Researchers take another stem cell step

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Researchers trying to figure out a safe way to turn an ordinary skin cell into a powerful stem cell treatment said they took another big step on Thursday, using one chemical to partly transform the cells.

Dr. Kevin Eggan of the Harvard Stem Cell Institute and colleagues said their experiment makes it easier to change plain cells into what they called induced pluripotent stem or iPS cells, which have the power to morph into any cell type in the body.

"This demonstrates that we're halfway home, and remarkably we got halfway home with just one chemical," Eggan said in a statement.

The goal is to take a small skin sample or blood from a patient, reprogram the cells into iPS cells, grow a large batch of these and then use them to make heart cells, blood cells, nerve cells or perhaps someday even entire organs to treat disease.

They would be tailor-made for the patient, who would not require immune-suppressing drugs. Such cells can also be used to study a patient's disease in the laboratory.

Stem cells are the body's master cells, giving rise to all the other cells in the body. Days after conception, an embryo is made of incredibly powerful stem cells that can develop into any cell type.

As an embryo grows and develops, these cells differentiate and lose their flexibility as they become muscle cells, bone cells or nerve cells.

Scientists seeking to recapture this power can use human embryos. An alternative route is to make iPS cells, but the most reliable method to do this requires using viruses to carry transformative genes into the cells.

The worry is the viruses might contaminate the resulting batches of cells.

Eggan's team found a chemical that replaces two of the four transformative genes known as cMyc, Sox2, Oct4, and Klf4.

"The one chemical replaces those two genes in different ways at different times in the experiment. The experiments we performed not only led to discovery of the chemical, but they also explained how it works," he said.

They have named the chemical RepSox -- in honor of Boston's Red Sox baseball team and a play on the name of one of the genes.