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The Scholl Institute of Bioethics is a nonprofit, Judeo-Christian organization that addresses bioethical issues including euthanasia, physician-assisted-suicide, the withholding or withdrawing of food and water from non-dying patients, brain death, organ transplantation, genetic engineering, and the rights of disabled or mentally ill persons.

Those Amazing Little Stem Cells and What They Can Do

By Germaine Wensley RN

Perhaps you've seen articles about how human stem cell therapy has helped and even cured individuals. Maybe you've wondered what stem cells really are or where they can be found. Stem cells are the very basic cells found in our bodies and a means of repair and healing that is constantly going on within our system. Adult stem cells, also known as blank cells can be found among *differentiated* cells in many organs and tissues. They function in two different ways: divide and replicate themselves while staying "blank" in their place of origin, or go through a process of change or *differentiation* to become various specialized cells in the body.

Human stem cells exist in every living person, embryonic stem cells are derived from pre-born babies, and perinatal stem cells are found in amniotic fluid and umbilical cord blood. This article is not going to cover the use of embryonic stem cells since they are derived from aborted babies or in-vitro fertilization embryos grown for that purpose. Though embryonic stem cell therapy has been highly touted, there is not much basis in fact to call it successful in humans. They are hard to grow and hard to control. More importantly these cells are considered morally unethical to use since they take the life of a human being. Stem cell therapies using adult stem cells, amniotic fluid or umbilical cord blood stem cells have no ethical controversy surrounding their use, so this article will concentrate on some of the amazing cures that have occurred with these stem cells.

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For decades blood stem cells from bone marrow have been used to successfully treat blood cancers such as leukemia, aplastic anemia and lymphoma. Later a very exciting discovery was made that greatly expanded the use of stem cells. First scientists found that stem cells occur in many more tissues and organs of the body than originally believed. In addition, the long-held view that

an adult stem cell was a completely committed cell after *differentiation* occurred was disproved. These were big breakthroughs in researching how to harness and use stem cells for therapy.

Adult stem cell exist in much fewer numbers so scientists learned how to manipulate and coax adult stem cells back into their "blank" state. From

there they could be altered to become any other type of cell in order to rebuild damaged tissue in various parts of the body. The best news is that these cells are often taken from the patient's own body, so when reintroduced back into the patient's body, the body won't reject them. Researchers at Boston Children's Hospital say, "The ultimate goal is for the [adult stem] cells to take up residence in their proper places in the body, divide repeatedly and form functioning tissues—or repair diseased tissue. In some cases, the transplanted cells may become part of the tissue or organ; in others, they may secrete growth factors that stimulate cells already residing there."¹

As early as 2010 CBS News reported on the case of a patient with a broken ankle that wouldn't heal. Dr. Thomas

Einhorn was treating a patient who had multiple surgeries trying to heal the ankle without success. So he decided to seek help from the man's own body. Dr. Einhorn drew bone marrow from the man's pelvic bone with a needle, condensed it to about four teaspoons of rich red liquid, and injected that into the man's ankle. Four months later the ankle was healed. Einhorn, chairman of orthopedic surgery at Boston University Medical Center, credits the "adult" stem cells within the injection for the healing.

The same news story also reported that scientists had restored vision to people whose eyes were damaged from caustic chemicals. Stem cells from each patient's healthy eye were grown and multiplied in the lab and transplanted into the damaged eye, where they grew into healthy corneal tissue.²

David Prentice PhD., an internationally acclaimed expert in cell biology and vice president and research director for the Washington-based Charlotte Lozier Institute, reports that more than 70,000 patients throughout the world are receiving adult stem-cell transplants annually, with an estimated 1 million total patients treated to date. He said many types of adult stem cells could be harvested in relatively painless, outpatient procedures. In his 2016 testimony before Kansas legislators, Prentice stated, "Beyond cancer, adult stem cells are also showing therapeutic promise for other diseases and conditions where there has previously been no available treatment option. The published scientific literature now documents therapeutic success in trials of adult stem cells for patients with dozens of other conditions, including heart damage, stroke, sickle cell anemia, spinal cord injury, multiple sclerosis, and juvenile diabetes."³

The remarkable news of how successful adult stem cell therapy is seems to have finally gotten the attention of some in the U.S. government because federal funding of human non-embryonic stem cell research today is outweighing funding for human embryonic stem cell research.

Following are a few real examples of remarkable cures using adult stem cell therapy as described on the Charlotte Lozier Institute website.

Sonia Coontz suffered a stroke at 31 years of age and lost the ability to use her arms and legs, or to speak normally. Scientists conducted a trial where adult stem cells from a donor were injected directly into areas of the brain near the area of her stroke. Sonia showed substantial physical improvements within hours of the transplant. "All of a sudden my body just woke up," recalls Sonia. She could lift

her arm and move her leg in ways that had been previously impossible. Her speech was stronger and clearer. Rather than being largely confined to a wheelchair, she began to walk on her own.

Barry Brown was told that the majority of arteries on the backside of his heart were blocked, and he needed triple by-pass surgery. At the same time he was offered the chance to be included in an adult stem cell trial call "Prometheus". Working with Dr. Joshua Hare of the Miller School's Interdisciplinary Stem Cell Institute, Barry entered the study, and adult stem cells were harvested from his bone marrow. During his heart surgery, those adult stem cells were injected into his heart. Three years after his transplant, Barry ran a thirteen-mile marathon that even amazed Dr. Hare.

Allison Carr was told she had a very aggressive form of multiple sclerosis with 18 lesions on her spine and another 6 on her brain. She decided she was not going to be passive in her battle with multiple sclerosis, and began researching adult stem cell therapy. She decided that was what she wanted to do. Dr. Richard Burt at Northwestern University in Chicago administered the stem cell transplant, and the results were almost immediate. Alison says she felt better than she ever had. Today with her new life, Allison bikes as much as she can, walks several miles a day in her job at the Salt Lake Airport, and goes horse back riding with her daughters through Utah canyons.⁴

Conditions previously thought to have no cure have been cured. The progress of stem cell research is advancing at an astonishing rate. Who knows what the future may hold? Whatever it is, it looks like non-embryonic stem cell therapy is no doubt here to stay - bringing hope to countless individuals who had lost hope. The possibilities seem endless.

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END NOTES

1. www.stemcell.childrenshospital.org/about-stem-cells/adult-somatic-stem-cells-101/how-do-adult-stem-cells-get-turned-into-treatments/
2. www.cbsnews.com/news/adult-stem-cell-research-leaving-embryos-behind/
3. www.ethicalresearch.net/kansascenter/
4. www.stemcellresearchfacts.org