

## **Embryonic Stem Cell Research**

Stem cells are unspecialized cells that have two important characteristics that distinguish them from other cells in the body. First, they can replenish their numbers for long periods through cell culture and division. Second after receiving certain chemical signals they can differentiate, or transform into specialized cells with specific functions, such as a heart cell or a nerve cell.

Researchers harvest embryonic stem cells from human embryos which are five to eight days old and consist of 50 to 200 cells. These cells are capable of becoming any of the cell types and organs of the human body. To produce the human embryonic stem cells, the developing embryo must be destroyed. The researcher must cut open the body of the human embryo, at this stage called a blastocyst and extract these embryonic stem cells. This process of directly extracting these cells kills the human embryo.



**A human embryonic stem cells**

Before the discovery of embryonic stem cells, researchers have been harvesting adult stem cells which are found in all organs of the body. These cells can renew themselves and generate specialized cell types (for example, cells found in bone marrow). Adult stem cells are routinely obtained from the cord blood of a newborn child, from the placenta, but also from skin, the pulp of baby teeth and increasingly from almost every organ in the body. It was previously thought that adult stem cells cannot grow well in culture and therefore could not be produced in the same quantities as embryonic stem cells. This is no longer true as there are now techniques that can duplicate adult cells in very large quantities. In the process of obtaining adult stem cells, no human life is sacrificed.

## Arguments for embryonic stem cell research

Human embryonic stem cells can be grown indefinitely in the lab and turn into most of the tissue types in the body, with the potential to cure many disease. Their use could enable the possibility of creating a 'Human Repair Kit', eliminating donor organ rejection and regenerating damaged tissues.

Embryonic stem cells are currently considered superior to adult stem cells for the following reasons:

There are more of them, whereas adult stem cells are often present in only minute quantities

They are quicker and easier to grow in the lab than do adult stem cells, which are difficult to isolate and purify

They can be more easily manipulated

They have been successfully with animals, especially in repairing the heart damage in mice.

Any attempt to use adult stem cells from a patient's own body for treatment means that stem cells would first have to be isolated from the patient and then grown in culture in sufficient numbers to obtain adequate quantities for treatment. For some acute disorders, there may not be enough time to grow enough cells to use for treatment

Adult stem cells may contain more DNA abnormalities, caused by exposure to daily living, including sunlight, toxins, and by expected errors made in DNA replication during the course of a lifetime. These weaknesses could limit the usefulness of adult stem cells

Embryonic stem cell research could facilitate the screening of drugs that may cause birth defects, while research using disease-specific embryonic stem cells lines could provide information on new drug treatments.

Science maintains that the first vestige of humanity does not reveal itself until day 14. Hence, the human embryos used (usually five to seven days after fertilization) are not humans, but human cells which is no more a human than a skin cells is.

## Arguments against embryonic stem cell research

- It is unethical to use embryonic stem cells, as the process to obtain them destroys a human embryo. The destruction of human life cannot be justified, even if the aim is to save other human life. Creating embryos with the intention only to destroy them in laboratory experiments crosses ethical boundaries.
- A very large percentage of cloning efforts end in failure. For example, it took 277 attempts to clone Dolly the sheep. Clones that do survive often have fatal or problem-causing issues in their genes.
- It is unnecessary to use embryonic stem cells as adult stem cells are proving to be a viable alternative, with many regular breakthroughs occurring. Adult stem cells have already been successfully used in treatment, while embryonic stem cells still offer only theoretical potential for good.
- The use of adult stem cells seems to solve the problem of immune rejection, which will be a big problem with the use of embryonic stem cells
- Many of the cell lines are in the hands of private companies which may well put profits ahead of principle
- The destruction of human embryos for research is morally repugnant to many groups including some religious and disability rights advocates.
- The potential for research on embryonic stem cells has yet been proven, and more animal research is needed.
- The lack of self-awareness argument regarding an embryo ignores its potential. If we say that an embryo is not a person because it is not fully conscious, we must also admit that people who are comatose or senile are lacking in personhood. The end result of this is a sliding scale of humanity. Who ticks those boxes? Who sets the criteria?
- There is concern about inequity of access to this technology, if it were available only to those who can afford to pay for it.