

Human adult testes cells can become embryonic-like

March 23 2009

Using what they say is a relatively simple method, scientists at Georgetown University Medical Center have extracted stem/progenitor cells from testes and have converted them back into pluripotent embryonic-like stem cells. Researchers say that the naïve cells are now potentially capable of morphing into any cell type that a body needs, from brain neurons to pancreatic tissue.

And because they produced these stem [cells](#) without the use of additional genes, the technology should be safe for human use, the researchers say in a paper published online in the journal *Stem Cells and Development*.

"Given these advances, and with further validation, it is possible that in the not-too-distant-future, men could be cured of disease with a biopsy of their own testes," says the study's senior investigator, Martin Dym, PhD, a professor in the Department of Biochemistry and Molecular & Cellular Biology.

The Georgetown researchers are among the first scientists to show that human testes [stem cells](#) can become embryonic stem-like cells, and they have done this work using testis tissue from organ donors, which they say has provided enough valuable tissue to allow them to make their discoveries. While they have published their preliminary results before, they are now disclosing a new and simpler method to isolate the testes stem/progenitor cells than has not been seen in other published procedures in humans and rodents.

Being able to use adult stem cells for this type of cell-based therapy offers a number of advantages over other strategies currently being explored, says Dym. The use of embryonic stem cells is controversial because it necessitates destruction of an embryo, and pushing fully mature cells, such as skin cells, back into a stem-like state requires use of cancer genes, and has therefore been viewed as potentially risky for human treatment, he says.

The idea with this approach is that men with an incurable disorder or disease could have a biopsy of their testes, which Dym says is a common procedure in patients suspected of having testicular cancer. Testes stem/progenitor cells - those cells that can go on to produce sperm - would be removed from the biopsy tissue, and grown in the laboratory with the addition of certain chemicals and growth factors. This causes the cells to revert back into an embryonic-like stem cell state, which could then be driven into chosen cell types.

"We are taking adult spermatogonial stem/progenitor cells, which in the body are unipotent, capable of only making sperm, and coaxing them back to embryonic-like stem cells, which are pluripotent," Dym says.

Once these new cell types are produced - several weeks after initial collection - they can be frozen and used at any point in the future, the researchers say.

He and the research team conducted the study using testes donated to GUMC from four organ donors, aged 16-52 years old.

"This is novel data which strengthens the argument for carrying out further research on pluripotent cells derived from human testes," Dym says.

The next step, he says, is to get differentiated cells to cure disease in animal models and the researchers are now working on a project that

uses testes spermatogonial stem/progenitor cells that morphed into pancreatic cells to treat diabetes in mouse models of human diabetes.

Source: Georgetown University Medical Center

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