Transforming skin cells into stem cells using a molecular toolkit

February 18 2010

In an effort to sidestep the ethical dilemma involved in using human embryonic stem cells to treat diseases, scientists are developing non-controversial alternatives: In particular, they are looking for drug-like chemical compounds that can transform adult skin cells into the stem cells now obtained from human embryos. That's the topic of a fascinating article in Chemical & Engineering News (C&EN), ACS' weekly newsmagazine.

C&EN Associate Editor Sarah Everts notes that in 2006, researchers in Japan figured out a way to use genetic engineering to coax a skin cell to become a so-called "pluripotent" stem cell — a type of cell that can potentially morph or change into any cell of the human body. The scientists achieved the result by infecting the skin cell with a virus containing certain genes instructing the cell to change.

Now chemists are trying to reproduce this cellular alchemy with drug-like substances because gene therapies have faced trouble getting into the clinic. Scientists are looking for chemical ways to go backward in cell development — to reprogram mature cells into stem cells. Others are trying to identify substances that can morph one cell directly into other cell types — for example, from a skin cell directly into a nerve cell that might treat Parkinson's disease — without the use of stem cells at all. The ultimate goal is to be able to reprogram any cell of the body into another by means of a simple molecular kit, the article notes. But as chemists start putting together toolkits with these drug-like molecules, they face many technical hurdles as well as challenges getting acceptance

from the stem cell community.

Provided by American Chemical Society