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Celebration of Latest Breakthrough on Stem Cell May be Premature

by Malcolm Ritter

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NEW YORK - For all the excitement, big questions remain about how to turn this week's stem-cell breakthrough into new treatments for the sick. And it's not clear when they will be answered.

Scientists have to learn more about the new kind of cell the landmark research produced. They have to find a different way to make it, to avoid a risk of cancer. Even after that, there are plenty of steps needed to harness this laboratory advance for therapy.

So if you ask when doctors and patients will see new treatments, scientists can only hedge.

"I just can't tell you dates," said James Thomson of the University of Wisconsin-Madison, one of the scientists in the United States and Japan who announced the breakthrough Tuesday.

"The short answer is: It's still going to be years," Dr. John Gearhart, a stem cell expert at the Johns Hopkins School of Medicine who was familiar with the work, said Wednesday.

Such a delay isn't unusual. It often can take a long time for medical payoffs to flow from basic scientific findings.

At least, federal money for research into the new kind of stem cell won't be a problem, said Story Landis, head of the National Institutes of Health's Stem Cell Task Force. The task force is about to invite scientists to apply for new grants for such work, she said.

This week's advance has apparently solved a supply problem for the study of embryonic stem cells. These cells are valued for their ability to morph into any of the cells of the body. Scientists had long searched for a way to produce embryonic cells that carry the genes of a particular person.

Such cells could be used for at least three purposes. The most highly publicized one is to create transplant tissue for treating disease. In the shorter term, they could be used to create "diseases in a dish," colonies of cells bearing illness-promoting genes that could reveal the vulnerable roots of medical conditions. Scientists could use such cells for rapidly screening potential medicines in the laboratory.

Until this week's announcement, scientists who wanted to make such cells looked to an expensive, cumbersome cloning process that destroyed embryos, making it an ethical lightning rod. And it hadn't yet worked with human embryos.

The new technique is much simpler. It makes human skin cells behave like embryonic-stem cells without using embryos at all.

End of problem? Not unless these altered skin cells can truly replace embryonic cells, and that's not clear yet, a prominent scientist said.

Paul Berg, a Stanford University Nobel laureate who helped establish federal guidelines for human research on genetically manipulated cells, said the celebration over this week's announcement is premature.

"I'm amazed at the ethicists" saying the problem of needing embryos has been solved, Berg said. "We're not in the clear - this is a first step."

So what are the next steps?

The first basic question to solve is how similar iPS cells are in behavior and potential to the embryonic cells that scientists have studied for nearly a decade.

"My guess is that we'll find that there are significant differences," said Dr. Robert Lanza of Advanced Cell Technology, which has been trying to produce stem cells from cloned human embryos. "I'd be surprised if these cells can do all the same tricks as well as stem cells derived from embryos."

Another big question is how to make iPS cells in a different way. The breakthrough technique treats skin cells by using viruses to carry in a quartet of genes. Those viruses disrupt the DNA of the skin cells. When that happens, there's a risk of cancer.

That's a showstopper when it comes to creating tissue to transplant into people. So scientists have to figure out a way to make iPS cells without those DNA-disrupting viruses.

The cancer-risk problem should be solved quickly, maybe within a year or so, said Doug Melton, co-director of the Harvard Stem Cell Institute.

Even with the cancer problem solved for transplant uses, there's another big hurdle: The whole idea of using embryonic stem cells or iPS cells for treating people with conditions such as diabetes and Parkinson's disease via transplant is far from proven. Scientists will need to learn how to turn iPS cells into the right kind of tissue, and how to use that tissue in a way that will treat a person's disease.