Who Says You Can't Teach an Old Stem Cell New Tricks?

Imagine a better future, one in which devastating diseases no longer tear apart families. Stem cell research can not only achieve this seemingly unattainable vision, but has the potential to do much more. Since the late 1990s, stem cell research has been at the forefront of medical discovery. From this stem cell research could come a "medical revolution," one that can be compared to the discovery of penicillin; this new revolution will save millions and change the public's outlook on medicine forever. Still this innovative research is considered exceedingly controversial. Many believe stem cell research is inhumane and immoral, but the untold possibilities of what this research can provide for society should take priority over any other misgivings. Although some believe that for ethical reasons stem cell research must be completely terminated, the majority insist that the study of these cells must continue, especially the research on adult stem cells, because this research holds the potential for innumerable medical breakthroughs.

The discovery of the stem cell took current ideas of future medicine for a spin. Stem cells are the most basic cells. The Stem Cell Research Foundation calls them the most "highly versatile" and "primitive" of cells (25). This is because the cells have not yet been specialized, or given a specific function to provide for the human body. These "blank" cells are highly sought after because researchers want manipulate and alter the originally intended specificity of the cell (Stem Cell Research Facts). Most scientists study stem cells to advance the ideas of stem cell therapy. This therapy is used to replace damaged cells or tissues with newly grown stem cells, or to alter cells to cure terminal diseases like cancer or Parkinson's disease (Stem Cell Research Foundation 23). Stem cells have the potential to divide many times, for months or even years, without ever specializing, but they can become specialized depending on their surrounding

environment. Figuring out when and why a stem cell changes can help scientists understand how to modify the cell in order to create a specific type. Stem cells are divided into three general groups: totipotent stem cells, that can become any type of specialized cell, are usually found in fertilized eggs; pluripotent stem cells, that form most specialized cells, are found in embryos; and lastly there are multipotent cells which become more than one type of specialized cell, they are found in adult stem cells (Newton 19). Future development of these stem cells seems a bright and encouraging, but still there are those who stand against any further research.

The potential progress of stem cell research has been dramatically slowed by the objections of a minority, who state that the research is unethical and extremely immoral. These protestors narrowly see stem cell research as the destruction of human embryos or fetuses, "the most innocent and defenseless human beings" (Newton 25). However these arguments are emotional not rational as they are unaware that the solution to that problem is simple; there are a plethora of other sources of stem cells that do not cause harm to any human life. These types of cells include: adult stem cells, amniotic stem cells, and human admixed embryos. Through much research, scientists have found that adult cells have the potential to be even more useful than embryonic ones. They are already partially "specialized" so they can be more easily converted into another type of cell. Also, scientists have found by using the patient's own adult stem cells for stem cell therapy; they can safely avoid rejection upon transplantation. The biggest concern is availability. Adult stem cells found in places like umbilical cords are more likely to be readily available than embryos (Stem Cell Research Facts). Availability is important because it allows more research to be done and can be essential when a patient needs an immediate transplantation. Amniotic fluid stem cells are another alternative to embryonic ones. They are found in the placenta, which is usually disregarded at birth and in the amniotic fluid located in the sac around

the fetus. Amniotic fluid stem cells have many common traits when compared to embryonic ones, but without the consequences of embryo destruction. They are pluripotent, so they can form into many types of cells, have a long life span outside the human body, and can be frozen, which allows for them to be available at all times (Carmichael 228). Another substitute for embryonic cells are human admixed embryos; which are genetically altered animal embryos. Scientists take out the animal genetic material and add a human cell nucleus to these stem cells. The stem cells are grown separately from the embryo, but still they can never be used on humans for experimentation, only for separate research (Gordon). The issue against stem cell research is a misconception. If any of these 'substitute' stem cells are used, it takes away the destruction of the unborn fetus or embryo. People should not consider the research immoral if adults can have the choice on whether or not to allow their cells to be used for research. The stem cell research protestors have nothing to argue about, if substitute stem cells are used in replacement of embryonic ones which in their opinion destroys unborn life, then there should not be any opposition.

Even with the multiple embryonic stem cell substitutes, many scientists believed that these alternatives would not be as successful. This was proven wrong when in 2001 President George W. Bush, in response to public moral outrage, restricted government funding on embryonic stem cell research. This restriction caused researchers to look into the other types of stem cells to continue with their progress (Ogilivie). This change generated an immense interest in adult stem cells, which led to huge successes in that department. One problem of adult cells was that it was only multipotent, embryonic ones were pluripotent. This was a great setback until in 2007 scientists figured out how to regenerate adult stem cells. By inserting 4 specific genes into the stem cell's DNA with the use of retroviruses, scientists now had the power to make an

adult stem cell pluripotent. With this huge breakthrough many others began to search for a better way to regress an adult stem cell. In some animals retroviruses can cause cancer, so in 2008 scientists figured out that adenoviruses could make an adult stem cell pluripotent. The research to improve these cells for replacement of embryonic ones is still in progress (Stein). The best proof of success so far for adult stem cells occurred in June 2008 when a human windpipe was transplanted into a woman suffering from severe shortness of breath due to tuberculosis. Using adult stem cells taken from the women's own bone marrow, European scientists were able to grow and replace a large piece of the windpipe. The use of adult stem cells made sure that the woman's body would not reject the cells upon implantation. As of November 2008 the woman is still improving (Cowell and Grady). With this encouraging success and many others adult stem cells are proving their potential to the world. People need stem cell research to aid humanity in the fight against world suffering. This success of adult stem cell research further proves that the controversial use of embryonic stem cells is not necessary. Researchers now have a better reason to look into adult stem cells for the benefit of the near future. Without any ethical objections adult stem cell medical breakthroughs can persist.

The most important reason for the continuance of stem cell research is its many benefits towards the future of medicine. Stem cell research holds an untold potential of making miraculous achievements, never before even dreamed of. With increasing progress, researchers will create substitute cells for multiple tissues or organs. This means that these organs will no longer have to be donated by the selfless people of the world, they could just be grown using the person's own stem cells. This would help to save lives and prevent the dangers of transplantation such as the rejection of the organ by a person's body. In addition, stem cells may be used to repair spinal or muscle injuries, possibly curing victims of paralysis. In the United States a large

portion of the population has been affected by cancer. Many people know someone or have been afflicted themselves with cancer, now only ten years after the start of stem cell research scientists can use stem cells to treat the conditions of cancers like leukemia (Gordon). Further research will investigate the movement of healthy stem cells into a human body. Hopefully these cells will become part of the body's system and work as another cell within the body. The future of stem cell research is very promising; with "dramatic cures" that will give people the opportunity to live a full and healthy life (Stem Cell Research Foundation 27). Adult stem cell research can lead scientists to the still unknown paths of medical scientific discovery. This research can help the millions of people who are afflicted with incurable diseases like cancer or people limited by paralysis or other muscle dysfunctions. In order to figure out the future of stem cells on medicine, scientists must continue their research. The continuing of stem cell research can only equal a longer and better life.

Stem cells may be the best discovery ever made in modern medicine, only an unrestricted future will tell. This means there must be a future for this research. By eliminating the use of embryos, scientists can resolve the immoral objections to the destruction of unborn life. Already there has been significant success with adult stem cells and it can only lead to further advancements. In the future, stem cells will change the world of medicine and lead to an overall improvement of life. Saving millions of lives is worth whatever cost, stem cell research is overall essential for the betterment of mankind.

Allison –
Good job –
Didn't mark it up because
I'd like to use it later.
Sound good? (98)

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