



ADULT STEM CELL SUCCESS STORIES – 2006

By Sarah Kleinfeld, William L. Saunders, and David Prentice

The political battles raging in Congress and in state legislatures over whether to destroy human embryos in order to get embryonic stem cells have obscured an important fact. There is one kind of human stem cell research that everyone can and should support – that involving **adult stem cells**. Many scientists feel that adult stem cells, which can be found throughout the human body, even in infants, are the real hope for the future.

James Sherley, associate professor of biological engineering at MIT, notes: “Adult stem cell research is predicted to beat the pants off human therapeutic cloning [and embryonic stem cell] research when it comes to yielding significant advances in cell medicine. And adult stem cells provide better approaches. These cells that naturally function in the regeneration and repair of adult tissues pose no ethical concerns.”¹

As Sherley notes, there are no ethical problems with the use of adult stem cells because such cells can be isolated without the necessity of destroying an embryonic – or any other – human being first. Past doubts about adult stem cells are daily proving to be mistaken. Recent studies show that many types of adult stem cells are pluripotent, meaning they can develop into different tissue

types, and appear to equal the “plasticity” (or, in layman’s terms, versatility) of embryonic stem cells.²

In 2005, researchers at Tufts University successfully isolated a single cell type from bone marrow that can grow into heart muscle, blood vessels, and nerve-like cells. According to Dr. Douglas W. Losordo, one of the main researchers, “embryonic stem cells are going to fade in the rearview mirror of adult stem cells. [Bone marrow] is like a repair kit. Nature provided us with these tools to repair organ damage.”³

Further, adult stem cells do not form tumors as embryonic stem cells sometimes do. Because embryonic stem cells are undifferentiated, or not developed into a specific cell type, they may multiply out of control. Research has also shown that, after growing for extensive amounts of time, embryonic stem cells develop genetic abnormalities. This is the case with all cells, but does

not happen with adult stem cells used in therapies because they are not kept in the lab for long periods of time before being used in patients. ⁴

Perhaps most significant from the clinical perspective is the fact that *embryonic stem cell research has not yet yielded a single successful human treatment.* (Nor, it should be noted, has there been major success in *any animal model* to date.) Embryonic stem cells from mice were first successfully grown in the lab in 1981. In 1998, James Thomson was the first to grow a human embryonic stem cell line.⁵ Since then, many studies have been performed using mouse and human embryonic stem cells in animals, to study diseases such as Parkinson's and diabetes, without any conclusive success.⁶

Adult stem cells, on the other hand, have been improving lives and treating living, breathing human beings suffering from *over seventy* different diseases. (See citations at the end for a complete list as of August 2006.)

It is odd – and regrettable – that these scientific advances using adult stem cell treatments rarely receive the media attention and celebrity hype lavished upon embryonic stem cell research. The major media seems to have accepted uncritically the claims of various scientific entrepreneurs about embryonic stem cell research. Within the scientific community, the situation may be even worse. As Prof. Sherley says, “Many scientists who do not support human embryo research are afraid to speak out because of possible reprisals from powerful scientists who can affect grant success, publication acceptances, tenure, promotion, and employment.”⁷

Alzheimer's disease currently afflicts 4.5 million Americans.⁸ Countless celebrity and media advocates have included Alzheimer's disease in the list of diseases and conditions that they claim would be cured were federal funding of embryonic stem cell research increased. However, according to many expert scientists in the field of Alzheimer's research, if a cure is obtained for Alzheimer's disease, it is unlikely to come from embryonic stem cells.

“I think the chances of doing repairs to Alzheimer's brains by putting in stem cells is small,” said stem cell researcher Michael Shelanski, co-director of the Taub Institute for Research on Alzheimer's Disease and the Aging Brain at Columbia University Medical Center in New York: “I personally think that we're going to get other therapies for Alzheimer's a lot sooner.”⁹ Since Alzheimer's affects the entire brain, the best hope is through chemical treatments, not stem cells.

Ronald D.G. McKay, a stem cell researcher at the National Institute of Neurological Disorders and Stroke, explained the hype about embryonic stem cells: “People need a fairy tale ... Maybe that's unfair, but they need a story line that's relatively simple to understand.”¹⁰

The sad thing is that people do not need to be fooled; the 'story-line' about stem cell research *is* simple and easy to understand. That story is this – **adult stem cell research offers the best – and only proven – treatments for a whole host of human ailments and frailties.** A society truly compassionate for the human beings who are – today – alive and suffering would support adult stem cell research and abandon the will' o' th' wisp of embryonic stem cell research. Research funds do not fall from the skies; they come from taxpayers, and the responsible use of taxpayer funds is to spend them on proven avenues of research.

Adult stem cell treatments are no fairy tale. They are real, and they are helping people even as you read this article. There are currently over 1100 FDA approved clinical trails going on in the United States using adult stem cells. There are none for embryonic stem cells.¹¹ The following are a few of the success stories of people who have been helped by adult stem cell therapies. We invite you to read these stories and judge for yourself whether adult stem cell research is not only the *ethical*, but also the *smart* and *compassionate*, path forward.

Heart Tissue Regeneration

Jeannine Lewis was diagnosed with cardiomyopathy in 1993. After the birth of her son Nathan in 2003, Jeannine's condition worsened. She contacted TheraVita, a company offering alternative therapies based on the patient's own adult stem cells. Two months after returning from Bangkok, Thailand, where she was injected with her own adult stem cells, Lewis reported, "I have personally experienced the healing effect of adult stem cells"¹²

Bob Grinstead, 70, from Atlanta, GA, had open heart surgery in 1990 and 2003. When his condition worsened, he was informed that a third surgery was out of the question. Refusing to give up hope, Grinstead turned to a revolutionary adult stem cell therapy he found on the internet – and it worked. "I can go for a 30-minute walk," he says. "I've taken trips to Antigua and Florida. I feel like living life again." Because this adult-stem-cell-surgery is not available in the U.S, Grinstead and his wife Barbara were forced to travel to Bangkok, Thailand for the procedure which cost over \$30,000.¹³

David Foege found himself in a similar situation following massive heart failure and was told by his doctors that he would soon need hospice care. Like Grinstead, he sought out alternative therapies and traveled to Thailand to be treated with his own adult stem cells. After only 88 days, Foege reported a 50 percent increase in heart function.¹⁴

TheraVita, a Thai/Israeli company founded by an American entrepreneur and an Israeli researcher, has had remarkable success treating patients like Lewis, Grinstead, and Foege, who suffer from **coronary artery disease, cardiomyopathy, or congestive heart failure.** Using techniques created in part by

Dr. Amit Patel of the University of Pittsburgh Medical Center, adult stem cells found in the patient's blood called Angiogenic Cell Precursors (ACPs) are injected into the heart and used to generate new blood vessels and heart muscle. The result is a decrease in physical pain (angina pectoris) and a greater capacity for physical activity.¹⁵ "The patient is effectively treating himself with his own blood, so there is very little danger of rejection," said Dr. Valentin Fulga, one of the founders of TheraVita. "It's the safest kind of stem cell you can get."¹⁶ Over sixty patients have been treated, including renowned Hawaiian singer **Don Ho**.¹⁷

Dr. Patel has successfully begun limited clinical studies in the U.S. that have shown "autologous stem cell transplantation [i.e., those that come from the patients own body] led to significant improvement in cardiac function in patients."¹⁸ Similar research is also being performed at several other institutions in the United States and early results have been extremely promising. In 2006, researchers noted improvement in patients suffering from chronic heart failure after they received a protein injection that sent adult stem cells from the bloodstream to the heart.¹⁹ In 2005, doctors in Germany were able to repair eight-and-a-half-year-old tissue damage in a patient's heart after injecting the patient with his own adult stem cells.²⁰

Spinal Cord Injuries

Adult stem cells have been used successfully in the treatment of spinal cord injuries. Dr. Carlos Lima, a neuropathologist with Lisbon's Egaz Moniz Hospital, helps paralyzed patients regain sensation and feeling by transferring the patient's nasal tissue containing adult stem cells to the site of the spinal cord injury. The nasal tissue contains three types of adult stem cells: renewable neurons, progenitor stem cells, and remyelinating olfactory ensheathing cells. Once these cells are introduced to the injured area, it is believed that they promote the growth of nerve cells and spinal cord pathways. Dr. Lima has performed over 80 successful surgeries and recently published his findings in the peer-reviewed *Journal of Spinal Cord Medicine*.²¹

Jacki Rabon, 18, is one such patient. She was injured in a car accident in 2003 and was told by her doctors that she would never walk again. Rabon's family heard about Dr. Lima's success in Portugal after their pastor saw a PBS special on the olfactory mucosa transplant. The Rabons turned to their community of Waverly, Illinois, which helped them raise the necessary \$47,000. In October 2005, Rabon and her mother traveled to Portugal. Since the procedure, Rabon reports increased sensation and feeling. She is hopeful that intense rehabilitation will help her get the maximum benefit out of her surgery. "I'm still really against abortion, so I'm not for embryonic stem cell therapy. But anything else that doesn't involve killing a baby is great," Rabon said. "I think they should do [olfactory transplantation] in the States because it's just from my own body."²²

Laura Dominguez, an earlier patient of Dr. Lima's, also reported significant improvement since her olfactory mucosa transplant in 2003. "The way I see it," said Dominguez, "scientists have been given the knowledge and tools to develop and make use of adult stem cells, whether they are derived from tissue removed from the olfactory mucosa or otherwise. This knowledge should be taken full advantage of to help people overcome injuries that can be helped by stem cells or people that suffer from some terminal or debilitating diseases. At the very least, some people can benefit from the possibility of a better quality of life."²³

Corneal Reconstruction

Stevens-Johnson Syndrome is a rare disease often caused by reactions to medications. In very extreme cases it can lead to blindness.²⁴ A 2006 study published in *American Journal of Ophthalmology* showed that in 12 Stevens-Johnson Syndrome patients treated with their own stem cells, the procedure was effective and provided increased visual acuity for a majority of the patients.²⁵

Another effective treatment using stem cells is **limbal (eye) stem cell transplants**. Limbal stem cell deficiency results when limbal stem cells are lost from the cornea due to disease or chemical accidents. A 2005 study performed in Great Britain showed that of ten eyes treated with limbal stem cells, seven showed extremely successful results. The study also showed that after a period of nine months there was no longer any DNA present from the donor stem cells. This has exciting implications because it means that immunosuppressant drugs would be required for only a short time. According to Dr. Sheraz Daya, one of the main researchers, "The technique not only works, but there was no donor tissue there. That is what really blew our minds. The cells appeared to have been shed from the eye and replaced by the patient's own, much more hardy, cells." **Edward Bailey**, 65, who participated in the study, said, "I couldn't believe it. For ten years all I had seen was shades of black and grey. Then after I had the operation, the nurse came by and I saw a flash of blue from her uniform. I went home, and when I took the patch off my eye, I had my vision back. It is only when you lose something like sight that you realize how precious it is."²⁶

Other limbal stem cell transplant successes in the United States include **Michael May, Jon Newton, and Shawn Smith**. All three men had successful adult stem cell surgeries and regained their vision within two years of the procedure.²⁷

Aniridia is a rare genetic disease that can result in loss of vision. A similar limbal stem cell transplantation procedure was done in a 2003 study of thirty-seven eyes. A majority showed improvement in visual acuity.²⁸

Autoimmune Disease: Multiple Sclerosis, Diabetes, Crohn's, and Lupus

Multiple Sclerosis (MS) is an autoimmune disease where nerves are damaged and can no longer conduct information to and from the brain. Symptoms of MS are varied but can include fatigue, difficulty walking/ maintaining balance, dizziness, and pain. Some, but not all patients, may find themselves confined to wheelchairs as the disease progresses.²⁹

Mark Pickup, founder of Human Life Matters, who suffers from Multiple Sclerosis notes, "I could not morally accept embryonic stem-cell therapies to deliver me from MS—a disease that's slowly destroying me."³⁰ The good news is that no one need be tempted to kill embryos to help Pickup and others suffering like him: adult stem cell therapy offers great hope.

For instance, **Donna Orr**, a patient suffering from MS, who was treated with adult stem cells in 1997, no longer needs the walker she once used to move around her home.³¹

Susan Stross is another patient whose MS has been treated with adult stem cells. In 1999, Stross received an adult stem cell transplant. Although her condition did not drastically improve, the transplant halted the downward depression that MS was causing her body. "I still have MS. I understand that perfectly well," says Stross. "What's changed is that my hope is back. Life has become OK."³²

A 2005 study performed in Italy showed that injection with adult stem cells in three patients suffering from malignant Multiple Sclerosis gave significant improvement in their condition.³³ A 2003 study in Greece that was published in the *Journal of Clinical Immunology* showed that eighteen out of twenty-three patients with progressive multiple sclerosis "improved or stabilized." The researchers claimed that the results of their protocol "appear better than those achieved by any other treatment of progressive multiple sclerosis."³⁴

Edjuana Ross describes her life while suffering from **lupus as** consisting of "extreme joint pain and [being] every single day, sick and tired." Her life changed when she was given an adult stem cell transplant that fixed her immune system and effectively cured her of her disease.³⁵ Half of the patients that participated in the same clinical study as Ross reported similar success.³⁶

Adult cells have also been used to successfully treat **diabetes** patients. In 2005, a mother donated her islet cells (clusters of insulin-producing cells) to her daughter who had been suffering from diabetes.³⁷ A similar procedure was done in 2001 on 12 juvenile diabetes patients using cadaveric islet cells.³⁸

There has also been success using animal models to treat diabetes. In 2003, researchers reported that they successfully used a chemical treatment and spleen cells to regenerate pancreatic islet cells. This resulted in "permanent disease reversal."³⁹ Dr. Denise Faustman, one of the researchers involved in this study, began preparations for an FDA-approved human clinical trial in June 2006.⁴⁰

Researchers in the United Kingdom have been able to create cells that produce insulin for diabetes patients from adult stem cells found in umbilical cord blood. Their work was reported in the *Sunday Times* and will be presented at the Augustinian Institute in Rome in September 2006.⁴¹

Several studies have been published showing the positive effects of adult stem cell transplants in treating **Crohn's disease**.⁴² Osiris Therapeutics has been developing a similar adult stem cell therapy that could treat not only Crohn's disease, but also **graft-vs.-host disease**, which affects many organ transplant beneficiaries.⁴³ They have also been working on adult stem therapies for **arthritis**.

Osiris Therapeutics is one of the many companies that have been aggressively pursuing adult stem cell research.⁴⁴ They currently have three stem cell based therapies in five clinical trials. According to the *Baltimore Sun*, "Osiris is thought to be the closest in the country to bringing a pure stem cell product to market—years ahead of its embryonic counterparts. Already, it's selling a therapy made from donor bone that contains stem cells."⁴⁵

Parkinson's disease

Parkinson's disease is a neurodegenerative disorder, the second-most common disease of this type, after Alzheimer's disease. It is caused when nerve cells responsible for the production of dopamine die or become impaired. It is characterized by four common symptoms: rest tremor of a limb, slowness of movement, rigidity, and poor balance.⁴⁶

Adult stem cells have already been used to provide successful and effective treatment for Parkinson's disease. In 1999, **Dennis Turner** was successfully treated with his own adult neural stem cells by Dr. Michael Levesque, M.D. At the Annual Meeting of the American Association of Neurological Surgeons in 2002, Dr. Levesque described how Turner's symptoms were reduced by more than 80 percent.⁴⁷ According to Turner, "Soon after having the cells injected, my Parkinson's symptoms began to improve. My trembling grew less and less until to all appearances it was gone, only slightly reappearing if I became upset. Dr. Levesque had me tested by a neurologist, who said he wouldn't have known I had Parkinson's if he had met me on the street. I was once again able to use my right hand and arm normally, enjoying activities that I given up hope of ever doing."⁴⁸ Because of the treatment he received, Turner was able to travel to Africa to go on a safari and photograph wild animals in their native environments.

Patricia Payne, a mother of five, has suffered from Parkinson's disease for over 15 years and plans to begin treatment soon with adult stem cells. She testified before the Massachusetts State Legislature in 2005: "I don't want to see cures, even a cure for my terrible disease, to be obtained by destroying a fellow

human being at the earliest and most vulnerable stage of their existence. To kill one human being for the benefit of another is never morally justifiable." She added, "To kill the weak in order to benefit the strong is even more objectionable."⁴⁹

A 2005 study published in the *Journal of Neurosurgery* described how University of Kentucky scientists were able to successfully treat ten patients suffering from Parkinson's disease, observing noticeable improvement in balance and motor function. The treatment involved stimulation of the patient's own brain stem cells.⁵⁰ An earlier 2003 study in Great Britain noted an average of 61 percent improvement in five patients after their adult neural stem cells were stimulated with a similar protein injection.⁵¹

Anemias, Cancers, and Other Diseases

Bone marrow transplants, perhaps the most well-known of all adult stem cell therapies, have been successfully used for treating patients *since 1968*, when the first one was performed at the University of Minnesota for a child suffering from severe combined immunodeficiency disorder. This also marked the first successful adult stem cell treatment.⁵²

Another related treatment, umbilical cord blood transplants, has had success with patients suffering from many diseases, including **cerebral palsy**, **anoxic brain damage**, and **acute myeloid leukemia**, to name a few.

When **Abby Pell** was born in 2004, she was diagnosed by doctors with **anoxic brain injury** caused by a lack of oxygen to her brain during delivery. Her mother was told that there were no effective treatments available. She decided to seek treatment using her daughter's umbilical cord blood which she had had stored with the Cord Blood Registry.⁵³ Doctors at Duke University performed the first transplant when Abby was only four months old. Abby's mother reports after three infusions, "According to her physical therapist, Abby has made huge strides in the past year, playing with toys appropriately and extending her arms to touch things. She is learning balance. She is blowing raspberries, which is an indication that Abby is gaining oral motor control, which is imperative for speech. She is taking the physical journey toward walking."⁵⁴

A similar procedure, also performed at Duke University, was done on **Ryan Schneider**, who was diagnosed with **cerebral palsy** when he was two years old. His mother had his cord blood stored when he was born, and this was used in a transplant. One year later, Schneider's symptoms have virtually disappeared.⁵⁵

Nathan Salley was diagnosed with **acute myeloid leukemia** at the age of eleven in 1997. In 1999, he was one of seven children to receive a cord blood transplant. Testifying before a Congressional committee in 2001, Salley proudly declared, "I am living proof that there are promising and useful alternatives to

embryonic stem cell research and that embryos do not need to be killed to achieve medical breakthroughs."⁵⁶

Stephen Sprague, 57, another cord blood transplant recipient and leukemia survivor says, "The concern I have ... is that the patient community has received a lot of promises about the 'other' stem cells. There is a frenzy out there about all the 'cures' that embryonic stem cells are going to give them 'tomorrow.' And we all know that that's not the case. I would hope that ... with good reason and good judgment, you'll see more and more advances in adult stem-cell technology – and time and effort and resources won't be diverted for chasing the other cures, while you have ones that are working."⁵⁷

Researchers from the United Kingdom in conjunction with the University of Texas Medical Branch at Galveston have isolated the adult stem cells found in umbilical cord blood to create cells that have the same flexibility as embryonic stem cells. They offer an ethical alternative to the use of embryonic stem cells derived from the destruction of human embryos.

"Acquiring stem cells from embryos has major limitations because it is difficult to obtain enough cells to transplant as well as getting the right tissue type for the patient," said Dr. Colin McGuckin, of Kingston University, Surrey, U.K. one of the main researchers. "Using cord blood gets over that obstacle because we can produce more stem cells and, with a global birth rate of 100 million babies a year, there is a better chance of getting the right tissue type for the many patients out there waiting for stem cell therapy. There is also far less likelihood of such cells being rejected when they are transplanted into people with liver disease, for example."⁵⁸

There have also been documented cases of patients suffering from **sickle cell anemia** being successfully treated with cord blood transplants, beginning with **Keone Penn** in 1998. Adult stem cells from donated cord blood successfully replenished Keone's blood with healthy cells. Today Keone has been pronounced cured of his disease. "I love stem cells," he says. "I mean they saved my life. If it weren't for them...I probably wouldn't be here today."⁵⁹

Female patients suffering from **stress urinary incontinence** were successfully treated with their muscle-derived adult stem cells in a study that was presented at the 2006 American Urological Association meeting.⁶⁰

Among the myriad of other diseases and conditions that have been helped with adult stem cells are **surface wounds, bone damage, stroke damage, liver disease, and breast cancer**.⁶¹

Conclusion

The stories you have read are just a few of the many examples of the success of adult stem cells in treating over 70 different diseases and injuries. Unlike embryonic stem cells, *which have not been used in a single human clinical trial*, adult

stem cells have already shown major accomplishment in the treatment of human beings. It is critically important that this research be promoted and continued.

"We don't have to go down long paths that will probably not lead to any cures simply for the sake of leaving no stone unturned," says **James Kelly**, who was paralyzed below the shoulder due to a car accident in 1997 and who is an activist for patients with spinal cord injuries. "What we have to do is use our limited resources efficiently. Money spent on embryonic-stem-cell research and human cloning is money that cannot be spent on [investigating] adult stem cells. And that means that the cures that I believe are available will be slower in reaching the patients that need them."⁶²

It is our hope that policy-makers will heed his counsel. The only practical hope for patients suffering today is through *adult – not embryonic – stem* cell therapies.

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For a complete list of journal references for the over 70 different conditions treated with adult stem cells, go to: http://www.frc.org/get.cfm?c=CENTER_LIFE

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