Published on *American Council on Science and Health* (https://www.acsh.org)

Parthenogenesis and Other Stem Cell/Cloning Ambiguities

By ACSH Staff — June 11, 2003

Parthenogenesis, potentially useful as a stem cell creation method, may be considered ethically acceptable by some who previously opposed stem cell and cloning research. Since parthenogenesis involves the division of egg cells that haven't been fertilized and thus do not have a unique, new DNA code anti-cloners are less inclined to view the resulting cell clusters as human embryos. That makes it easier (i.e., less controversial) for scientists to use the cell clusters for research that may one day treat disease: malleable stem cells can be grown into many types of cell and harvested as replacements for damaged or dysfunctional ones.

How do cloning opponents decide which techniques they consider morally acceptable? Looking at different types of stem cell research may help us sort through the confusion.

> ***FACT**: For ethical and public policy purposes, two types of cloning are usually distinguished: reproductive cloning and therapeutic cloning, the latter being the source of embryonic stem cells (NOTE: for simplicity and to better understand the position of the anti-cloning forces, we will grant the anti-cloners' broad definition of "embryo" and use it throughout this article, though it might be argued that an egg cell fertilized in a petri dish and not implanted in the womb is not in any meaningful sense an embryo). Reproductive cloning is the creation of a clonal embryo to be implanted in a woman's womb to create a living child. Therapeutic cloning also produces a clonal embryo, but it is not implanted in a womb. Instead it is used to generate stem cells that can give rise to many different types of cells with specialized functions, such as nerve or heart cells. These cells can then be used for treating diseases.*
>
> > *Question: Are there any reasons to oppose therapeutic cloning?*
> >
> > *Answer: Therapeutic cloning from embryonic stem cells is viewed negatively by anti-cloning forces, which regard the destruction of the blastocyst (the early cell clump that would normally grow into an embryo) as morally*

> *equivalent to aborting a fetus.*

***FACT**: Stem cells can actually be derived from two sources: from early embryos or from adult cells that are chemically treated to make them revert to a pliable stem state (though it is not yet clear the latter method can create stem cells as versatile as the ones from embryos). Stem cells from these two different types of cells are termed "embryonic" or "adult," respectively.*

> *Question: Is one source of stem cells considered more ethical than the other?*

> *Answer: Nearly all anti-cloning activists consider embryonic stem cells unacceptable, but many view adult stem cells as acceptable, since they do not require the creation and destruction of an embryo (though in principle, one might someday be able to create an embryo even from an adult cell it would be a clone and would not have a unique, new DNA code). Some anti-cloning activists feel that even adult stem cell research will put science on a slippery slope to biotechnology they do not accept, such as embryonic stem cell creation, reproductive cloning research, or unforeseen transformations of the human body. While accepting adult stem cell research in principle, some activists are not confident that science can draw lines of demarcation for itself.*

***FACT**: Parthenogenesis is the creation of embryos from unfertilized eggs.*

> *Question: Why does parthenogenesis appease the anti-cloning forces?*

> *Answer: Parthenogenesis uses chemicals or electricity to make an egg behave as if it were fertilized. It can then begin to divide and grow into the early stage of development in which stem cells can be harvested. The resultant parthenodes, as opposed to embryos, do not have the potential to*

> *grow into a fetus and thus can be utilized without concern that a potential human has been destroyed.*

Still confused as to what the controversy is about? Let's delve further.

> *Question: Is it ever acceptable, in the view of those skeptical about cloning, to destroy life or the potential for life?*

> *Answer: For some the answer is a simple no, but for some the purpose behind the embryo's creation is key. If an embryo is created for in vitro fertilization, for instance, but is left unused, its subsequent use in stem cell research (it is sometimes argued) may be more acceptable than the deliberate creation of embryos for the purpose of being converted into stem cells and harvested. Parthenogenesis gets around this issue because the embryo was never capable of continued growth.*

> *Question: At what point in development is an embryo considered a person?*

> *Answer: Some anti-cloning forces, such as the U.S. Roman Catholic Bishops, hold the view that an embryo is a human at conception. Pro-cloning groups, such as officials of the biotech company Advanced Cell Technologies, argue that a blastocyst is merely cellular mass, not yet sufficiently divided to constitute a person (or persons division into twins is still possible at the blastocyst stage, so it is not even clear how many, if any, potential persons are present). The Presbyterian Church USA and various Jewish groups support stem cell research for the advancement of disease treatments. Supporters of stem cell research view the banning of the research as unethical; the research may well save many lives far more lives than its detractors claim it would kill (though few supporters would argue they were proposing trading lives for lives merely cell clumps for lives). Both sides tend to agree that if a method of harvesting stem cells were found that*

achieved all desired medical ends while avoiding the current ethical dispute (such as adult stem cells that were as fully malleable as embryonic stem cells), that method would be desirable.

Question: Stepping back for a moment to question one of the anti-cloning forces' underlying assumptions: Should an egg cell be considered a person if "fertilized" in a petri dish by fusing DNA into the egg lining with an electrical charge?

Answer: Hardcore anti-cloning forces say yes, while stem cell research supporters tend to say no. Pro-life Sen. Orrin Hatch appears to agree with cloning supporters that this procedure is insufficient to confer personhood; he is likely influenced by the view held by many of his Mormon constituents that egg cells do not become people until successfully implanted in the uterine wall. That view adds another wrinkle to a complex debate and creates unexpected supporters of stem cell research but will not likely put an end to an ongoing controversy.
