



### ▣ Questions

- What is the status of the early human embryo? Is it just a ball of cells, should it be treated as a potential human being, or something in between?
- If embryonic stem (ES) cells have the potential to help alleviate or cure diseases, is the sacrifice of human embryos to generate these ES cells justified?
- Researchers have made stem cells from umbilical cord blood and other sources. Should more effort be put into finding ways of obtaining "ethics free" ES cells?
- Should we be mixing parts of human embryos with animal material to generate "cytoplasmic hybrid embryos" to make stem cells?

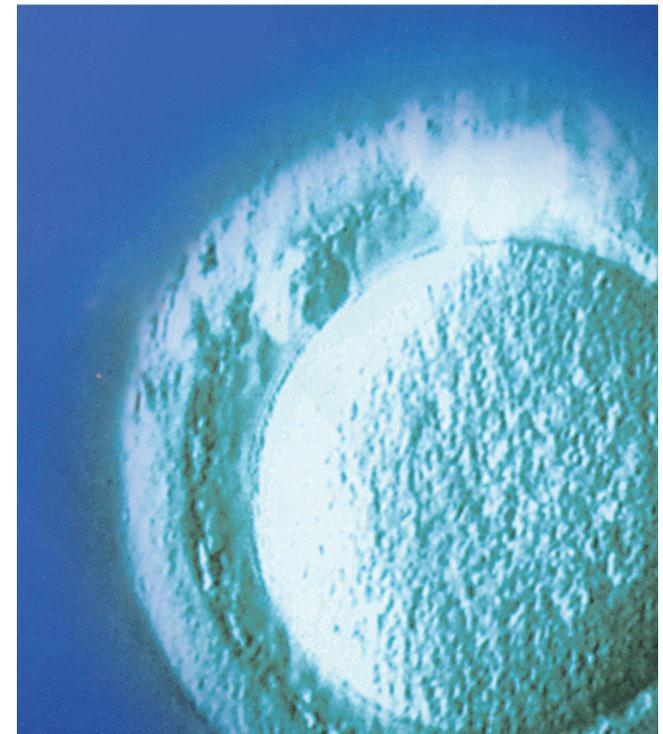
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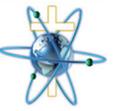
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# Embryonic and Adult Stem Cells: Ethical Dilemmas





'For you created my inmost being; you knit me together in my mother's womb. I praise you because I am fearfully and wonderfully made.' Psalm 139:13-14



## Embryonic and Adult Stem Cells: Ethical Dilemmas

### ▣ The Vital Ethical Issues Surrounding Embryonic and Adult Stem Cell Research

Dolly the cloned sheep has become an icon for biotechnology, representing both the hopes and the fears about where embryology and genetics might lead. To most people's relief, fears of cloned humans have not yet materialised, despite a number of attempts. In the view of many, reproductive cloning of humans would be unacceptable both on ethical principles and due to the high risk of producing deformed babies. Now the focus is on the use of human stem cells, derived either from adult tissue or from "spare" in vitro fertilisation (IVF) embryos or from embryos specifically made for the purpose. The Church of Scotland Society, Religion and Technology (SRT) project has been at the forefront of this ethical debate for almost two decades. So what are the issues?



### ▣ What are Embryonic Stem Cells?

These are special cells found in the early embryo before it begins to form specialised structures. At this point, the cells can turn into any type of cell in the human body. In the laboratory, scientists can direct these cells to become any type of cell they choose - skin, heart, muscle, nerve cells, etc. This opens up a possibility of creating replacement cells to inject into patients suffering from a wide range of diseases which cause irreversible cell degeneration, such as Parkinson's, some heart conditions and diabetes. However, the generation of embryonic stem (ES) cells raises deep concerns particularly in relation to the ethical evaluation of the human embryo.

### ▣ Ethical Issues Surrounding Stem Cell Research

Current ethical debate centres around the following topics: the status of the embryo, the use of 'spare embryos' and possible alternatives to embryonic stem cell research.

### ▣ What is the Status of the Embryo?

The UK Human Fertilisation & Embryology (HFE) Act of 2008 allows research on embryos up to 14 days, mainly for research into infertility. The use of the embryo in research is seen as appropriate because it may eventually benefit other embryos. The current routine use of human embryos as a source of stem cells implies for some a more utilitarian view of the embryo as simply a ball of cells, constituting a downgrading of its previous legal status. In contrast, the previous HFE Act of 1990 accorded the human embryo a special status restricting the conditions under which embryos could be created or used. The Roman Catholic Church and many individual Christians believe that from conception onwards the embryo should be accorded the fully human status. In principle, this allows no embryo research at all. In 2006 the General Assembly of the Church of Scotland took a middle position, which affirmed the special status of the embryo but also recognised potential benefits of embryo research under limited circumstances.

### ▣ Use of Spare Embryos

Initially, IVF techniques fertilised eggs to create early embryos. A small number of these embryos were implanted; the remainder were stored for possible future IVF cycles. Technology has now moved on, and it is now possible to freeze unfertilised eggs, so there is now less need to generate "spare" IVF embryos. However, spare embryos exist as a residue of previous IVF treatments. These embryos are, in many cases, destined to be destroyed. After a certain period of time, parents must choose either to donate them for research, have them destroyed, or allow them to be "adopted" and implanted in the womb of an unrelated woman. Many feel it would be better to use spare embryos for stem cell research to find cures for incurable diseases rather than simply destroying them. For others, subjecting these embryos to research would compromise the status of the embryo.



### ▣ Are there Viable Alternatives to Embryonic Stem Cells?

The 2006 General Assembly "urge(ed) Her Majesty's Government to encourage research into stem cells derived from adult tissues and placental cord blood, and to work to find therapeutic solutions which avoid embryo use." The recent rise of an alternative to ES cells which avoids the ethical issues around using human embryos seems to make the need to use human embryos in research less necessary. These so called 'induced pluripotent' (IP) cells involve artificially 'regressing' specialised human cells - such as skin cells - so that they acquire the ability of stem cells to be reprogrammed into other cell types. Although IP cells have not yet achieved the gold standard set by true ES cells, the ease with which they can be generated and the rapid advance of the technology, coupled to the lack of ethical "baggage", is causing great excitement in the stem cell research world.