Adult Stem Cell Research Showed Tremendous Success in 2007 Studies, Trials

by David Prentice, William L. Saunders, and Michael Fragoso
January 5, 2008

LifeNews.com Note: The three authors write for the Family Research Council.

As the reader will see from our prior publication, "Adult Stem Cell Success Stories - 2006," [1] adult stem cell research had an impressive track record as of 2006 -- over 1100 FDA approved clinical trials in the United States for 72 different illnesses and disabilities.

2007 has seen further advances in adult stem cell research and therapy. Currently, peer-reviewed studies have documented over 1400 FDA approved trials[2] for 73 different conditions in humans where patient health has been improved through adult stem cell therapy.[3]

Adult stem cells are found throughout the human body from birth onward, in placentas, and in umbilical cord blood. Unlike embryonic stem cell research, no embryos are destroyed in retrieving them.

Treatments with adult stem cells continue to be so impressive and continually increasing that we have decided to publish a yearly update each fall/winter. (Note: There have been no successful treatment trials in human beings using embryonic stem cells.)

Unlike embryonic stem cells and the recently discovered (and ethical) "induced pluripotent stem cells" ("iPS cells")[4], adult stem cells do not create tumors.[5]

Below we summarize some of the developments in adult stem cell research and treatments since our 2006 paper.

Heart Tissue Regeneration

Doug Rice of Otis Orchards, Washington, was diagnosed with congestive heart failure eight years ago. Diabetes prevented him from receiving a heart transplant.

Facing the possibility that he would suffer fatal heart failure, Rice flew to Thailand to receive an experimental adult stem cell therapy through the company TheraVitae. Stem cells were isolated from Rice's blood in a lab in Israel and differentiated into angiogenic cell precursors, and transferred back into Rice's heart.

So far, TheraVitae has treated over 100 patients, 80 of whom have seen improvement, with the remainder holding steady. In Rice's case, the results were immediate, with his heart increasing to 41 percent efficiency from 11 percent before the procedure. According to Rice, "I've been around a lot of people with bad hearts. I know if they looked at [adult stem cell therapy], it might save their lives. I firmly believe it saved mine."[6]

Osiris Therapeutics is another company that has begun using adult stem cells to treat heart patients. Their "easy to administer" adult stem cell treatments have been given to recent heart

attack victims, who have seen their hearts pump blood 25 percent more efficiently on average, when tested at both three and six months intervals following the procedure.

The procedure is done intravenously, thus raising the possibility it could be widely and easily used at local hospitals. Marc Penn, director of the Bakken Heart Brain Institute at the Cleveland Clinic, says of the new therapy, "It's very exciting, perhaps a sea-changing trial for the field ... offering the chance of an off-the-shelf-product."[7]

Bodo-Eckehard Strauer is the director of the cardiology department at Dusseldorf University Hospital, and has used bone marrow stem cells to treat over 300 heart patients. In September, 2007, Dr. Strauer used adult stem cells on a patient "on the verge of dying" following a severe heart attack. Following seven weeks in intensive care, he received a transplant of his own bone marrow adult stem cells from Dr. Strauer, and his condition improved. This seems to be the first time that cardiogenic shock has been treated by adult stem cells. Dr. Strauer calls it a "global innovation."[8]

Type 1 Diabetes

Jaider Furlan Abbud is one of 13 patients who were the first to be successfully treated with adult stem cells for Type 1 Diabetes. Dr. Abbud and the other patients participated in a clinical trial led by researchers from Northwestern University and Brazil. Dr. Abbud became insulin-free after receiving treatment which included an adult stem cell transplant using his own blood stem cells.[9]

Bone Cancer

Carol Franz has survived two bouts of multiple myeloma -- a cancer of the bone marrow -- because of adult stem cell transplants. In 2003, when Franz first was diagnosed with the disease, the only way to keep the cancer from destroying her bone structure was to undertake five months of aggressive chemotherapy.

Following this, Franz had some of her blood removed, and her adult stem cells were isolated. Next Franz was given additional chemotherapy treatment. Then her adult stem cells were transplanted back to her withered bones, which regenerated.

Three years later Franz was again diagnosed with multiple myeloma, and again was treated with her adult stem cells. To this day she is healthy and cancer free.[10]

Nerve Regeneration

Dr. Paul Kingham of the United Kingdom Centre for Tissue Regeneration in Manchester and his team announced in October that they were able to transform isolated adult stem cells from human fat tissue into nerve cells. They expect to isolate more such stem cells and use them to create artificial nerves. According to Dr. Kingham, "The differentiated stem cells have great potential for future clinical use, initially for treatment of patients with traumatic injuries of nerves in the arms and the legs."[11]

Liver Cancer

Scientists at the University of Dusseldorf have successfully taken bone marrow stem cells from liver cancer patients and used them to regrow liver cells in their patients. Two years after the procedure, six of the eight patients have healthy livers.[12]

Neurological Disease

At the University of California, Irvine, scientists used adult stem cells in restoring the memory of mice. Lead researcher, Mathew Blurton-Jones, said of the finding, "This is one of the first reports that you can take a stem cell transplantation approach and restore memory ... There is a lot of awareness that stem cells might be useful in treating diseases that cause loss of motor function, but this study shows that they might benefit memory in stroke or traumatic brain injury, and potentially, Alzheimer's disease."[13]

---

[1] For a comprehensive survey of adult stem cell research successes prior to 2007, please see Family Research Council's Insight paper "Adult Stem Cell Success Stories - 2006." Available at: http://www.frc.org/get.cfm?i=IS06H01

[2] See clinicaltrials.gov; searching with the term "stem cell". For discussion of stem cell search terms, see the online supplementary information for Prentice, D. A. and Tarne, G., "Adult versus Embryonic Stem Cells: Treatments," Science 316 (June 8, 2007): 1422-1423. Available at: http://stemcellresearch.org/facts/scienceletter.htm, or http://www.sciencemag.org/cgi/data/316/5830/1422b/DC1/2

[3] For the most recent list, see http://stemcellresearch.org/facts/treatments.htm and the peer-reviewed reference list at that site.

[4] In this procedure, one's own body cells are directly re-programmed to an embryonic-like stem cell state. Since this kind of embryonic stem cell, or iPS cell, was not derived through the destruction of a living embryo, their retrieval for research does not pose an ethical problem. Takahashi K., et al., "Induction of Pluripotent Stem Cells from Adult Human Fibroblasts by Defined Factors," Cell 131 (November 30, 2007): 861-872, published online November 20, 2007; Yu, J., et al., "Induced Pluripotent Stem Cell Lines Derived from Human Somatic Cells," Science published online November 20, 2007; Nakagawa, M., et al., "Generation of Induced Pluripotent Stem Cells without Myc from Mouse and Human Fibroblasts," Nature Biotechnology, published online November 30, 2007.

[5] The iPS cells, being an "embryonic-type" stem cell, have the same propensity to multiply out of control and produce tumors as do embryonic stem cells taken from embryos.

[6] Kevin Graman, "Lending Heartfelt Support: Stem Cell Recipient Spreads Message," The Spokesman-Review (June 19, 2007). Available at: http://www.spokesmanreview.com/local/story.asp?ID=195513

[7] Rob Waters, "Stem Cells Spotlighted in Baxter Heart Study: Treatment Believed to Reverse Heart Failure," Bloomberg News (July 16, 2007). Available at: http://www.chicagotribune.com/business/chi-mon_baxterjul16,1,1153370.story

[8] Brehm, M. and Strauer, B. E., "Reversal of Therapy-resistant Cardiogenic Shock after Intracoronary Transplantation of Adult Autologous Bone Marrow-derived Stem Cells," Dtsch Med Wochenschr 132 (September 2007):1944-1948,

[9] Voltarelli, J. C., et al., "Autologous Nonmyeloablative Hematopoietic Stem Cell Transplantation in Newly Diagnosed Type 1 Diabetes Mellitus," Journal of the American Medical Association 297 (April 11, 2007):1568-1576.

[10] See carolfranz.com; J. Mehta and S. Singhal, "High-dose Chemotherapy and Autologous Hematopoietic Stem Cell Transplantation in Myeloma Patients under the Age of 65 Years, Bone Marrow Transplant 40, 1101-1114, 2007; A. Aviles, et al., "Biological Modifiers as Cytoreductive Therapy before Stem Cell Transplant in Previously Untreated Patients with Multiple Myeloma," Annals of Oncology 16 (2005): 219-221.

[11] Roger Highfield, "'Bionic' Nerve to Repair Injured Limbs," The Telegraph (October 18, 2007).

[12] Celia Hall, "Stem Cell Treatment Saves Liver Cancer Patients," The Telegraph (March 27, 2007). Furst, G., et al., Portal Vein Embolization and Autologous CD133+ Bone Marrow Stem Cells for Liver Regeneration: Initial Experience," Radiology 243 (April 2007): 171-179, published online Feb 20, 2007.

[13] Steven Reinberg, "Stem Cells Restore Memory in Mice," HealthDay (October 31, 2007). Yamasaki, T. R., et al., "Neural Stem Cells Improve Memory in an Inducible Mouse Model of Neuronal Loss," The Journal of Neuroscience 27 (October 31, 2007): 11925-11933.