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## STEM OF THE PROBLEM

**Stem cell therapy is a landmark innovation in the field of medical science, bringing back hopes of living a normal life for millions of people. Bhavna Nagpal gives us the details...**

Man's quest to prolong his life on this planet has been a subject of research from time immemorial. From pacts with the Gods to the Philosopher's stone (which not only turned base metal to gold but also bestowed eternal life on the owner) the search has been long, and mostly fruitless. Until recently, when stem cell research offered people a way to give themselves additional organs when the old ones wore out or were lost to disease. A lot has been speculated and said about stem cell therapeutics. As a science of regenerative medicine, stem cell therapy holds a lot of promise for people suffering from irreversible diseases. While research in this field is in full swing, questions are raised about the hope on offer against the efficacy of the procedure. With respect to this, guidelines for Stem Cell Research Therapy has been prepared by the Indian Council of Medical Research (ICMR) and the Department of Biotechnology (DBT).

Dr Vasantha Muthuswamy of ICMR states, "All stem cell therapeutic interventions are experimental at present and are not yet accepted as standard treatment in medical practice. We have brought out guidelines for the same as a joint ICMR-DBT exercise. All science agencies in India want to promote research in this area. Once we are able to establish safety and efficacy, this will become a standard treatment. Till such time, these processes are termed experimental and require monitoring by the institutional ethics committees and institutional stem cell committees for autologous and cord stem cell procedures. For embryonic stem cell therapy, one needs to monitor closely at the national level as proposed in the guidelines."

"Our government is very liberal in its support of this field in comparison to the other Catholic nations of the West. This science of regenerative medicine was actually started by cell biologists. With ongoing research, stem cell therapy is rapidly evolving," says Dr R Ravi Kumar, Senior Consultant - Interventional Cardiology, Lifeline Hospital, "Adult stem cells found in the bone marrow are an abundant source of stem cells. Since they are derived from a patient's own body there is no problem of 'rejection'. Also there are no ethical issues for doctors in using these cells. The umbilical cord stem cells are another rich source. They have great potential for future applications in medicine. But the present treatment status of these cells is not clear. The third main source - the embryonic stem cells are regarded as the richest source of undifferentiated stem cells, which can potentially transform to any organ. However, embryonic stem cell research falls under 'restricted' category. Apart from the above mentioned, adult stem cells can also be sourced through limbus of the cornea, dentine of the teeth, adipose tissue, skin, corneal endothelial cells, olfactory cells, germ cells, myocardium, liver, etc. Each of these sources in return has their own advantages and disadvantages."

The stem cells that are harvested from the bone marrow or by drawing the patient's own blood are called autologous. Stem cells are different from adult body cells as the former have the capacity to change themselves into any type of body tissue like bone, heart muscle, nerve tissue, liver cells, blood vessels, etc. "This property is called Pluripotency or Plasticity. It represents a big hope for medical science as damaged body parts can now be potentially healed and replaced using these versatile cells," says Dr Ravi.

Dr Samuel JK Abraham from Nichi-in Centre for Regenerative Medicine (an Indo-Japanese venture), says, "Stem cell therapy is the future alternative for donated organs and tissues as the need for transplantable tissues and organs far outweigh the available supply." A well-matched donor is important to the success of a stem cell transplant. Donated cells need to engraft quickly, as the patient is at a high risk of infection. Scientists, researchers and doctors' worldwide have emphasised the need for nationalised stem cell banks.

Life Cell is India's first private cord blood stem cell bank that launched in Chennai. In collaboration with CRYO-CELL International, USA, it facilitates the cryogenic preservation of stem cells at its unique facility in Chennai. A new entrant to the field of stem cell banking in the city is Jeevan Blood Bank. Starting its operations in March, Jeevan Blood Bank proposes to collect cord blood cells from donors, then proceed to test, process HLA type, store, preserve and make available stem cells for recipients in need of a transplant. Dr P Srinivasan, Chairman of this blood bank says, "While 70 percent of its (Jeevan Blood Bank's) facility will be for public storage, the remaining 30 percent will be used for private banking." Dr Saranya Nandakumar, Medical Director, Jeevan Blood Bank, says, "While units stored in a private bank would be used restrictively, cord blood in the public bank would be available for those in need of stem cell transplantation after HLA typing was done. When a match is detected, the required unit of frozen stem cells would be transported to the hospital where the transplantation is scheduled." Jeevan Stem Cell Bank will soon be venturing into bone marrow donor registry as well.

Though research and studies continue in the field - from curing blood diseases to organ transplants, stem cell therapy brings with it a ray of hope for millions for a better future. A chance to avoid long organ donor lists and who knows, perhaps to live forever even.

