**What are stem cells?**

*Posted by*[*James Andrews*](http://landing.store-a-tooth.com/blog/?Author=James+Andrews)*on Wed, Dec 19, 2012 @ 01:22 PM*

***What Are Stem Cells?***

The news that scientists found a way to use [stem cells to cure serious hearing loss](http://hearinglosscure.stanford.edu/blog/) is great news for more than 275 million people in the world who cannot hear. The science is discovering every day a new way to use stem cells for curing diseases, repairing damage and helping people. *But what exactly are stem cells?*

***Universal repair machines***

Each cell in our body has a particular function: cells can be blood cells, muscle cells, or bone cells. When they divide during their life, cells divide themselves into the same cells which perform the same function.  
  
But, some our organs, and some scientists believe all organs, contain special cells, called stem cells, which stay dormant until that organ gets damaged. Then they transform into the needed type of cells to repair the damage. Some stem cells can become any other type of cells, and others can become cells in the nearby organ, helping its repair if it becomes necessary. This ability of stem cells to keep dividing and becoming specialized under certain condition is behind their power to potentially drastically change our approach to treating diseases.

***What is the problem?***

*Controversy*: One of the best sources of stem cells was fertilized human embryos. Embryonic stem cells have the ability to differentiate into any tissue in the body. They normally do not start to differentiate into other types of cells until the embryo gets imbedded in the wall of uterus.

*Solution*: Researchers discovered that there are other rich sources of stem cells.

Bone marrow - The most commonly used one is bone marrow, but accessing it is painful and invasive.  
  
Cord Blood - An increasingly popular option for expecting mothers is to save the stem cell rich blood from the umbilical cord of their child at birth. Stem cells can be retreived from both the placenta and and the cord blood iteself. It's a one time shot at birth to save stem cells.  
  
Dental Pulp - One of the newest and most cost effective options available. The pulp inside a tooth is rich in stem cells. The usual candidates for banking are baby teeth, wisdom teeth and teeth being removed for othodontia.

***The potential***

If they could learn how undifferentiated or stem cells become differentiated, scientists would be able to treat a number of health conditions such as birth defects as well as some types of cancer. Differentiated cells created from stem cell lines can be used to test new medications. Cancer cell lines are already used to test new anti-tumor drugs. Stem cells could be induced to transform into organs needed for transplant, or to repair damage from burns. They could repair spinal stem injuries, stroke or damage caused by diabetes.  
The least objectionable type of stem cell research is done on adult stem cells, harvested from various organs. Some adult stem cells can differentiate into other cell types. For example, brain stem cells can differentiate into blood cells, blood stem cells can differentiate into heart muscle cells, etc). In addition, some adult stem cells can be genetically reprogrammed to become different cells.  
Besides being ethically acceptable, adult stem cells, and tissues made from them, have another advantage: they can be taken from the patient”s own organs, what reduces possibility of the tissue being rejected after transplantation.  
We are likely to hear much more about the use of stem cells in curing diseases. But, it is important that the general public as well as legislators are well informed about the available options and all ethical issues involved.