Findings

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The Alternative to Embryos

Successes of Non-Embryonic Stem Cell Treatments

By Dr. David Prentice and Bradley Richard Hughes Jr.

With increasing frequency, American citizens and others from around the globe are experiencing newfound freedom from disease, affliction, and infirmity. Individuals' lives are forever changed with the strengthened faith and renewed hope that arise from healed bodies and physical restoration. These seemingly miraculous cures are the result of adult stem cell treatments. Yet the debates in the popular media tend to ignore and obscure the medical breakthroughs made by adult stem cell research—success that has conspicuously eluded embryonic stem cell treatments.[1]

Adult stem cells (or, more accurately, tissue stem cells) are regenerative cells of the human body that possess the ability to specialize and develop into other tissues of the body. Beginning in an unspecialized and undeveloped state, they can be coaxed to become heart tissue, neural matter, skin cells, and a host of other tissues. They are found in our own organs and tissues such as fat, bone marrow, umbilical cord blood, placentas, neuronal sources, and olfactory tissue, which resides in the upper nasal cavity.[2] This simple fact has remarkable implications for medicine—diseased or damaged tissue can become healthy and robust through the infusion of such cells. This has consequently commanded the attention of many researchers as well as those suffering from disease.

It is necessary to note that the power of adult stem cells is not nebulously potential, but tangible and real, as it has produced wonderful results in multiple cases. These have been documented in clinical trials, that is, treatments with human patients. With adult stem cells, physicians have successfully treated autoimmune diseases such as lupus, multiple sclerosis, Crohn's disease, and rheumatoid arthritis.[3] Furthermore, adult stem cells have helped to avert corneal degeneration and to restore vision in cases of blindness.[4] They have also restored proper cardiac function to heart attack sufferers[5] and improved movement in spinal cord injury patients.[6]

The debates in the popular media tend to ignore and obscure the medical breakthroughs made by adult stem cell research—success that has conspicuously eluded embryonic stem cell treatments.

It is also important to note that all of these successes have come exclusively from adult stem cell and umbilical cord research. Embryonic stem cell research, which requires the destruction of early human life to acquire the cells, has not produced any successes in human patients.[7] The breakthroughs demonstrated by adult stem cells and umbilical cords are detailed below.

Spinal Cord Injuries

Spinal cord injuries are one of the most severe forms of debilitation known to humanity. Many times they result in different forms of paralysis, including paraplegia and quadriplegia; other times they involve the immediate or imminent death of the patient. Laura Dominguez is an example of the former. Living in San Antonio, Texas, she was a sixteen-year-old girl attending summer school in 2001. On her way back from class, she and her brother encountered an oil spill on the highway that caused their car to careen out of control. The accident left her paralyzed from the neck down with a C6 vertebrae fracture. She subsequently entered various hospitals to be emphatically informed that she would never walk again.[8]

After relocating to San Diego, California, Dominguez and her mother checked into a protracted physical therapy program. While there, they consulted with many spinal cord injury specialists and concluded that the most promising option existed in Portugal, where a cutting-edge procedure was being performed.

This procedure, known as olfactory mucosa transplantation, involves transplantation of stem cells found in the nasal region into the injured area (these cells include renewable neurons, remyelinating olfactory ensheathing cells, and progenitor stem cells). Dr. Carlos Lima, a neuropathologist of Egaz-Moniz Hospital in Lisbon, leads the procedure. Lima's procedure has proven successful in 26 patients, states Dr. Jean D. Peduzzi-Nelson, a co-researcher at the University of Alabama in Birmingham. [9] Dominguez was the tenth person in the world and the second American to undergo the surgery.

Following her surgery, she returned to the United States and continued the therapeutic process and resumed home life in San Antonio. After an MRI was conducted, physicians informed her that her spinal cord had begun healing and that 70 percent of the lesion had recovered into normal spinal tissue. Within six months she had acquired sensation down to the abdominal region. By 2004, she had gained upper body agility and the ability to stand for extended periods of time with the aid of a walker. In addition, she reported

improved motor skills, including the ability to stand on her toes and contract her quadriceps and hamstring muscles. She also announced that she had walked more than 1400 feet with the use of braces and outside help. Laura is inspired by the results and hopes to walk unassisted by the time she turns 21.[10]

Susan Fajt of Austin, Texas, experienced a similar spinal cord injury in a car accident in 2001. The wreck left her lower body paralyzed. After researching available treatments and opportunities, she discovered the adult stem cell procedure being conducted by Lima's team. She went to Lisbon to acquire the treatment in June 2003. As with Laura Dominguez, the stem cells were extracted from her own body's sinus region and transplanted into the spinal injury site. By 2004, she was able to walk with the aid of braces.[11]

Heart Tissue Regeneration

Recent years have seen the emergence of successful adult stem cell treatment for those who have suffered from heart attacks and heart failure. Dr. Andreas M. Zeiher, the chairman of the department of internal medicine at the University of Frankfurt, and Dr. Stefanie Dimmeler, head of the division of molecular cardiology at the same institution, conducted a study of 28 heart attack patients in 2003.[12]

The subjects received a transplantation of their own blood and hematopoietic (blood-forming) stem cells into their heart arteries an average of 4.7 days after their respective heart attacks. Two of the patients experienced difficulties arising from personal arterial conditions. The remaining 26 demonstrated higher levels of heart-pumping capability.

The researchers reported that the heart's ability to pump blood increased from 44.1 percent to 48.9 percent. The report also indicated the average amount of dead tissue for the subjects decreased by 20 percent within four months of the stem cell implantation.

In a French study, doctors found that skeletal muscle stem cells taken from a patient suffering from heart disease and implanted back into his heart successfully treated the condition. This was the first adult stem cell treatment that successfully treated cardiac degeneration.[13]

Another study investigating 14 patients in Brazil showed that there was notable improvement in their heart capacities after implantation of their own stem cells. Scientists stated that oxygen capacity increased from 17 percent to 24 percent.[14]

The capability of adult stem cells to regenerate a damaged and malfunctioning heart was clearly seen in the case of Dmitri Bonnville. A 16-year-old from Almont, Michigan, he was accidentally shot in the chest by a nail gun while conducting house work on February 1, 2003. The injury was exacerbated by cardiac arrest a few days later.

His family examined the available effective treatment options. Physicians informed the parents of the possibility of a heart transplant or the use of extended medication while noting the risks and failures of such procedures. The doctors also notified the parents of a procedure that involved stem cell extraction from Bonnville's own body and subsequent transplantation into his heart. Predicting success, they determined to go forward with the surgery under the direction of Dr. Cindy Grines, Dr. William O'Neill and Dr. Steven Timmis at Beaumont Hospital in Royal Oak, Michigan. The treatment had never been conducted on a human patient in the United States prior to this occasion. Within a week of the February 21 surgery, Bonnville's heart pumping capacity had increased from its previous 25 percent to 35 percent.[15]

Corneal Reconstruction

Another area in which adult stem cell therapy is demonstrating rapid advancement is the field of ophthalmology. A surgical procedure known as limbal stem cell transplantation offers hope to those suffering from corneal degeneration, blindness, and other ocular diseases. The procedure involves the extraction of stem cells from the limbus, the region of the eye between the epithelial layer of the cornea and the sclera, the eye's outer layer. The cells are typically extracted from a healthy eye of the patient himself, from a family member, or from cadaveric material. Once extracted, the limbal stem cells are implanted into the patient's defective eye. The stem cells then differentiate into corneal epithelial cells which improve the health of the outermost layer of the eye.[16]

Michael May, a business owner in Davis, California, was exposed to a chemical explosion as a child, losing his left eye and becoming blind in his right. Forty-three years later, he regained his sight in the right eye after a limbal stem cell transplant complemented by a corneal transplant. Five months following the operation, May had reacquired limited vision and within two years had recovered his sight.[17]

Other researchers in the United States and Taiwan have shown that corneal adult stem cells can be successfully extracted and transplanted into diseased eyes. Of the twenty patients studied, sixteen had experienced increased levels of vision.[18]

Autoimmune Disease Treatment

Adult cell treatment has also shown significant results in the treatment of various autoimmune disorders. Individuals have experienced remarkable successes with adult stem cell therapy. A girl found that she had systemic lupus erythematosus, a highly detrimental kind of lupus in which organs of the body lose proper functioning. She had experienced pneumonia, lung weakness, and blood deficiency, among other ailments. At eighteen, she underwent a transplantation of blood stem cells. Fifteen months after the operation, she had attained complete and vibrant health, free of the disease's effects.[19]

In another clinical study, nineteen patients suffering from various autoimmune disorders such as refractory polychondritis and systemic lupus erythematosus were treated with their own stem cells. After the procedure, ninety percent had improved or experienced disease remission.[20]

Another example of the success of adult stem cell utilization is found in the treatment of Crohn's disease. The disorder is characterized by an immune system that attacks the sufferer's digestive system. One patient, a 22-year-old female who had suffered from Crohn's disease for more than ten years, was treated with her own blood stem cells. Within three months of the operation, her health had dramatically improved, she could eat comfortably, and her acute abdominal discomfort was no longer present.[21]

One report on patients shows that adult stem cell treatment holds promise for combating multiple sclerosis (MS).[22] David Hassenpflug, a Long Beach resident who suffers from MS, has experienced some improvement in health as a result of receiving adult stem cells. He reported that the pain in his legs and hips is gone.[23]

Parkinson's Disease

Parkinson's disease is a disorder of the central nervous system in which the substantia nigra, a part of the brain, ceases to produce dopamine, a chemical that allows for effective motion. Dennis Turner is a man who suffered from the disorder for fourteen years. His condition was characterized by strong shaking on the right side of his body, making arm coordination virtually impossible. He underwent years of medication and watched his condition gradually deteriorate. After consultation with a neurologist, he discovered the op-

tion of adult stem cell therapy and decided to have the procedure done. His own stem cells were extracted from his brain and subsequently transplanted into the left side of his brain in a 1999 procedure.[24]

Turner announced in a July 2004 United States Senate subcommittee hearing that he has since experienced dramatic improvement in daily activity. He stated that he went four years without symptoms of the disease. He also affirmed that he would pursue another treatment involving his own stem cells to further improve his condition. The procedure would involve a second extraction of stem cells from his brain and implantation into the right side. Meanwhile, he explained that his treatment had enabled him to remain active; he has since gone on safaris, photographic excursions to Africa, and swimming sessions in the Atlantic.[25]

In another study, five Parkinson's patients received an injection of a normal protein known as glial cell line-derived neurotrophic factor. The factor stimulates the adult stem cells of the brain. Within a year, the patients demonstrated a 61 percent increase in physical coordination and lessening of symptoms.[26]

Other Diseases

Adult stem cell transplants are also widely used to treat such diseases as anemias, leukemias, lymphomas, and other cancers. Treatable diseases include Fanconi anemia, pure red cell aplasia, juvenile chronic myelogenous leukemia, juvenile myelomonocytic leukemia, immune deficiencies, and some genetic diseases.[27]

Keone Penn is a young man who had sickle cell anemia. He was diagnosed when he was six months old and he suffered from its symptoms until the time he was eleven years old. He experienced extreme joint pain and underwent several blood cell transfusions. After receiving stem cells from umbilical cord blood under the direction of Dr. Andrew Yeager, his body stopped producing the sickle cells. He is now cured of the disease.[28] More than two hundred sickle cell patients have undergone hematopoietic stem cell transplantation with a 80-85 percent success rate.[29]

Leukemia is a cancer of the blood-making tissue in which excessive amounts of abnormal lymphocytes or leukocytes, i.e., white blood cells, are produced. This can result in infections, bleeding and shortness of breath among other things. Savannah Jantsch was four years old when she was diagnosed with leukemia along with another rare blood disorder. She was treated with stem cells obtained from the umbilical cord of a newborn baby. The cells, once transplanted into her body, developed into the bone marrow necessary to produce healthy blood cells. Five years later, she is cured of the cancer and enjoying childhood.[30] Another study regarding leukemia involved 18 patients who also received adult stem cell transplantation. In this study, physicians used cells obtained from umbilical cord blood. After the procedure, 14 of the 18 patients emerged free of disease.[31]

There are many other examples of successful treatments involving adult stem cells. Five patients diagnosed with ovarian carcinoma were treated with donor-derived hematopoietic stem cell transplantation. After treatment, four of the patients had tumor regression of at least fifty percent.[32]

In another study, seventeen patients with advanced multiple myeloma were treated with autologous stem cell transplantation (this is a procedure in which the cells are taken from the patient's own body). Within one and a half years, twelve of them were free of disease advancement.[33]

Another study presents the medical treatment of two patients who were suffering from non-Hodgkin's lymphoma and multiple myeloma, respectively. After allogeneic (donor) stem cell transplantation, both of them are in remission and in great health 17 months later.[34]

A 59-year-old female suffering from a pancreatic tumor received peripheral-blood stem cell transplantation and subsequently experienced a decrease in tumor size of 80 percent.[35]

Stem cells have shown success in treating immune deficiencies as well. As one example, three boys with congenitally impaired immune systems were cured through implantation of cells in Los Angeles. These stem cells were acquired from umbilical cord blood.[36]

An interesting study was conducted on twenty children diagnosed with Hurler's syndrome. The disease attacks and destroys the central nervous system. Stem cells were procured from umbilical cord blood and implanted into their bodies. Seventeen of the 20 survived and showed improvement in nervous system functioning.[37]

Conclusion

The above examples are a strong testament to the amazing power of adult stem cells and umbilical cord stem cells. These "miracle cells" have provided real treatments for real people. They have provided hope for those suffering from spinal cord injuries, Parkinson's disease, multiple sclerosis, diabetes, lupus, Crohn's disease, ocular degeneration, blindness, heart disease, leukemia, non-Hodgkin's lymphoma, aplastic anemia, and sickle cell anemia.

While the potency and success of adult stem cell treatments and umbilical cord stem cells are becoming evident, treatments using embryonic stem cells have not produced any clinical successes. Rather, embryonic stem cell treatments tend to create tumors in numerous animal studies.[38] The public should consider these issues and ask why the media do not cover such results. In a world with limited funds for research, why are we arguing about unproven and often dangerous embryonic stem cell treatments when treatments using adult stem cells and umbilical cord stem cells are today producing real results for real patients?

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