Development Of Stem Cell Research

Our bodies already have the ability to cure cancer. Although this statement sounds quite impossible, it could be true in the future. In fact, scientists have already found the antidote, which is stem cells. Stem cell research can be extremely beneficial. The excitement over stem cells does however, pose some significant drawbacks. These drawbacks include: new problems concerning the functionality of the cells, lack of control of regrowth the cells possess, and multiple more problems that could cause horrendous diseases and cancers. However there still is a tremendous amount of hope in the research world to encourage the study of these amazing cells.

The first step to understanding stem cell research is understanding what stem cells are and how they can help cure different diseases. The most important thing to know about stem cells is that they are unspecialized, which means they have no apparent function to perform in the human body yet(“Stem Cell Basics I”). Since the cells are unspecialized, they have a natural need to become a specific type of cell. This transformation happens through a process known as “cell division”.An interesting fact about stem cells that needs to be noted is the specificity of cells they can become after cell division; this includes muscle cells, blood cells, and brain cells (“Stem Cell Basics I”). When they build up, they replace cells in our major organs (such as our heart and lungs) to renew and heal them (“Stem Cell Basics I”).Stem cells are so unique and so important without them, humans would not be able to fully form.

Since stem cells do not perform specific functions like all other cells do, the function of cell division is particularly important . When the cell undergoes division, it changes from one nonspecific cell into two new specific cells (“Stem Cell Basics I”). Through this process, the cell endures mitosis and meiosis (the specialized cellular division that generates eggs, sperm, and new daughter cells) (“Mitosis v.s Meiosis”). A specific part concerning stem cell research that needs to be noted is the two main types of stem cells in the human body. The first is known as the embryonic stem cell (Hall 4). Embryonic stem cells are primarily relevant before birth. These are the cells that divide and generate into our major organs (Hall 4). Embryonic stem cells generate from the egg in the uterus. They continue to break down and develop inside the egg. Soon the cells begin to form organs and tissues that eventually form a baby (“Stem cell basics III). The second type of stem cell in the body is the non-embryonic stem cell. These cells are a diluted version of the embryonic cells. The difference between the two main types of stem cells is their ability to break down into new cells (Hall 4). Embryonic cells have that ability to form into completely new specialized cells. Adult stem cells--which can be found in the skin--can only form into that specific cell. Therefore, skin cells can only regenerate new skin cells and nothing else (“Stem Cell Basics IV”).

Using the knowledge about stem cells and their ability to grow into specific cells, scientists have questioned whether or not they can use those same properties in the adolescent cells to help regrow damaged cells in adult bodies into clean and fully-functioning cells. One scientist explains the main goal of stem cell research as a question; he states, “Can we harness the adolescent stem cells to regrow harmful cells such as cancerous clots by replacement?” (Hall 4) His question helps people understand the objective behind the extensive process of stem cell research. If able to fully understand the properties of the newborns cells, there is a possibility

scientists can guide them to perform the same regenerative techniques embryonic stem cells use on damaged cells for almost any disease (Hall 4).

Although the idea behind embryonic stem cell research seems pretty encouraging, there are many problems surrounding it. As easy as it seems to take existing cells and transplant them to different cells, there is a lot more to process. Scientists' main problem regards figuring out how to get the stem cells in the specific area of the body in order for them to be useful (“Stem Cell Basics I“). If not directed to the right place, stem cells will easily spread and form into other unnecessary cells. A second reason it is extremely risky is due to the weak immune system present in the new cells. The lack of an immune system makes the body even more vulnerable to sickness (Hall 5).

Stem cell research is not a new idea to a lot of people. Through the use of social media the epidemic of this recovery technique has posed many questions mainly focusing on the ethics of it (Doan 32). In order to test stem cell therapy, scientists need stem cells. Since embryonic stem cells promise more success for regeneration than adult stem cells, they need embryonic cells. This is a problem because using an unfertilized embryonic egg could potentially mean taking a future life. Embryonic stem cell research has the potential to save many lives. However, it has the potential to take many lives as well (Navellier 16).

Because of the moral ethics behind the research and the numerous problems that could arise from it, the FDA has created multiple regulations against it (Doan 32). Right now, stem cells seem to be more harmful than helpful since there are multiple reports of stem cell research leading to blindness, paralysis, and tumors (Hall 5). For now, therapy is regulated to certain blood disorders, and even some of those procedures are not permitted (Hall 5). As of recent years, scientists have been trying to figure out how to avoid the moral issue surrounding the embryonic stem cells and still harness the amazing qualities these cells possess.

Due to the FDA regulations, there can be no use of the embryonic cells. Therefore, scientists have had to become very creative and find new ways to implement stem cells in their research. Animal experimentation that has changed research forever. Through it, many discoveries have been made encouraging the manipulation of adult stem cells. Recently, researcher Jun Wu, from the University of Texas Southwester Medical Center made a discovery using mice (Kelin 17). Mice are a common theme in stem cell research and from them, scientists have made some of the most groundbreaking discoveries. For the first time ever, artificial embryos have been made without sperm or eggs, and further, life has even begun to start from it. This new breakthrough was possible because of the pluripotent stem cells- “cells that have the ability to generate the specific cell types the embryonic stem cells possess” (Kelin 17). The artificial embryos were transferred into the mouse uterus. Seven percent successfully implanted (implantation has never been done before) and removed(Kelin 17). This is an extremely fortunate discovery for Wu. However, he now faces the hard battle of finding out how to successfully form the transferred embryos into a fully functioning mouse fetus. Wu and his team have been working on this; they know the power of stem cells and what could happen if there is a way to artificially create them. If they can realistically create a fetus, this could give way to helping many fertility problems people face today. Wu’s experiment brings a lot of hope to the scientific community. Because of his breakthroughs, there is now reason to believe people cannot manipulate the adult stem cells to perform other functions.

Through all the funk surrounding research regulations and the multiple problems that could arise

after transplantation, stem cells provide the most hope for curing many of the world’s most incurable diseases. Because of how much potential there is surrounding the cells, research still continues despite the multitude of obstacles in the way. An example of this constant state of research is shown through the experimentation involving Alzheimer's disease. Alzheimer's disease is very detrimental to the brain and it destroys neurons causing it to perform differently. This affects a person's ability to recall memories (Jabr 17). Alzheimers is very common today and that's a problem. There are not any optimistic cures for it. Every drug meant to benefit patients only solves the problem temporarily. Since the present way to treat Alzheimers is not useful, stem cell treatments could be the key to curing this heartbreaking disease forever (Reddy 1).

Another major breakthrough happened recently, it highlighted two specific groundbreaking discoveries that happened around the same time. The first is from Children's Medicine research where Sean Morrison singled out an RNA binding protein known as the LMPL (Key discoveries 14). The LMPL is “a self renewing cell that is only in the human body for a short amount of time during fetal development” (Key discoveries 14). It is extremely important since it could help cancer research in tremendous ways because of the fast renewing properties it possesses (Key discoveries 14). Around the same time Morrison made his discoveries, Hao Zhu from the Dallas Medical Center was making headway of his own. Zhu found an RNA binding protein he classified as Lin28a. This protein is very similar to LMPL because of its repairing qualities. The reason this discovery is particularly helpful is because it has a very similar configuration to the embryonic stem cells. (Key discoveries 14-15). If constructed properly in the future, these scientific discoveries could help with the multiple problems we still face today.

Science has gone incredible places no one would have ever imagined. Who would have thought there are specific cells in our bodies that have the ability to regenerate and cure diseases. It is encouraging to see the scientific achievements being made. Today, there are multiple people affected from stem cell procedures in extremely positive ways. The future of stem cells is going to save thousands of lives. Stem cell research has a lot of potential, but there is still a lot to figure out. If scientists persist to keep working and understanding research even better there’s no limit to how many diseases could possibly be cured in the future, especially with all the new breakthroughs currently happening today!