

# Stem cell obstacles

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"There are still a number of major hurdles in the path of stem cell research today that are preventing the routine application of the technology in regenerative medicine." So say UK scientists writing in a forthcoming issue of the International Journal of Biotechnology.

In an article entitled, "Blazing the trail from stem cell research to regenerative medicine", Jane Bower of the ESRC Innogen Centre, at University of Edinburgh, and colleagues highlight some of the recent advances in stem cell science. They suggest that research in this area holds promise for applications in regenerative medicine, but point out that technical and ethical remain to be addressed. The researchers also discuss the issue of how to patent stem cell discoveries and to make them commercially viable.

Stem cells are immature cells that can replicate rapidly and then mature into the different cells needed around the body to build tissues in the skin, liver, heart, bone, brain, blood cells, nerves. They are present only in limited quantities in adults but are present in huge numbers in embryonic tissue. Human embryonic stem cells are currently the most promising source for therapeutic purposes, but their use has ethical implications.

Stem cell research holds great promise in medicine. Advocates hope that the work will lead to important therapies for tackling major degenerative diseases, such as Parkinson's, Alzheimer's, stroke, heart disease, diabetes, cancer and arthritis. There are also the possibilities of using stem cells to treat debilitating injuries of the spinal cord and other structural injuries. Indeed, the recent case of the trachea engineered to avoid organ rejection by using a patient's own stem cells is a prominent and early success. Stem cells will also have applications in discovering and testing new drugs.

"Technical solutions may involve the use of human embryos and this has created barriers to the use of the technology in a number of countries," Bower

and colleagues say, "There is already a need for the progressive development of appropriate legal and regulatory frameworks to allow both the scientific and clinical research to move forward." The team adds that, "Although public acceptability of the technology is by no means universal, it does not at present appear that therapeutic applications are likely to meet with wholesale rejection."

The researchers explain that while there remain technical obstacles to be overcome in stem cell research, Western scientists are not the only ones working on advancing this field. Scientists in China, South Korea, and India are also taking steps forward, although revelations of scientific fraud have led to additional negative publicity.

Nevertheless, the team believes that if a high level of routine success were achieved outside the West, then this might have a positive impact on the public demand for stem cell therapies in the West and so create the political pressure necessary to address the regulatory, legal, and ethical issues sooner rather than later.

Citation: "Blazing the trail from stem cell research to regenerative medicine" by D. Jane Bower, A. Najib Murad, Julian C. Sulej, and Joyce Tait in International Journal of Biotechnology, 2008, 10, 461-475

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