



**I**s it ethical to use embryonic stem cells in research?

For many people, the ethics of embryonic stem cell research are closely tied to the ethics of destroying embryos. Even where an embryo is destined to be destroyed, e.g. at the behest of a couple that is no longer able to use it for reproductive purposes, some people are uneasy, even if it is for the benefit of medical research.

Debates about the moral status of the embryo tend to follow several lines of analysis. For some, moral status is derived from the presence of a human genome and from the sheer theoretical possibility of development to live birth. This is often called the argument from potentiality. For others, moral status is linked to the ability to experience some degree of sentience, often called the argument for personhood. For still others, moral status is neither present nor absent, but exists on a continuum throughout the developmental process, with the ethics of destroying the embryo dependent upon the justification for the act. And of course, there are those for whom the important question is not the moral status of the embryo, but rather the obligation to heal the sick.

There are separate questions about whether to use public funds to support the research, given that some people object to the research. Public opinion polls suggest that the majority of both religious and non-religious Americans support embryonic stem cell research and support public funding for the research, although public opinion seems divided about the creating embryos solely for research.

**H**ow is stem cell research different from cloning?

Cloning research and stem cell research are often lumped together, but in fact they are distinctly

different. Cloning research can and does occur independently of stem cell research. It is a means of creating customized stem cell lines with particular genetic make-ups from any cell in the body. Cloning can include the use of stem cells, but it is not limited to the use of stem cells. Cloning is done for two purposes: first, to develop cell lines that can be used to study various genetic diseases in a laboratory dish, and second, to develop cell lines from a patient that can be used to grow replacement tissues that are genetically matched, thus offering patients a safer alternative to traditional tissue transplants.

Currently, the use of induced pluripotent stem cells (iPS cells) seems likely to be an adequate substitute for the genetics research, but iPS cells still pose unique problems when it comes to tissue transplantation, because the current techniques to induce pluripotency in these cells may cause cancer.

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Objections to cloning research usually are based either on the claim that it creates embryos solely to destroy them or that the research will inevitably lead to reproductive cloning, a form of cloning almost universally condemned, at least in part because it is unsafe for many of the offspring. Supporters of cloning research respond by arguing that creating an embryo for research is no worse than using an existing one for research, provided one believes the moral status of the embryo depends on "personhood." In addition, many argue that the FDA prohibition on reproductive cloning, coupled with many state and national bans, provide an adequate safeguard.

### **What are chimeras and why are they needed for stem cell research?**

Chimeras are organisms composed of cells or tissues from more than one individual. They are considered essential for moving stem cell research into clinical studies, because most therapies cannot be tested in humans without research in animals first. For example, to learn whether it is possible to safely transplant tissues grown from stem cells into the brains of patients suffering from Parkinson's or Lou Gehrig's disease, it would be important to test these tissues in animal models first to see how they act before putting them into humans.

Chimeras have been used in research for many years, but they still raise public concern. Some people see chimeras as an affront to human and animal dignity, or as an improper interference with perceived natural species boundaries. Others believe that creating chimeras with human cells for medical research is morally acceptable as long as the chimera has no human consciousness and is treated humanely as mandated by the Animal Welfare Act. The National Academy of Sciences guidelines lay out limits on chimera research designed to guard against just these two problems. For these and other guidelines, see [www.nap.edu/catalog.php?record\\_id=11871](http://www.nap.edu/catalog.php?record_id=11871).

### **Is stem cell research legal?**

As of the summer of 2008, stem cell research of all types is legal at the U.S. federal level. In other words, federal law does not prevent scientists from deriving new stem cell lines or working with existing lines. Federal law does, however, severely restrict the use of federal funds. They may not be used to derive new lines, nor may they be used to work with lines that were created after August 2001, even if created with private funds. Many companies, private foundations and states (such as Wisconsin, California, Massachusetts, Maryland, New York, New Jersey and Connecticut) have been supporting this work. Some general requirements of federal law, such as human subjects protections, apply to state and privately funded stem cell research.

It is legal to conduct research using embryos and to derive new cell lines in most states, with some exceptions, particularly with respect to the legality of cloning research. Because state stem cell legislation is an area of active debate, the best source of up-to-date information is the National Conference of State Legislatures. Visit [www.ncsl.org](http://www.ncsl.org) to learn about the laws in a particular state.

### **How do I get stem cell therapy for myself?**

Stem cell therapy, like all new therapies involving biological drugs or cell-based treatments, cannot be used for the general public until after the FDA has overseen a series of carefully controlled clinical trials. These are designed to protect the public from dangerous or useless treatments. Some patients argue that they are morally entitled to decide for themselves whether to accept the risks of unapproved therapies, but to date the courts have held that they have no legal entitlement to circumvent FDA rules. Some patients are now going to other countries to seek out these treatments, but it is difficult to confirm which are legitimate and which are hoaxes.