

The World of Stem Cell Research and Why It Cannot Be Ignored

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Stem cell research has been a reoccurring topic of debate since the mid-1970's due to medical benefits and the controversial nature surrounding the obtainment of the cells (Lovell-Badge). Research previously done on stem cells have revealed versatile uses for these cells including, but not limited to blood transfusions, skin grafts, spinal cord injuries, rheumatoid arthritis, heart disease, retinal disease, Huntington's disease, and Parkinson's disease (Cafasso). Despite these wonderful benefits many believe that use of these cells is immoral, especially the use of embryonic stem cells. This struggle between humanity, ethics and societal benefits has been an on-going debate all while the rapid progression of biotechnology and stem cell discoveries are constantly occurring. Why should the usage of stem cells in medical research be deemed acceptable? Stem cell research and biotechnology will greatly benefit the livelihoods of humans and medical breakthroughs for those who need it most. Research will be the only way to officially know how everyone can be helped. Some of the ethical controversies and rules in place surrounding the way stem cells are retrieved should be reconsidered for the betterment of all people.

The human body is a network of pre-programmed cells with specific functions in the tissues that combine to form organs. Cells that are not yet specialized or differentiated are called stem cells ("Stem Cell Basics"). Human stem cells (hSCs) have self-renewing abilities that allow them to replicate as needed as well as transform to perform functions other cells would have (Lovell-Badge). According to Lo and Parham, hSCs can also be classified into two categories:

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embryonic and adult cells (Lo and Parham). Embryonic stem cells (hESC or ES cells) are pluripotent, meaning they can create virtually any of the body's cells ("Stem Cell Basics"). Adult stem cells are multipotent meaning they can specialize similarly to hESCs, but they will only generate a few different cell types in specific tissues and organs ("Stem Cell Basics"). As stated by Jacquelyn Cafasso, a writer and research analyst in the health and pharmaceutical field, scientists later discovered a way to reprogram adult stem cells to perform much like ES cells would. These cells are called induced pluripotent stem cells (iPSCs), and they show great promise for treatments using a patient's own stem cells. ES cells and iPSCs have research to support that they could be beneficial to medicine, and now researchers need to find a way to ethically produce these discoveries. Yet due to these many functions for the body, embryonic and adult stem cells are viewed as having multiple capabilities that researchers would have ethical problems preventing them from being expanded upon (Cafasso).

Deborah White, a political journalist states that ethical concerns have been at the forefront of the topic on stem cell research especially since President George W. Bush's veto of the Stem Cell Research Enhancement Act of 2005. President Bush prevented this act from becoming a law, along with the Stem Cell Research Enhancement Act of 2007, due to the ideology of destroying embryos for scientific research. Bush along with many other political figures view embryonic stem cell research as immoral since the embryos being destroyed were devoid of the chance to live. Many other political figures do not hold such stance on the topic and believe that embryonic stem cells are necessities to betterment of all human life. For instance, President Barack Obama lifted President Bush's eight-year ban of federal funding put towards stem cells research during March of 2009. Stated by "President [Obama], 'Today... we

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will bring the change that so many scientists and researchers, doctors and innovators, patients and loved ones have hoped for, and fought for, these past eight years” and so many people agreed (White). A pulling of polls done during years prior to 2009 revealed that 59 percent of Americans believed that a loosening of current restrictions on embryonic research would be beneficial, as well as the push for federal funds to be used for this research (White). Cafasso, a writer and research analyst in the health and pharmaceutical field, states that while stem cell research has not been completely eradicated in the United States, multiple ethical restrictions have been set in place (Cafasso). The future years are set up for research to be profitable and beneficial, and yet many still refuse to view these medical miracles in action.

The usage of adult and embryonic stem cells as everyday treatments is part of the near future. The market for stem cell treatments and therapies is growing by 36 percent per year (Moradi). As new diseases continue to arise and mutate so do the need for technology and defense mechanisms for the body. More and more people are coming to realize that certain diseases will persist as plagues to our health and livelihoods if we do not act. Cancer, for example, is a disease that has taken the lives of many people and their loved ones. Stem cells are offering potential benefits to end this destructive disorder, so it is understandable that the want for these treatments is rising on a yearly basis. To further support this statement on the research involved, currently 959 regenerative medicine companies worldwide are sponsoring 1,052 clinical trials whether it be for creation of cell therapies or tissue engineering (Moradi). 525 companies carrying out these trials are coming out of North America (Moradi). This information has been kept from the public eye for far too long. Many believe that stem cell research has been ban completely, this is false. Actions are being carried out right now to ensure that stem cells are

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the cure we have been looking for, and researchers will not stop until we have hit a breakthrough in the world of medicine.

Stem cell research cannot be fully explored without the trials including embryonic stem cells. The creation of iPSC's was a way to bypass the controversy of ES cell testing. However, Harvard researchers believe that the usage of adult stem cells as ES cells is a process that could take up to ten years perfecting (White). This research is promising but with the high demand for this research to be expanded on rapidly, time is running out. White states that in the U.S., medical innovations in general have slowed drastically. Countries such as Japan, Germany, South Korea, India, and more are much farther ahead of the U.S. in medical technology and the economic benefits that are included this new source of revenue (White). Revenue from stem cell research could easily arise in the U.S. if the use of embryonic stem cells occurs. We know that ES cells possess extremely beneficial advantages, so if we use these cells while we expand on research of iPSC's we can catch up to the rest of the world's progress. Many would still dismiss this idea due to moral obligations, but action should be taken so the use of embryonic stem cells in the future could be lessened after iPSC's are ready for use.

Although many view embryonic stem cell retrieval and usage as immoral, many more believe that it would be immoral to leave this technology unused. While ethics become a large concern with the public and researchers alike in this situation, there are ways to carry out research in the most humane way possible. Lo and Parham, whom are both a part of the Program in Medical Ethics at the University of California San Francisco, discuss the ways researchers are conducting experiments ethically. Informed consent, a signed waiver, and confidentiality of donors are required for the safety of the embryo donors but are also stipulations in place for

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control of ES cell usage. Many couples who go through the process of invitro fertilization decide to donate the unused cells that would be disposed of for research purposes. And many people agree with this decision, even those who are known to be pro-life supporters. U.S. Senator Orrin Hatch stated, “I believe that human life begins in the womb, not a Petri dish or refrigerator The tragedy would be in not using these embryos to save lives when the alternative is that they would be discarded” (Lo & Parham). The promises of creating therapy for cancer and other non-communicable diseases can be fulfilled with the use of ES cells, so we must make the decision to choose the most beneficial for the world currently and future humans.

Despite the wide range of support for the expanding upon of stem cell research, many more disagree with the furthering of this research. Whether it be due to religious or moral reasonings not everyone will have the same views. There are some dangers in the retrieval of embryonic stem cells due to breach of confidentiality or misuse of these cells for malicious intent. This same ordeal can also occur with adult stem cells. According to Lo and Parham, adult skin cells will largely be used without the knowledge of the donor (Lo & Parham). This calls into question the safety of donors, not just the cells themselves.

The topic and debate of stem cell research is portrayed as a two-sided argument. Pro-life/anti-abortion versus pro-choice/pro-abortion is described as the voices in this fight. This, however, is not the case since stem cell research is so versatile and upcoming. Something with an abundance of power in the medical community will not be neglected by researchers, ethic councils, and the public alike. The future of therapy is rising rapidly and cannot slow due the high demands. The six leading causes of death are stroke, diabetes, Alzheimer’s, cancer, heart disease, and lung diseases (Moradi). Stem cells have the potential to aid the treatment and

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possibly the eradication of a few of these deadly diseases. The future is bright for usage of stem cells, and we have a good portion of the tools required to profit from the known benefits.

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