

## Stem cells could allow "blood farms," company says

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Embryonic stem cells can be used to grow vats of red blood cells, which could lead to the creation of "farms" that could provide limitless sources of blood, U.S. researchers reported on Tuesday.

The team at Massachusetts-based Advanced Cell Technology hopes the finding might help save the struggling company, which is desperately seeking investors to keep it afloat.

"I think it's really a big break for us," said Dr. Robert Lanza, scientific director of the company, one of a few commercial ventures trying to make a business out of the emerging stem cell field.

Stem cells are the body's master cells, replenishing various cells and tissues as they die. Stem cells taken from days-old embryos are especially powerful, with the ability to produce any cell type.

Doctors hope to some day use them to provide tailor-made transplants for patients, and to study disease. One problem is that the immune system may reject tissues grown from someone else's stem cells.

Red blood cells may be an exception to this, because they do not have a nucleus, Lanza and colleagues at the University of Illinois at Chicago and the Mayo Clinic reported. "You don't have to worry about the DNA going haywire," he said.

What Lanza envisions is growing batches of cells from human embryos possessing all the different blood types: A, B, O and AB,

as well as negative and positive Rh versions of each.

O negative, considered "universal" because it can be transfused safely into anyone possessing any of the other types, would be the most desirable, Lanza said.

"The ability to, on-demand, make as much as you want is obviously very, very attractive," Lanza said.

The researchers first coaxed embryonic stem cells into differentiating into blood precursor cells, and then found a way to get them to go down the road of becoming erythrocytes -- the red blood cells that carry oxygen through the body.

The cells carried oxygen correctly and appeared capable of delivering it to tissue, they reported.

"We can currently generate up to a 100 billion red blood cells from a single six-well plate of stem cells," Lanza said.

The U.S. federal government strictly limits its funding of embryonic stem cell research because of controversies over the use of human embryos.

Lanza said his team was now trying to make blood cells using induced pluripotent stem cells -- a new source of stem cells made using ordinary skin cells and several genes that re-program them back to an embryonic-like state.

But funding for such research is hard to come by, Lanza said.

"Right now, it's tough," said Lanza, whose company is down to 12 employees. "For a while we had the phones off. It's tough going but the people who are here, we believe in this and we are riding it out."

