

## Animal eggs not suitable substitutes to produce stem cells

February 2 2009

Since the cloning of Dolly the Sheep over a decade ago, somatic cell nuclear transfer (SCNT) has been considered a promising way to generate human, patient-specific stem cells for therapeutic applications. The shortage of human donor eggs has led to efforts to substitute animal oocytes.

However, a new study published online ahead of print in the Volume 11, Number 2, 2009 issue of *Cloning and Stem Cells*, a peer-reviewed journal published by Mary Ann Liebert, Inc., demonstrates that animal oocytes lack the capacity to fully reprogram adult human cells.

Robert Lanza, M.D. and colleagues from Advanced Cell Technology (Worcester, MA), Wake Forest University School of Medicine (Winston Salem, NC), Reproductive Medicine Associates of New Jersey (Morristown), Fertility Specialists of Houston (Texas), Stem Cell Source (Houston), and the College of Veterinary Medicine and Biomedical Sciences at Texas A&M University (College Station), compared the reprogramming of human cells using oocytes obtained from cows, rabbits, and humans. They report their findings in a paper entitled, "Reprogramming of Human Somatic Cells Using Human and Animal Oocytes."

The ability to reprogram human cells using oocytes would enable the production of patient-specific stem cells that could then be differentiated to become any type of somatic cell and used for cell or tissue repair or placement therapy. This extensive reprogramming



requires that the oocyte turn on, or up-regulate a large number of genes in the donor nucleus.

Although previous reports have documented the formation of cloned embryos using both human and animal eggs, to date, there have been no data indicating to what extent the donor human DNA was reprogrammed. Lanza et al. show for the first time that human oocytes have the capacity to change these patterns of gene expression, and that interspecies (human-to-animal) cloning does not produce the same results. Although the human-bovine and human-rabbit clones looked similar to the human-human embryos, the human-animal hybrids did not exhibit the changes in gene expression seen in the human-human clones and normal embryos. Specifically, they did not achieve up-regulation of critical pluripotency-associated genes needed for stem cell production.

"This very important paper suggests that livestock oocytes are extremely unlikely to be suitable as recipients for use in human nuclear transfer. This is very disappointing because it would mean that production of patient-specific stem cells by this means would be impracticable," says Ian Wilmut, Ph.D., Editor-in-Chief of *Cloning and Stem Cells* and director of the Centre for Regenerative Medicine, in Edinburgh.

The paper is available free online at <u>www.liebertpub.com/clo</u>.

Source: Mary Ann Liebert

Citation: Animal eggs not suitable substitutes to produce stem cells (2009, February 2) retrieved 27 April 2024 from <u>https://phys.org/news/2009-02-animal-eggs-suitable-substitutes-stem.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is



provided for information purposes only.