

November 6, 2008

Scripps improves reprogramming of cells

Method won't destroy embryos

BY TERRI SOMERS

LA JOLLA – Scientists from the Scripps Research Institute have identified a combination of druglike chemicals that can be used to reprogram human cells to become similar to embryonic stem cells so that they may develop into all the cell types in the body.

The Scripps method, documented in a story published today in the journal *Cell Stem Cell*, improves upon a process that until now involved using genes and viruses to coax human cells backward down the development pathway until they are pluripotent, meaning they can become many different cell types. One of the genes used, known as Sox2, had previously been regarded as essential for the reprogramming process.

The problem is that the genes and viruses create a risk of cancer, which means the cells could never be used for therapies in humans.

Many scientific teams around the globe have begun to look for safer methods of inducing pluripotency in human cells. There is much excitement about the improvement of this method because it creates cells that are embryonic like, but do not require the destruction of a human embryo.

In June, the Scripps team, led by Sheng Ding, associate professor in the Department of Chemistry, showed that it could use druglike chemicals to create pluripotent cells from the brain cells of mice. This recent Scripps study appears to be the first published showing success with an alternative method for creating human pluripotent cells.

“I think this is a very important study because it indicates that we are getting closer to being able to make stemlike cells from adult cells without the need for genes or viruses that could produce tumors or other dangerous cells,” said Evan Snyder, head of the stem cell program at the Burnham Institute in La Jolla.

There also are other advantages to the Scripps work, Snyder said.

Using drugs and small molecules, chemicals that are made into drugs, “we are getting closer to understanding the fundamental cellular mechanisms by which cells can move 'forward and backward in time' from a developmental perspective,” Snyder said.

Through this window into the workings of cells, scientists may learn how cancers emerge, or how cells learn to become particular organ systems, and why those processes sometimes go awry, he said.

Ding said the work of his team, which included scientists from the Max Planck Institute for Molecular Biomedicine in Germany, could be used to identify other drugs and small molecules that might also be used in the process for different results.

Scientists expect this area of research to continue developing rapidly.

“This paper will simply be the first, I am sure, of many over the next one, two years that will begin to crack this puzzle,” Snyder said.