Research Question: What effect do stem cells have on the damaged human heart?

Annotated Bibliography


Bone marrow stem cells were originally studied because of their involvement in hematopoiesis. After these studies, it was realized that bone marrow stem cells were the progenitors of the skeletal frame and that they had potential to differentiate into several different types of tissue. It is also possible that there are multiple types of stem cells in the bone marrow - some that are too far along in the differentiation that they may not turn into unrelated tissues - and some that may turn into a multitude of different tissues, including myocardial tissue. Published in 2001, this source may be a little dated; however, it still provides valuable information about the research done on bone marrow stem cells. At times the source is difficult to understand and would be even more so to someone without a working knowledge of medical terms. This can be overcome with a little more research but still poses some obstacles. For experts and experienced students, Bianco et al.’s work is very informative, with age of the study being the main issue. More recent studies would be much better to have for reference since this issue tends to move quickly.


Burnsides and Ellsley's book contains a lot of information regarding stem cells and the possibilities of applying them to diseases and other injuries including heart attack. Some of the information in the source is relevant to the topic of stem cells and their interaction with a damaged (or diseased) heart, but a lot of it also focuses on the other uses of stem cells in therapies. The source is good for background information on stem cells and gives a good idea of how stem cells can affect the body in general. This source is fairly recent, being from 2008 and seems reliable.

This source describes many different sources of Stem Cells and the way they interact with the body tissues. The sources of stem cells mentioned include: embryos, umbilical cords, amniotic fluid, and bone marrow. The main tissue discussed in the handbook is cardiac tissue and the way that stem cells interact with it when introduced to the system. This is a source that is an amazing tool for research. It is a massive collection of both introductory and advanced information. It is easy to understand and extremely relevant to the topic. It is accessible and fairly recent, being from 2008.


The leading cause of mortality in the United States is congestive heart failure or coronary artery disease. Despite advances in medical and device therapies, limited strategies are available to treat or counteract the development of heart failure. Stem cell therapies are an upcoming way to counteract the effect of damage to the heart. Gaetani's article is very informative about the issue and about the stem cells and their effects. It is a useful source for a research paper and has good in-depth and highly relevant information presented in an easily understood fashion.


The study evaluates the effectiveness of bone marrow derived stem cells on rabbits with induced heart failure. The results of the study show that the transplantation of stem cells into the left ventricle increased the contractility of the heart, as well as the capillary density in the myocardial tissue. The study also shows, however, that the BMC failed to differentiate into new cardiomyocytes. This source is useful for information concerning bone marrow stem cells and their questionable ability to transdifferentiate into different types of tissue. While the study was done on rabbits, studies on other mammals can also be fairly indicative of what would result when the studies are done on humans. The study gives good information regarding the effects of the stem cells on the heart. This is useful for a research paper, but may not be as relevant as studies
done on the human heart or the pig heart (which is the most biologically similar to the human heart).


IV delivery of Stem cells is a very attracted method of introducing them into the heart. However, the efficacy of this method is not well established in large mammals such as pigs (or humans). Myocardial tissue does not have the ability to regenerate when damaged. The studies done are to test the efficacy of delivering stem cells intravenously to the heart of large mammals. After suffering heart attacks pigs were given an IV injection of Stem cells. The experiment group recovered some function of the heart but in some cases they also developed benign tumors, usually consisting of scar tissues. This is a useful source for some background information on Stem cells and is also useful for its studies in mammals other than humans. While the subject may not seem relevant to some, studies on animals (especially those done on pigs) are fair indicators of what would happen if the same experiment was done on a human. This would be helpful to explore any potentially dangerous effects of using an IV method of introducing stem cells to a damaged heart.


Studies show that the introduction of stem cell progenitor cells to the myocardium after damage from myocardial infarction or other coronary diseases may significantly improve function and the rate of recovery. Many studies use PET technology to track the progress of stem cells. This source is extremely informative on many different levels. The information provided about stem cells and their effect on the myocardium is very useful and interesting. The information about the PET and other methods of tracking the cells is not as useful towards my research and is really unnecessary, but still interesting to read. The source is also fairly recent, coming from 2008. Overall this would be a great source to use in a research essay due to the information provided
as well as the way it is presented (tables and graphs as well as informative writing).

This is a very satisfactory source.


The source indicates that stem cells (particularly bone marrow stem cells) may not be the most effective choice for regenerating the tissues of the heart. Bone marrow stem cells only show marginal increase in heart function and that may be due to other effects of attempted stem cell transplantation, meaning that the main cause of the improvement is not due to stem cell differentiation and could possibly be replicated without the use of stem cells. It could very possibly be that the best way to repair heart function is not to find stem cells and cause them to differentiate, but to find a way to encourage myocardiocytes to proliferate. This source is useful for information and seems to agree with some parts of other research done but it also contradicts certain parts meaning more research is required. The source is relevant because it explores methods of repairing the heart and approaches the topic of alternative heart therapies. It would, however, be more relevant if it spoke more of the stem cells and the way they could possibly be involved. The source is very recent which is good. There are parts of this source that may be used well in a research essay, however, other sources may provide similar information in greater detail.