UCSD Researchers Suppress Embryonic Stem Cell Tumors

North County Times – Bradley Fikes
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A UCSD research team says it has found a way to inhibit the distressing propensity of human embryonic stem cells to form tumors, or "teratomas".

Writing in this week's issue of the *Proceedings of the National Academy of Sciences*, the researchers report that they have identified a signaling pathway necessary for stem cells to replicate endlessly. Small molecule compounds that inhibited this pathway dramatically reduced the tumor-forming potential of these human embryonic stem cells. The researchers experimented on immune-deficient mice like the one below that received grafts of human embryonic stem cells. Human embryonic stem cells formed tumors in this immune-deficient mouse.

To make tissue suitable for transplantation, the embryonic stem cells must be differentiated into the appropriate type of cell.

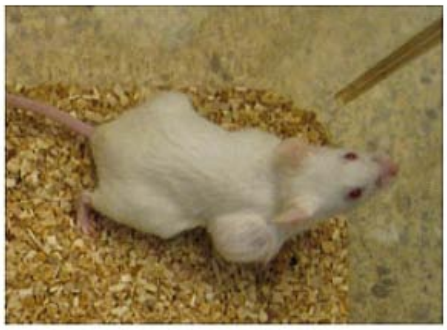
"But this differentiation is never complete, meaning that the final product is a mixture of cells inevitably containing undifferentiated embryonic stem cells. So by transplanting these cells into a patient, there's clearly a risk of producing teratomas," said Yang Xu, a professor of biology who headed the team that published the report, in a UCSD press release on the study.

The research focused on a protein called Nanog, essential to the unlimited replication of embryonic stem cells. Nanog also suppresses cell differentiation signals. Interfering with Nanog's function inhibits the replication, and assists in differentiation. The differentiated cells are not vulnerable to making teratomas like the undifferentiated embryonic stem cells are.

Other UCSD researchers were Steven Briggs, a professor of biology, and biologists Matteo Moretto-Zita, Hua Jin, Zhouxin Shen and Tongbiao Zhao.

Last month, Xu received a $1.2 million grant from the California Institute for Regenerative Medicine for another research project, to make induce immune tolerance to transplants of cells grown from human embryonic stem cells. This was part of $25 million in grants for immune tolerance research from CIRM.

The paper, "Phosphorylation stabilizes Nanog by promoting its interaction with Pin1," will be available at PNAS' Web site later Tuesday.



Mice with dysfunctional immune systems that receive human embryonic stem cells produce tumors called teratomas.
Credit: Xu Lab, UCSD