

# Scientists develop new test for 'pluripotent' stem cells

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"Pluripotent" stem cells—which have the potential to mature into almost any cell in the body—are being widely studied for their role in treating a vast array of human diseases and for generating cells and tissues for transplantation. Now, a team of Scripps Research Institute scientists has created a quality control diagnostic test that will make it much easier for researchers to determine whether their cell lines are normal pluripotent cells.

The study was published in an online version of *Nature Methods* on March 6, 2011.

"Many scientists are unhappy with the current gold standard for testing for pluripotency, called the teratoma assay," said Scripps Research molecular biologist Jeanne Loring, principal investigator of the study. "The teratoma assay requires animal testing and a time span of six to eight weeks before scientists can prove that they have a pluripotent stem cell line. In addition, this method is technically challenging and difficult to standardize."

The new test, called "PluriTest," meets the need for a cost-effective, accurate, animal-free alternative to the teratoma assay for assessing pluripotency. Using microarray technology, which enables the simultaneous analysis of thousands of different DNA sequences, the Scripps Research team created a large database of information about all the genes that are active in hundreds of normal human embryonic and induced pluripotent [stem cells](#) and a variety of non-pluripotent cell lines.

For PluriTest, this database was used to create a detailed molecular model of a normal pluripotent stem cell line.

"Unlike diagnostic tests that use small sets of biomarkers to examine cells, the molecular model approach uses all of the thousands of pieces of information in a microarray," Loring said. "This results in a [diagnostic test](#) with remarkable sensitivity and specificity." Scientists upload raw data straight from a single microarray analysis to the PluriTest website and learn within 10 minutes whether their cell line is pluripotent.

An additional feature of the PluriTest diagnostic test is that it can show whether a cell that is pluripotent is different in some way from the normal model pluripotent cell line. For example, a "novelty score" generated by the software may indicate that the pluripotent cells have genomic aberrations such as extra copies of genes or chromosomes. This feature would alert the researcher to do additional analysis on the cells to determine what is causing the abnormality.

A first author of the study, Franz-Josef Mueller, said, "Scientists are making new induced pluripotent stem cell lines at a rapid pace to understand human disease, test new drugs, and develop regenerative therapies. Thousands of induced pluripotent stem cell lines have already been generated and soon there will be many more thousands. PluriTest is designed to enable the growth of this technology."

**More information:** "A bioinformatic assay for pluripotency in human cells," *Nature Methods*.

Provided by The Scripps Research Institute

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