# Stem cell recipe gets even simpler

Feb. 5, 2009
Courtesy Cell Pressand World Science staff

A simple recipe scientists earlier devised for making adult stem cells act like more powerful embryonic-like stem cells may have gotten simpler. A new report indicates a single chemical can convert stem cells from adult mice into the desired type.

Stem cells are immature cells that haven't yet developed into specific types to form organs. A large body of medical research is aimed at using stem cells to grow new organs and heal tissue. But there have been difficulties in obtaining or producing stem cells without getting them from live embryos—which are usually destroyed in the process, raising ethical problems.

The new work, in the Feb. 6 issue of the research journal Cell, focuses on converting cells using a substance called a transcription factor, a molecules produced by genes and that controls the activity of other genes.

The finding follows a 2006 report also in Cell that showed that four ingredients could transform differentiated cells taken from adult mice into "induced pluripotent stem cells" with the characteristics typical of embryonic stem cells. Pluripotent refers to the ability to differentiate into most other cell types. The same recipe was later found to work with human skin cells as well.

Subsequent studies found the four ingredients could sometimes be pared to just two or three, said Hans Schöler of the Max Planck Institute for Molecular Biomedicine in Germany. "Now we've come down to just one," he added. "It's really quite amazing."

The finding sheds light on centuries-old questions about what distinguishes the embryonic stem cells that give rise to egg and sperm from other body cells, Schöler said. It might also have implications for the use of "reprogrammed" stem cells for replacing cells lost to disease or injury.

Schöler and colleagues found a transcription factor called Oct4 sufficed to make stem cells from the adult mouse nervous system become pluripotent. The converted cells, dubbed 1F iPS, can differentiate into all three germ layers of the body, which eventually form all tissues and organs, the group said; when injected into mouse embryos, the cells also found their way into the organs and could be passed to the next generation.