

Bioethicists lead call for public debates on future uses of stem cells

July 2 2009

More than 40 scientists, bioethicists, lawyers and science journal editors are calling on their colleagues, policy makers and the public to begin developing guidelines for the research and reproductive use of stem cell-derived eggs and sperm, even though such use may be a decade or more away.

"Science has always moved faster than social debate or society's ability to grapple with these issues," says Debra Mathews, Ph.D., lead author of a paper published in the July issue of *Cell Stem Cell* and assistant director of science programs at the Johns Hopkins Berman Institute of [Bioethics](#). The paper calls for all parties to begin engaging in open discussion and debates, and describes the need for informed social policy well in advance of the eventual use of eggs and sperm derived from [pluripotent stem cells](#).

Mathews said stem cell researchers need to be better prepared to address public questions about uses of so-called pluripotent stem cell-derived gametes -- regardless of how realistic or soon those uses may be. Such uses would potentially include reproductive uses such as the creation of sperm and eggs for in vitro fertilization, embryo selection based on [genetic profile](#), and the creation of embryos from the tissues of fetuses, children and the deceased.

The issues are too complex, and the stakes are too high, the authors suggest, for the public to be caught unaware by some new capability for using stem cell-derived gametes, and the research already is moving

rapidly toward generation of sperm and eggs capable of making human embryos and potentially children.

"Because derived-gamete research will require the creation and destruction of human embryos, this line of research will be morally objectionable to those who imbue human embryos with full moral status, and those objections must be addressed," the authors state.

In their paper, the Johns Hopkins-led team described an analysis of the current state of pluripotent stem cell science and suggested a framework for the debates that need to take place.

There was consensus by the authors that policymakers should not restrict scientific inquiry solely because ethical or moral disagreement exists about the use of these cells. Instead, they offered recommendations for guidelines that would be the focus of social debate. Among them were that restrictions should be specific to those aspects of the technology that are deemed morally unacceptable in a given nation or state, and that specific consent should be required of tissue donors whose cells will be used to derive gametes for use in reproduction. This approach would rule out using for reproduction any tissue from fetuses, minors and the deceased. Consent, they said, need not be required in situations involving laboratory studies that produce no embryos.

The authors emphasized that significant oversight rules must be in place before any reproductive uses of gametes even begins, and early attempts to use gametes for these purposes should take place only as part of clinical research that follows the highest ethical standards.

Assuming that reproductive use of stem cell-derived gametes does occur, the health of women carrying the resulting fetuses, and of children born to them, should be monitored rigorously and tracked in long-term studies.

Pluripotent stem cell-derived gamete research brings together several of today's most contentious ethical issues, including the use of embryonic [stem cells](#), the increasing ability to identify and understand risks associated with particular parts of the human genome, advanced reproductive technologies to treat infertility and interest in "human enhancement."

Mathews noted that pluripotent stem cell-derived gamete research already is producing significant advances in basic understanding of how eggs and sperm develop from germ cells, infertility, genetic diseases and some cancers.

Mathews said the most difficult scientific issue the study team faced was predicting how long it would take to get from a human stem cell to a set of gametes capable of successful test-tube fertilization, and how long, if ever, it would be until such gametes are used in clinical care. The group believes it will take at least a decade to develop derived human gametes and that clinical applications likely won't be available for several years beyond that.

Whatever the time frame, she said determining whether pluripotent stem cell-derived gametes can function reliably and normally is critical for both nonreproductive and reproductive purposes.

Scientists and the public also must prepare, Mathews noted, for the potential production of large numbers of human gametes that facilitate multigenerational laboratory studies of human genetics and disease.

"Although many welcome the prospects for disease prevention and health promotion that such research should facilitate, many others will find the treatment of human embryos in such blatantly manipulative ways to be ethically unacceptable," the authors said in their paper.

Source: Johns Hopkins Medical Institutions

Citation: Bioethicists lead call for public debates on future uses of stem cells (2009, July 2)
retrieved 2 May 2024 from

<https://phys.org/news/2009-07-bioethicists-debates-future-stem-cells.html>

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