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What are the pros and cons of stem cell research

Cholesterol is needed to maintain good health, but too much of it can be troublesome and put you at risk for heart disease. Statins are prescription drugs that help to manage levels of cholesterol, but taking them does have risks. Here's a look at the pros and cons of statins.

The Benefits of Statins Statins work by blocking the enzyme used to make cholesterol, a function that occurs in the liver. This has the effect of lowering LDLs, known as "bad" cholesterol, by up to 50 percent, according to WebMD. By taking statins, you can decrease your risk of having a heart attack or a stroke. Statins also make the lining of blood vessels more stable, can help to lower blood pressure and reduce inflammation and artery damage, states Healthline.

The Cons of Statins When statins are taken along with grapefruit, there's a risk of kidney failure, a breakdown of muscle tissue and liver damage. This happens because an enzyme that assists the processing of the medication is suppressed when statins and grapefruit are combined. Dizziness is also experienced by some people who take statins, according to Healthline.

The Side Effects of Statins There's an adjustment period when you start taking statins, during which time you may have side effects such as nausea, constipation or muscle problems with statins. Can statins cause memory loss? Yes, but it's rare, states WebMD. Females are more likely than males to experience side effects of statins. Being 65 or older also increases your chance of having side effects, as does consuming excessive alcohol, according to Healthline. It may be necessary to change your dose or to try a different statin if you're experiencing adverse side effects, states WebMD.

Length of Time Required You may not have to take statins for an extended period of time if taking them decreases your cholesterol levels, or if you make lifestyle changes that help to manage your cholesterol. However, if your levels go back up, your doctor may advise that you continue to take statins, according to Healthline.

Statin Alternatives You can lower your cholesterol levels by making healthy dietary choices, such as eating soluble fiber, healthy fats and whole grains, according to Healthline. That means loading up on oatmeal, nuts, fresh fruits and vegetables, olive oil and fatty fish such as salmon. If you smoke, kicking the habit can help to lower your cholesterol levels, states WebMD. Exercise is also important for keeping your LDLs within a healthy range. Even losing just a few pounds can benefit your cholesterol levels. However, these alternatives to statins may not mean that you should stop taking statins or other cholesterol-lowering drugs altogether and any changes in your dosage should be discussed with your doctor, reports Healthline.

MORE FROM QUESTIONSANSWERED.NET Stem cell research takes two primary forms: adult stem cells and embryonic stem cells. Each cell line that is harvested offers the opportunity to develop new treatments that may help to stop a plethora of diseases that affect humanity. Cord blood treatments that involve stem cells have helped to treat more than 6,000 people and 60+ diseases and that is just the beginning of what this medical research may offer.

One of the primary advantages of stem cell research is the availability of cell lines and that they can be obtained ethically. Adult stem cells can be harvested from healthy individuals by accessing their bone marrow and other tissue sources. Embryonic stem cells can be obtained from cord blood taken after the umbilical cord has been removed.

As for disadvantages, one of the primary points of content against this type of research is how some embryonic stem cells are obtained. These cells require the destruction of an embryo when harvested, which to some is a direct decision to end a human life. No amount of medical research, it would be argued, should come at the expense of life itself, no matter the number of people who could be potentially treated from processes developed from the research.

There are additional advantages and disadvantages of stem cell research that must be considered. Here are the key points to look at.

What Are the Advantages of Stem Cell Research?

1. Adult stem cells have low rejection rates. Therapies can be developed from adult stem cells that are taken from each patient. These cells can then be transformed into various therapies that run a low risk of rejection because the cells are taken from the individual needing treatment. Even when familial umbilical cord blood cells are used to develop treatments, the rejection rates are quite low. This limits the need for immunosuppressant treatments to maintain a positive quality of life in the future.
2. Some stem cells can be transformed into pluripotent stem cells. Adult stem cells, through the use of iP5 reprogramming factors, have the ability to be reprogrammed into pluripotent stem cells. Once this occurs, they can be activated into mesoderm, endoderm, or ectoderm cells. This process allows for the potential benefits that embryonic stem cell lines could provide for medical treatments without the need to destroy embryos to collect the cells that are needed.
3. The current treatment options for stem cells are numerous. The most common use of stem cell therapy currently used is to treat leukemia and lymphoma patients with bone marrow transplantation. A stem cell therapy called Prochymal has been conditionally approved in Canada to manage graft vs host disease in children who do not respond to steroid treatments. Holoclar is another potential treatment that can help people with severe limbal deficiencies because of burns to the eye. In the US, there are 5 hematopoietic cord blood treatments that have been approved by the FDA.
4. This research gives us insights into how human life works. Stem cell research allows us to understand how the cells in our bodies work. By understanding these processes better, it becomes possible to understand how an illness or disease develops. Even if a stem cell therapy isn't developed from this research, the understanding obtained can help to create new treatments that can potentially cure what is damaging our cells. That allows us to extend average life expectancy rates, stop diseases, and even reduce the costs of medical treatments.
5. Because stem cells have regenerative properties, the potential is unlimited. Imagine being able to grow a replacement organ for one that is failing. Or having a veteran who lost a limb in an attack could have a replacement grown in a lab setting and then attached so they don't need a prosthetic - they could have the real thing. The potential of stem cell research is unlimited, including offering the chance to improve mental health. Improving insulin production, repairing damaged heart muscle after a heart attack, repairing torn tendons or ligaments, and even attacking cancers or viruses. Embryonic stem cells offer a similar potential, along with the possibility of being able to treat certain genetic disorders or birth defects so more people could go on to live happy and healthy lives.
6. Embryonic treatments can be developed through stem cell research. Many issues that afflict the human condition occur during the initial stages of development for the embryo. Errors in the cell's coding can lead to potential birth defects as the embryo transitions into being a fetus. By studying how stem cells begin to transform into the 200+ different cell types of the human body, medical science has the potential to learn how defects, genetic errors, and other problems develop and stop that process before it starts - even if the parents are carriers of current genetic disorders.
7. Stem cell research could reduce pregnancy loss. Miscarriage is defined as the spontaneous loss of a pregnancy before the 20th week. Up to 20% of known pregnancies end in a miscarriage, those the number is likely higher because most miscarriages occur so early on at the embryonic stage of development that women don't realize they've become pregnant. Stem cell research offers the potential of reducing this issue so that more pregnancies can be successful with individualized treatments developed from this work.
8. Stem cells can self-replicate in enormous numbers. It only takes a few adult stem cells to create potentially trillions of cells that are specialized to a certain treatment. With ongoing research, even current cell lines, including embryonic lines, can continue to self-replicate and provide ongoing research opportunities.

What Are the Disadvantages of Stem Cell Research?

1. Embryonic stem cells can have high rejection rates. Embryonic stem cell therapies have been known to create several future health problems. Rejection rates are high for these therapies. Research has shown that these therapies encourage the development of tumors. Some embryonic stem cells do not respond to the activation sequences as intended.
2. Adult stem cells have a determined cell type. Without iP5 reprogramming, adult stem cells have a determined cell type. This means they cannot be changed into different cell tissues. This limits the therapies that can be developed by stem cell research because the cells, in their raw form, can only involve the same type of tissue from which they were harvested in the first place.
3. Obtaining any form of stem cell is a difficult process. To collect embryonic stem cells, the embryo must be grown in a culture. Once harvested, it takes several months for the stem cells to grow enough to the point where they could be potentially used for the creation of a therapy. Adult stem cells, especially those which are obtained from a person's bone marrow, can be extremely painful to obtain for the patient. Some individuals may not live anywhere near a facility that has the capabilities of obtaining those cells, which creates another set of logistics which must be solved.
4. Stem cell treatments are an unproven commodity. The treatments developed from stem cells are experimental at the current phase of research. There is the potential of having such a treatment work with current research, but there is a better chance that nothing could happen. The most effective therapy right now is hematopoietic stem cell transplantation (HSCTx). They are 90% effective and about 50,000 transplants occur per year.
5. Stem cell research is a costly process. The cost of a single stem cell treatment that has been approved for use in the United States is typically about \$10,000. Some clinics have found ways to reduce this cost by up to 20%. Outside of the United States, the costs of a single treatment can be as high as \$100,000. The cost of harvesting an embryo for stem cells is up to \$2,000 per instance. Services rendered to take adult stem cells may not be included in the treatment cost and could be several thousand dollars. And, because stem cell treatments are experimental in most instances, health insurance plans and government-provided benefits do not generally provide access to them.
6. We do not know if there are long-term side effects to worry about. Tens of thousands of people are receiving stem cell transplants every year, with efficacy rates improving each year for the dozens of illnesses and diseases that respond positively to such treatments. What we do not know yet is if there are long-term consequences to such therapies, even if there are short-term benefits that are being seen. More than 3,500 different research studies are happening right now to determine the effectiveness of stem cell research and therapies, but the results are still pending.
7. There will always be some limitation to the research possibilities. The ethics of stem cell research will always place limitations on the medical potential of this research. Individuals must decide on their own how they will respond to the ethics of this research. Is it permitted to alter adult stem cells or umbilical embryonic stem cells? What are the consequences of destroying an embryo to get stem cells, even if that embryo was going to be discarded? Some people will feel the entire process is unethical and that has the potential to hold this research back.
8. Research has been held back by factual contradictions. Some of the research in this field has been discredited because it contains hundreds of factual contradictions. This includes some of the pioneering work in stem cell research by Bodo-Eckehard Strauer, who focused on how stem cells could help to treat cardiovascular conditions. Current research has had to correct these contradictions before proceeding with future potential benefits.
9. Research opportunities are somewhat limited, especially in the United States. In 2001, when the US Government took steps to limit the funding and availability of stem cell research to just 19 lines. The research itself wasn't banned, but the severe restrictions placed on having funding for that research made it virtually impossible to conduct for more than a decade. Some states in the US have or have an interest in additional restrictions or complete bans on embryonic stem cell research in its current state.
10. Adults have very few stem cells. The treatment options that are available for adult stem cells without reprogramming are few because the number of cells that adults have are very few. Although they reside in many different areas of the body, they are isolated from tissue samples and their current source is unknown. Being able to separate them is a time-consuming and costly process and self-renewal within the body may be slow to occur.
11. Current embryonic stem cell harvesting requires the death of an embryo. Harvesting embryonic stem cells and germ cells may offer numerous research advantages compared to adult stem cells, but current methods of harvesting require the death of the embryo. Embryonic stem cells also have limited self-renewals, measured at 2 years. Germ cells can double a maximum of up to 80 times. This limits the research potential of any existing line.

The advantages and disadvantages of stem cell research go beyond the ethics of this field. Although the proven benefits of stem cell research are somewhat limited according to current science, the future potential of these treatments continues to inspire hope for many. As the processes to develop adult stem cells into programmable cells, the ethical questions may begin to fade. Until then, each key point must be considered before a final conclusion can be reached.

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