The therapeutic uses of stem cells

Stem cell therapy is examined as an exciting direction in biotechnology. Many medical experts think that stem cells will be key to treating and even curing dozens of diseases, including cancer, diabetes, and neurological disorders. Stem cells are unspecialized cells that have the potential to become any of the 220 specialized cell types in our bodies.

Some cells in the body do not differentiate and hence they retain the ability to divide continuously and give rise to new cells which then become specialized, these are known as stem cells. These cells are important part of our body's natural repair system.

Stem cells: A single cell that can replicate itself, or differentiate into many cell types, with a long life span.

Most stem cells are derived from embryos in the very early stage of development. As soon as fertilization takes place, in which the male and the female gametes combine together, the resulting zygote begins to divide. As the development of the cells increases, the cell division and reorganization produce a hallow structure called a **blastocyst**.

As thick as a diameter of a human hair.

Embryonic stem cells are found inside the blastocyst, a in a small mass of cells. These cells are known as pluripotent meaning that they can form almost any type of cell or to give rise to a complete embryo. Some adult stem cells can only differentiate into one type of stem cell – they are known as unipotent. A prime example would be skin stem cell.

Stem cells have a wide variety potential therapeutic uses:

- **Brain and spinal Cord**
- **Eyes**
- Heart
- **Lungs**
- **Pancreas**
- Bone marrow
- Liver
- Skin

Brain and spinal Cord: Lou Gehrig's disease is a disorder that affects the motor neurons that connect the brain to the spinal cord to the muscle in the body. Over time, Lou Gehrig's disease causes these motor neurons in the brain and spinal cord to shrink and disappear, so that the muscles no longer receive signals to move. As a result, the muscles become smaller and weaker. Gradually the body becomes paralyzed, which means that the muscles no longer work. With the use of stem cells, doctors

will be able to replace damaged motor neurons.

Eyes: Muscular degeneration is the main cause of blindness in adults of all ages. In a fit eye, the lens and the cornea focus light onto the retina. The light is converted in to electrical signals with the help or rods and cons and are sent to the brain via optic nerves. Part of the eye called macula is a spot near the center of the retina that contains a lot of cones cells which is highly responsible for the central vision. Normally, the choroid removes the waste away from the cells and provide them with nutrients. When this does not happen the retinal cells are destroyed causing blindness. Doctor may be able to use the stem cells and replace damaged retinal cells with healthier ones and restoring vision.

Lungs: A genetic disease called cystic fibrosis is disease that can affect the lungs badly by causing musuc to build up in the air passage of the lungs. Scientists are now researching stem cell therapy to correct this faulty gene and preventing blockage in the lungs.

Pancreas: The pancreas contains cells that produce insulin, a hormone that cells require in order to reduce the amount of sugar in the body. Type 1 Diabetes is a disease that occurs in children and young adults when the body's immune system malfunctions and destroys the cells in the pancreas that produce insulin. People with diabetes must inject that selves with insulin daily to control the amount of sugar in their blood. They have to be very careful about what they eat. If it were effective, stem cell replacement would simply be a case of swapping insulin-producing cells from a healthy pancreas with those destroyed by diabetes in a diabetic patient. In order to prevent the immune system from rejecting a new pancreatic cells, the patient must take immune-suppressant drugs.

Throughout years, stem cell research has grown as well as increasing the controversy with it. The debates surrounding stem cell research primarily are driven by methods concerning embryonic stem cell research. It was only in 1998 that researchers from the University of Wisconsin-Madison extracted the first human embryonic stem cells that were able to be kept alive in the laboratory. The main critique of this research is that it required the destruction of a human blastocyst. That is, a fertilized egg was not given the chance to develop into a fully-developed human.

The stem cell debate has risen to the highest level of courts in several countries. Production of embryonic stem cell lines is illegal in Austria, Denmark, France, Germany, and Ireland, but permitted in Finland, Greece, the Netherlands, Sweden, and the UK.