

Stem Cell Research

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Pros And Cons in Research

The debate of the pros and cons of stem cell research clearly illustrate the difficult ethics evaluations researchers sometimes must do.

All scientists must consider whether the positive effects from their research are likely to be significantly higher than the negative effects.



The banner features the Explorable logo at the top center, with the text "EXPLORABLE" in a large, bold, white font and "Quiz Time!" in a smaller, white, cursive font below it. Below the logo are three square images, each with a white border and a white caption underneath. The first image shows a pair of red roller skates on a wooden deck, with the caption "Quiz: Psychology 101 Part 2". The second image shows a fan of colorful pencils, with the caption "Quiz: Psychology 101 Part 2". The third image shows a Ferris wheel at sunset, with the caption "Quiz: Flags in Europe". In the bottom right corner of the banner, there is a white text link "See all quizzes =>" with a right-pointing arrow.

What are Stem Cells?

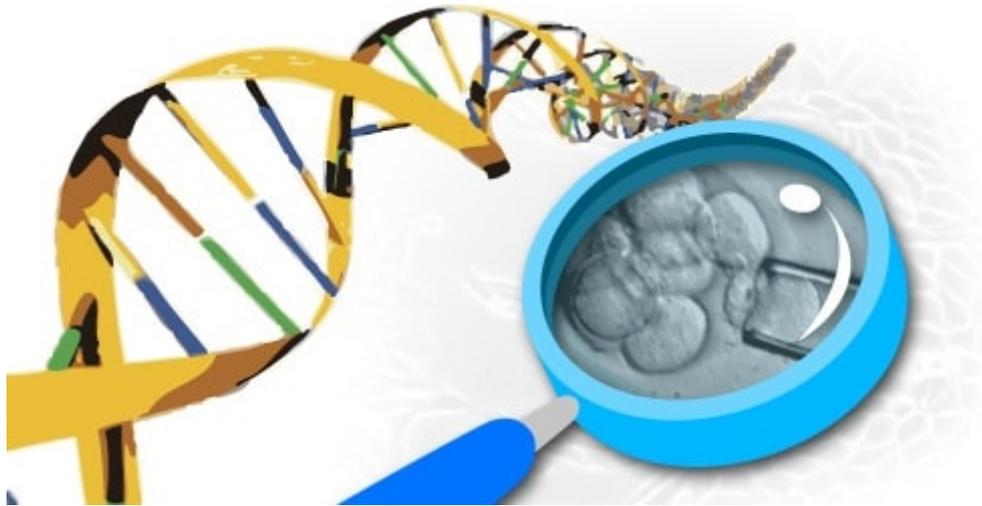
Stem Cells are crucial to develop organisms. They are nonspecialized cells which have the potential to create other types of specific cells, such as blood-, brain-, tissue- or muscle-cells.

Stem cells are in all of our body and lives, but are far more potent in a fetus (also spelled foetus, foetus, faetus, or faetus) than in an adult body.

Some types of stem cells may be able to create all other cells in the body. Others have the potential to repair or replace damaged tissue or cells.

Embryonic Stem Cells are developed from a female egg after it is fertilized by sperm. The

process takes 4-5 days.



What is Stem Cell Research?

Stem cell research is used for investigation of basic cells which develop organisms. The cells are grown in laboratories where tests are carried out to investigate fundamental properties of the cells.

Aborted fetuses are not the only source of stem cells

There are stem cells in the both placenta and blood contained in the placenta. Also the primary source of stem cells is from blastocysts. These are fertilized human eggs that were not implanted into a woman.

The controversy surrounding stem cell research led to an intense debate about ethics. Up until the recent years, the research method mainly focused on Embryonic Stem Cells, which involves taking tissue from an aborted embryo to get proper material to study. This is typically done just days after conception or between the 5th and 9th week.

Since then, researchers have moved on to more ethical study methods, such as Induced Pluripotent Stem Cells ^[1] (iPS). iPS are artificially derived from a non-pluripotent cell, such as adult somatic cells.

This is probably an important advancement in stem cell research, since it allows researchers to obtain pluripotent stem cells, which are important in research, without the controversial use of embryos.

There were two main issues concerning stem cell research with both pros and cons:

1. How the knowledge will be used
2. Concerns about the methods

The first issue is really not just about stem cell research, as it may be applied to most research about human health.

Since 2007, the second point, concerns about the methods involved, has been less debated, because of scientific developments such as iPS.

1) Stem Cell Research - Arguments Regarding the Usage of the Knowledge

As you will most probably notice, the following arguments are not exclusively in use when talking about stem cell research.

Pros

Stem cell research can potentially help treat a range of medical problems. It could lead humanity closer to better treatment and possibly cure a number of diseases:

- Parkinson's Disease
- Alzheimer's Disease
- Heart Diseases, Stroke and Diabetes (Type 1)
- Birth Defects
- Spinal Cord Injuries
- Replace or Repair Damaged Organs
- Reduced Risk of Transplantation (You could possibly get a copy of your own heart in a heart-transplantation in the future)
- Stem cells may play a major role in cancer

Better treatment of these diseases could also give significant social benefits for individuals and economic gains for society

Cons

- "We should not mess with human life."
- "Humans should not be trying to play God"
- Some argue that stem cell research in the far future can lead to knowledge on how to clone humans. It is hard to say whether this is true, but we have seen devastating consequences of other research-programs, even with good intentions, such as nuclear research.

2) Stem Cell Research - Pros and Cons About the Methods Involved

The controversy regarding the method involved was much tenser when researchers used Embryonic Stem Cells as their main method for stem cell research.

DISCLAIMER:

These points are based on the old debate about the methods of stem cells research, from before 2007. Since then, scientists have moved on to use more ethical methods for stem cell research, such as iPS. This section serves as an illustration of the difficult evaluations researchers may have to analyze.

Pros Before 2007

- "The benefits of stem cell research have such a great outcome that they outweigh the ethical issues." (Cost-benefit-analysis)
- "If someone is going to have an abortion, isn't it better that we use it for something

useful?"

- Adult stem cells would not be that interesting because they do not have the same properties as stem cells from a fetus.
- The research would give great insights about the basics of the body.

Cons Before 2007

- Critics against stem cell research argued that the ethical issues of scientific work on aborted fetuses did not justify the possible benefits.
- "A life is a life and that should never be compromised. A fertilized egg should be valued as a human life even if it is in its very first weeks. Destroying human life in the hopes of saving human life is not ethical."
- We should (and will) develop more ethical methods (such as using adult stem cells) which will enable us to research ethically. We should wait until those methods are available.
- The scientific value has been overstated or has flaws. E.g. we do not know for sure that we can use stem cells to clone transplantable organs.

Conclusion

The stem cell-research is an example of the, sometimes difficult, cost-benefit analysis in ethics which scientists need to do. Even though many issues regarding the ethics of stem cell research have now been solved, it serves as a valuable example of ethical cost-benefit analysis.

The previously heated debate seems to have lead to new solutions which makes both sides happier.

Stem Cell pros and cons [2] had to be valued carefully, for a number of reasons.

When you are planning a research project, ethics must always be considered. If you cannot defend a study ethically, you should not and will not be allowed to conduct it. You cannot defend a study ethically unless the presumed cost is lower than expected benefits. The analysis needs to include human/animal discomfort/risks, environmental issues, material costs/benefits, economy etc.

Why was the debate regarding the stem cell research so intense?

First, it was a matter of life - something impossible to measure. And in this case, researchers had to do exactly that: measure life against life.

Both an abortion and someone dying, suffering from a possible curable disease, is a tragedy. Which have the highest value? Does a big breakthrough in the research justify the use of the method in the present?

Would the benefits of studying abortions outweigh the costs? The choice was subjective: Nobody knows all the risks or all the possible outcomes, so we had to value it with our perception of the outcome. Perception is influenced by our individual feelings, morals and knowledge about the issue.

Second, at the time we did not know whether the research was necessary and sufficient to give us the mentioned health benefits.

Third, other consequences of the research are uncertain. Could the research be misused in the future or not? We simply do not know. All knowledge acquired, within research or other arenas, may be used for evil causes in the future - it is impossible to know.

The Stem cell research-debate is an example on how people value various aspects differently. It is also an example of how critics and debate can lead to significant improvements for both sides.

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Links

[1] http://en.wikipedia.org/wiki/Induced_pluripotent_stem_cell

[2] http://biotech.about.com/od/bioethics/i/issuestemcells_2.htm