scientists at a Massachusetts biotech company have repeated the feat, only this time with a new method that creates the first stem cells safe enough for human use. The achievement brings the potentially lifesaving technology one step closer to real treatments for disease.

Dr. Robert Lanza, chief scientific officer at Advanced Cell Technology (ACT), reported today in the journal *Cell* that his team has created stem cells using human skin cells and four proteins. The innovation builds on the breakthrough discovery in 2006 by Shinya Yamanaka, who similarly coaxed human skin cells to revert to a pristine, embryonic state by introducing four key genes into the cells, piggybacked on viruses. However, some of those genes are known to cause cancer, which made Yamanaka's stem cells — known as induced pluripotent stem cells, or iPS cells — unsuitable for human use.

Until now, no one has been able to create iPS cells without using viruses and genes. But Lanza and his team found a way around both: the researchers isolated the proteins made by the same genes Yamanaka used and "tagged" them with a message that allowed the proteins to slip easily into the cell. Yamanaka's method, on the other hand, relied on using viruses to ferry genes into the skin cell.

So far, the ACT group says the iPS cells generated using their method are equivalent to those made using Yamanaka's strategy. In fact, they seem to flourish more robustly than the traditional iPS cells, at least in lab tests that involve regrowing certain cells found in the retina. This could lead to a potential treatment to replace damaged eye cells in conditions such as retinitis pigmentosa or macular degeneration.

Dr. Arnold Kriegstein, director of the Institute for Regeneration Medicine at the University of California, San Francisco, is excited by the advance but notes that it is still relatively inefficient. "The ability to make cell lines from patients with any risk of genetic alteration is a significant step, but the efficiency of 0.001% of cells is low, and even that took two months to achieve," he says, referring to the fact that only a tiny percentage of skin cells in the study transformed into iPS cells over two months. "How readily or quickly this technology is applied, and whether the efficiency is improved, are things that we will have to wait and see." ([Read "Stem-Cell Research: The Quest Resumes."](#))

Still, the rapid pace of the research means we may not have to wait long. "We really lucked out," says Lanza. "These iPS cells were just discovered a few years ago, and here we are three years later with a method safe enough to actually use in people." ACT plans to file a request for the first human trial using its cells sometime next year.