

The New Way to Save Lives

Cord Blood Banking

Summer

When Christian Williams was diagnosed with a rare form of leukemia, a type of blood cancer, his mom, Kristi Williams, was five months pregnant with her second son, Noah. The doctors advised Kristi to save her umbilical cord blood since cord blood has been proven to be an effective way of curing or treating leukemia. Christian underwent intense chemotherapy, and throughout his procedure, Christian's immune system became so depleted that his parents could hardly leave his side. They had to sit and watch other kids playing outside. "It was really hard. Christian was sick and tired most of the time. I can't explain the pain of watching your child go through this experience," Kristi said. Once Kristi gave birth, the cord blood was immediately drawn and the two boys were tested and a few days later they were shown to be a match. Christian then underwent even more high-dose chemotherapy, and on March 29, 2004, he was injected with stem cells from Noah's cord blood. This process only took about ten minutes. On Easter, the family got the news that Noah's cells were accepted by Christian's body, and were producing healthy new blood cells.

Cord blood is a painless way of getting stem cells. Stem cells are parent cells that are able to develop into blood and immune cells. Cord blood is taken from the umbilical cord, causing no harm to the mother or baby. It is then stored in a tube and shipped off to a cord blood bank chosen prior to the procedure, and housed in a cryopreservation laboratory at a temperature of -120° Celsius in liquid nitrogen.

Once a patient like Christian needs treatment, a donor with similar tissue needs to be found. Siblings are the best choice since they have tissue as closely matched as possible. Tissue needs to be a match because, like a fingerprint, tissue has certain genetic markers found on the white blood cells. These markers called Human Leukocyte Antigens – HLAs – and they are found in pairs, one from the mother and one from the father. The more closely these HLAs are matched, the more likely the cells will be accepted in the transplant.

In the case that the body doesn't accept the transplant, one of two things will happen. In some cases the patient contracts Graft Versus Host Disease (GVHD), a condition that occurs when donor cells attack the patient's body, causing damage to the tissues and organs (luckily, though, there are drugs to help prevent this). The second possible outcome is that the body won't recognize the new cells if the HLAs aren't similar enough to yours. At this point, the immune cells would launch an attack on the new stem cells; this is called "Graft Rejection." In Christian's case his cells "engrafted," simply meaning they were accepted by his body.

There are many diseases that were once considered incurable that doctors are reexamining and seeing in a different light. "Cord blood contains all the normal elements of blood - red blood cells, white blood cells, platelets and plasma. But it is also rich in hematopoietic (blood-forming) stem cells, similar to those found in bone marrow," explains the National Cord Blood Program's website. According to the studies the Program has conducted, cord blood has been shown to treat, and even cure, about nine different kinds of leukemia. About 20 thousand and 80 different illnesses have been treated with cord blood since its potential was first utilized according to a list that the National Cord Blood Program has created. Other than the National Cord Blood Program, there are many other companies looking into the subject of stem cells, such as CYTORI, who are finding stem cells in fat, read more in the side bar entitled A Revolutionary Company to learn more.

"Umbilical cord blood stem cells and adult stem cells in general are curing people of a myriad of terrible conditions and diseases, over 70 diseases in adults as well as in children." Congressman Chris Smith explains. The bill, "the Stem Cell Therapeutic and Research Reauthorization Act of 2010," was reauthorized through the year 2015, "created a new nationwide umbilical cord blood stem cell program designed to collect, derive, type and freeze cord blood units for transplantation into patients to mitigate and even cure serious disease and pursuant to the law, also provided stem cells for research. The new cord blood program was combined in the 2005 law with an expanded bone marrow initiative,"

explained Congressman Smith. This bill authorized over 90 million dollars to be spread throughout 2015 to fund this plan.

Leukemia is a serious illness. It and many other diseases that were once thought incurable, are now through this revolutionary process many people have been cured. ClinImmune Labs Executive Director Brian Freed states. "Cord blood transplants now make up one quarter of all bone marrow transplants in this country, compared to less than 2 percent in 2000. Caucasian patients have a 90 percent chance of finding a well matched cord blood donor, but African-American patients have only a 50 percent chance." A three year grant of \$6.3-million was given to the Cord Blood Bank at the CU School of Medicine's ClinImmune Labs, from the United States Department of Health and Human Services. "The project's ultimate focus is expanding the genetic diversity in the blood bank's cord blood and improving stem cell treatment for specific diseases," wrote Adam Goldstein in the Aurora Sentinel.

In 1988 American Matthew Farrow, at the age of five, received the first successful transplant of umbilical cord blood in France. The blood from his newborn sister was infused after his intensive chemotherapy, like the kind that Christian received. In about 1970, the first ever, public cord blood bank opened called The New York Blood Center. It then supplied the first unrelated cord blood transplant in 1973. With public cord blood banks, you don't need your siblings' cord blood to have a transfusion. When you save your cord blood in a bank, it is open for the public to use. "There has been progress toward achieving the goal of collecting and maintaining a collection of 150,000 ethnically diverse units," however Smith said "more time and funding is necessary to reach that goal."

Allison Bashaw, a speech-language pathologist, has a two-month old baby girl Allison donated her baby's cord blood, and, when asked if she told her family or friends, she recalls that she told one of her co-workers. Allison's co-worker had a sister who was undergoing a stem cell transplant to treat her rapidly progressing multiple sclerosis at the time. Allison recalled, "When I told my co-worker about our plans to donate, she gave me a huge hug and thanked me for doing that so that people like her sister might one day be helped." Allison said that she feels she made the right decision and that it "made [her] feel great to think that something that might otherwise just be a waste product could allow someone like my co-worker's sister a longer & better life." Cord blood had been considered for the longest time to be waste product. It is part of the after birth, it's not what matters. "Hospitals throw millions of [cord blood units] away each year because prior to the law, the infrastructure required to properly collect and store them was not

available,” said Congressman Chris Smith.

Allison Bashaw’s finances played a large role in her and her husband’s decision to not bank privately. It costs approximately \$2,000 initially to privately bank the cord blood plus an annual fee of about \$100 to maintain it, depending on where it is banked. That alone takes this option off the list for many prospective parents. “If banking was less expensive or free, I certainly would have privately banked.” Allison clarified. She went on to explain how her child isn’t at risk for the illnesses the cord blood is able to treat, and also how, hopefully, the future benefits of the process will justify the cost.

There are many people who like Allison, if cord blood banking is a scam, since many children are born healthy and most are not at risk of getting serious diseases. When it costs so much each year to bank cord blood, it puts a strain on families. For Ryan and Jenny Levine, when their daughter Chloe Levine was born everything seemed all right. However, when Chloe was around nine months old, she couldn’t use her right hand or raise it above her head, and when she crawled, she would pull her right leg behind her. She was diagnosed with Cerebral Palsy, a type of brain injury that the doctors think could of could have been caused by a stroke when she was born. Since Chloe’s parents had saved her cord blood when she was born, Chloe was able to undergo stem cell infusion. She is now able to catch a ball and has started speaking. She is also able to run fast. “I’ve never seen anything turn around this fast. I’m a believer,” said Chloe’s physical therapist, Dottie Waldo.

On June 13, 2005 Charles E. Schumer made a public announcement that on Staten Island, in New York, there have been over 1000 people, in the past five years that have blood cancer, which could be cured by umbilical cord blood. Schumer then showed off his plan to facilitate umbilical cord blood donation. There are around 20 public cord blood banks operation in the United States, yet the government doesn’t yet regulate the collection of the cells. The FDA still classifies cord blood transplantation as an experimental therapy yet to be licensed. Cord blood has the ability to save many lives. On Schumer’s website he explains that “At least 175,000 people nationwide over the past five years have been diagnosed with fatal diseases that can be treated by a bone marrow transplant, but many die waiting for a donor match.” Schumer’s website explains.

There is no single registry for cord blood, so with twenty different operating public banks, searching for a matched donor is tedious and time consuming. Roughly 20 thousand Americans with fatal blood diseases have been cured by this procedure; although thousands of

others have died because they were unaware of this option or were simply unable to obtain the benefit.

A Revolutionary Company

A company called CYTORI has been looking into a way to harvest stem cells from adults. Stem cells are not only found in the embryonic state or in the umbilical cord; there are stem cells in adults too. Although these adult cells are already semi-formed since they are designed to really only form blood cells and to maintain and repair tissues. Cell potency is the potential a cell has differentiate into different types of cells. The stem cells in adults are in Multipotency stage, which is where they have the potential to transform into multiple, but a limited number of lineages. This company, CYTORI has created a machine that will take these Multipotency stem cells out of fat. “The use of ADRCs (Adipose-Derived [fat] Stem and Regenerative Cells) is a unique and promising approach and holds key advantages over stem and regenerative cells from other sources.” This process was used to re-grow a boy’s cheek bones in Cincinnati Children’s Hospital Medical Center. This process, if it were to be approved for general use, it could save the lives of many people, such as cancer survivors, and war veterans. Brad Guilkey, was born with Treacher Collins syndrome (TCS). TCS is a disease where parts of the face doesn’t form correctly, the symptoms include down-slanting eyes, notched lower eyelids, underdevelopment or absence of cheekbones and the side wall and floor of the eye socket, lower jaw is often small and slanting, forward fair in the sideburn area, underdeveloped, malformed and/or prominent ears. Brad Guilkey was born with undeveloped cheek bones. Guilkey’s doctor, Jesse Taylor, who is a surgeon and researcher in the hospital’s Division of Plastic Surgery and one of the procedure’s lead physicians lead the procedure of creating cheek bones from fat derived stem cells. Jesse Taylor and his team tested this process for more than two years on laboratory pigs; they were more than ready to attempt it on a person. Guilkey was 14 years old at the time of his surgery. To create the new bones, old bones had to be used; they used bones from a cadaver and shaped it to Guilkey’s face to create a scaffold. They then drilled holes into these scaffold bones, and inserted the stem cells taken from his fat; they wrapped the bones with tissue found naturally around all bones called Periosteum Tissue, they then inserted these bones in his face. The tissue and stem cells helped to bond the bones to Guilkey’s face. The doctors believe that this process, if it were open to the public, may save many lives, although it might be because of Guilkey’s young age that helped the process work so well.

“... It remains one of the best kept secrets in America that umbilical cord blood stem cells and adult stem cells in general are curing people of a myriad of terrible conditions and diseases...” United States Congressman Chris Smith said on September 30, 2010. This may be due to a lack of public awareness, or donations don’t occur as often as they could. If awareness were brought to this subject, more healthy women would be able to donate, increasing the lifesaving potential of this procedure. Since women don’t donate as often as they could, there is limited availability, leaving doctors with less to work with. Right now there are about 50 thousand units of cord blood. As Schumer said- “We have an incredible opportunity to turn medical waste into medical miracles.”

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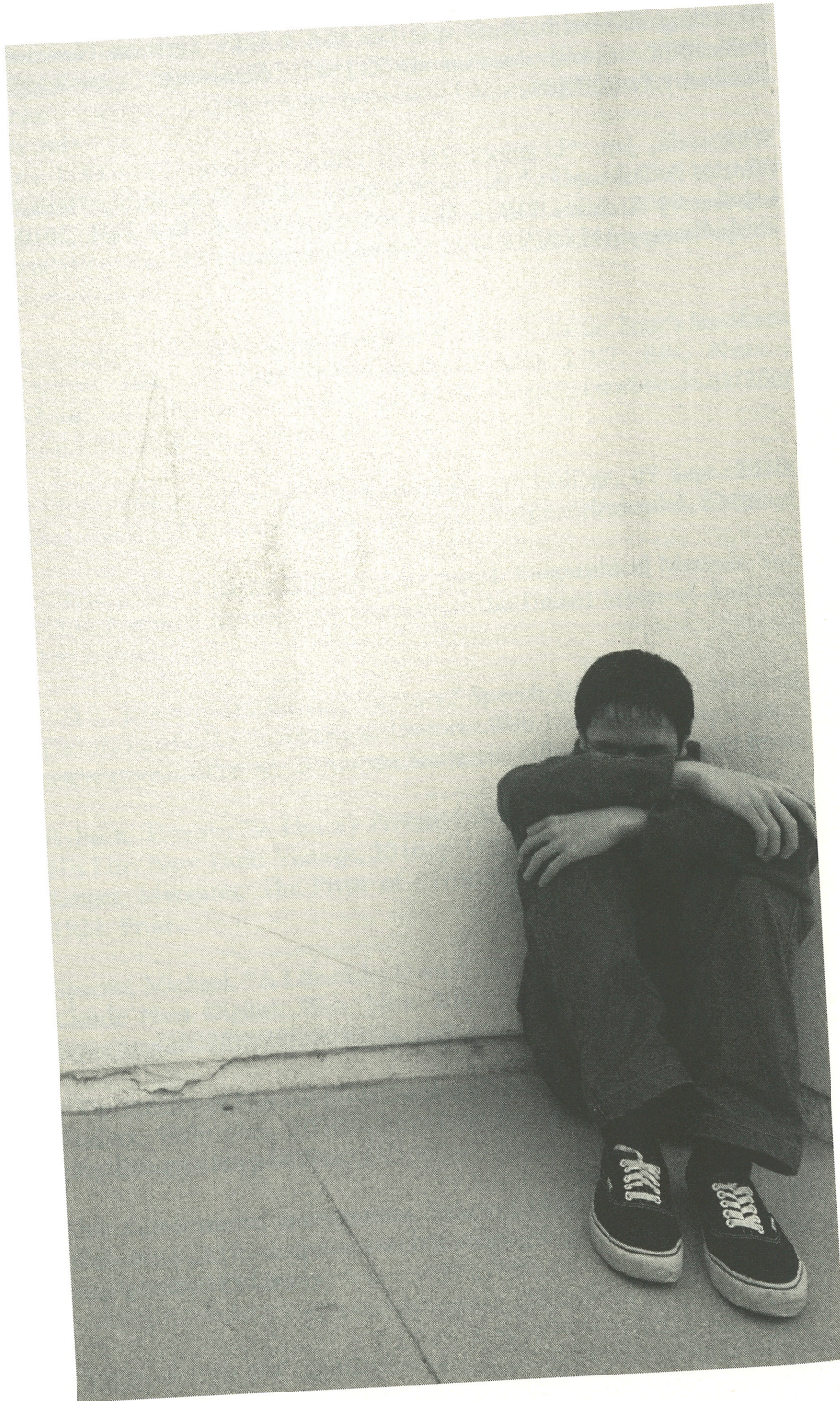
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Prada, Gucci, and Babies

When we design our children, are we designing our future?

Erica

My name is irrelevant I am from a future of unending choice. My parents chose all of my features. I am not unique and not who I should be. My parents artificially selected my traits through genetic engineering combined with in vitro fertilization to ensure the presence or absence of particular genes or characteristics in me. I am not the way nature intended me to be.

Imagine a future where parents go to a doctor's office and fill out a survey of exactly what they want their future child to look like. It is predicted that if we surge forward into the science of genetically

Aryan Nation

One of the uncertainties of designer babies is that it will lead to a superior race. The concept of a superior race has been a fear throughout history. In World War II, the Germans were declared "Aryans, a heroic master race" by Hitler. The Aryans were depicted as blonde, blue eyed, physically strong and Christian. Hitler managed to convince his country that the Jews were at fault for all the problems in their country. He exploited this and told his country a superior race was possible and only through Christianity. If we continue with designer babies not all children will be changed and it will be very gradually spread. If the "designer babies" become conscious of their genetically enhanced superiority; they would not want to breed with people who are still average. This may lead to an eventual segregation and the creation of a separate race.

modifying humans the next step would be children. One letter changing in the genetic code of children can make a substantial difference. This kind of genetic modification is called transfection. With transfection you can remove, replace or add in new genes. Unwanted genes are cut out and new genes spliced in. The product of this would be a transgenic organism. A child, your child, could be referred to as a transgenic organism. There are so many important things that can be changed at a genetic level, not only cosmetic things. IQ level, athleticism, even sexual preference could be altered.

Right now there is a search for the "gay gene." There has always been the question: "is sexual orientation a choice or not?" Many people now believe that "yes you are born that way," and that sexual orientation can be controlled at the genetic level. There is a fear that in the future people would change their child's sexual orientation. Proof for this is partially found in the "twin studies." All identical twins share their DNA and if homosexuality is chromosomal this would present itself in both twins. They have found that 50 percent of twins do share a sexual orientation. The "gay gene" has yet to be discovered, but if it is there will be a hard choice for each parent.

According to "Newsvine" the cost for gender selection is around 19 thousand and gender selection is not really a complicated procedure. One can only imagine how high the cost of genetic modification would be. With prices as high as they would be only a small part of our population would be able to afford a "designer baby." With all the

Modifying Mice

Genetically modifying living organisms has been in the works for a very long time. On September 1, 1999, neurobiologist Joe Tsien found that adding the NR2B gene to a mouse increased its ability to perform tasks and solve puzzles. The mouse retained some of the parts of a young mouse that are believed desirable, through adulthood. This discovery showed that genetic improvement of a species is possible. In the long run this technology could lead to curing disorders or preventing them. The NR2B gene is the blueprint for a protein that aids in controlling synaptic plasticity and memory function.

NR2B was used to enhance the intelligence of mice. After the testing the mice had improved test results and improved their memory. In particular, the NR2B gene could be a target for drug makers, who could try to design medicines that boost its effects. Tsien not only gave mice extra copies of the NR2B gene, he set up the extra copies so that their activity increases as the mice age, counteracting the decline of the natural gene.

possible things you can change at the genetic level the "designer babies" would end up with an advantage in life and eventually lead to a further separation and possibly a superior race.

All of this begs the question: "how could this be legal?" Professor Ronald M. Green, envisions a "nearly disease-free future" through genetic engineering. He asks "Why not improve our genome?" A belief that many people share is that the improvement of the genome is inevitable. On the other hand there are some who are still completely set against it. In January 2009 a study was conducted by researchers at NYU Langone Medical Center. They found that 75 percent of parents would want the choice of trait selection using PGD, or Pre-implantation Genetic Diagnosis, but only in the case of mental retardation. 10 percent of the parents would choose embryos based on better athletic ability, and 12.6 percent would choose for IQ level.

Surprisingly this is not as far off in our future as we think. Presently a doctor in Los Angeles, working for the Fertility Institute, had a major success in the selection of the sex of an embryo "The Fertility Institute" is one of the most successful companies that does gender selection and they are placed all over the world.

The first steps to a world of designer babies have already been taken. Sharla and Shane Miller are two parents that are extremely happy about selecting the sex of their child. They had always wanted a girl but with every child they had a boy. Sharla had given birth to 3 boys and with every child born Sharla found herself more and more disappointed and missing that little girl meant to be in her life. She found the Fertility Institutes while looking for a girl to adopt and immediately went to them.

Dr. Steinberg is the doctor that the Millers were referred to. He offers a technique called PGD or Pre-implantation Genetic Diagnosis. This allows the parents to screen for diseases and choose the gender of their child. It cost the Miller family \$18,480 just to have a girl. This doctor's patients used to be people who were having problems with impregnation and

Economics

The average American's income median is \$50,000 per year. That means only about 10 percent of America's would be able to even afford just gender selection. Such a small percentage of American's would be able to pay for full genetic modification. The separation between middle and high class people is already very distinct and designer babies would only define that distinction.

needed in vitro fertilization but now more that 70 percent of the people come in for gender selection Dr. Mark Hughs, a doctor angered by the concept of designer babies, says he developed the technique for one reason: to screen for disease. He says doctors have no business to change people like that. He is one of the few doctors in the world that can understand the genetic makeup of an embryo and test for over 100 diseases.

The boy you met at the beginning of this article is not real, but he could be and there could be many others like him. Right now the human race is nothing less than sprinting towards this terrifying future.

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