

Stem-Cell Therapy in China Draws Foreign Patients

BY: LOUISA KING



Louisa Lim, NPR

Jena Teague and Terry Williams brought their blind, 7-month-old baby Laylah to China for an experimental stem-cell treatment. Laylah has optic nerve hypoplasia, an incurable condition. Chinese doctors say they see signs her therapy is working.

Other Possible Treatments

Some U.S. experts say there's no evidence that the stem cell therapy being offered in China will work in one of the most common causes of childhood blindness, optic nerve hypoplasia (ONH). Dr. Mark Borchert, head of the vision center at Children's Hospital Los Angeles, weighs in on the debate and possible treatments.

Morning Edition, March 18, 2008 · China is gaining popularity among a new breed of travelers: patients with incurable conditions who are visiting the country to receive experimental stem-cell treatments not offered in the United States.

One company is now claiming a medical breakthrough, advertising that its treatments are restoring vision to blind children. It has ignited a firestorm of controversy in both China and in the U.S.

Giving Parents a New Option

Jena Teague and her husband Terry Williams are among these new visitors. They traveled to China to seek stem-cell treatment for their blind, 7-month-old baby daughter, Laylah. She was born with optic nerve hypoplasia, or ONH — when the optic nerves fail to develop properly in the womb. Conventional medicine offers no treatment and no cure.

But Teague came across a Web site about stem-cell treatments offered by Beike Biotechnology in China and decided to try it — against advice from specialists at home in Georgia.

"None of the specialists had heard of the stem cells, of what they're doing here. They didn't believe it would work. They told me not to expect anything to happen out of it," Teague says.

Nonetheless, the family traveled to the eastern Chinese city of Hangzhou, where Beike is based. They are spending \$23,000 for Laylah to have infusions of stem cells harvested from umbilical cords — not the more controversial embryonic stem cells. In the U.S., cord blood stem cells are used for treating blood diseases, but are not used for treating other conditions, such as Laylah's vision problem.

Treatment Seems to Yield Positive Results

After three sessions, Teague and Williams say the therapy is already working.

The doctors have told Laylah's parents that the baby now sees light through one eye, while the other eye is dilating almost to the point where she can see light.

So far, 10 patients suffering from ONH have received the same stem-cell treatment in China, and doctors there claim that the vision of all 10 improved after the therapy.

At age 5, Rylea Barlett also received the stem-cell treatment. She, too, had been blind before.

Dr. Shalesh Kaushal, an eye specialist at the University of Florida, examined Bartlett, who is now 6, after she returned to the U.S.

"This child had essentially no light perception, and upon returning she's had a gradual improvement — so much so that at our exam it appeared that she had formed vision," he says. "That is to say that she could at least recognize large letters."

Kaushal concluded that the stem-cell therapy was the only clinical explanation for her improvement. Some infants with ONH gain more vision spontaneously over the first few years of life, but Barlett was already too old for that.

Kaushal is now evaluating other patients before and after the stem-cell treatment. But he is not recommending that patients go to China; he says much more research needs to be done.

"It's clearly a provocative result. ... If this is a real, reproducible observation or effect in other patients, one may consider it as a fundamental breakthrough," says Kaushal.

Reasons for Improvements Remain a Mystery

Dr. Sean Hu, the 40-year-old chairman of Beike Biotechnology, is a medical doctor-turned-entrepreneur with a doctorate in biochemistry from a Swedish university.

Less than three years ago, he set up Beike. Since then, 3,000 patients — most of them from China — have received Beike's stem-cell treatments for a wide range of conditions. He says 70 percent have seen improvements, but he admits he can't explain why.

"In the clinical areas, we know there are improvements. We don't know the mechanism behind it," Hu says.

That raises many concerns. Any improvement could be due to the placebo effect — or other factors besides the stem-cell therapy — and may not lead to longer-term functional gains. No rigorous, controlled clinical trials were carried out before the treatment was offered to patients. No research has yet been published in established peer-review journals overseas. And no one knows for sure what the possible risks might be.

But Hu isn't worried by the ethical implications of what he's doing.

"I can say I changed the life of these patients. Now they get their vision back. They went from completely blind, now they can see stuff. You think that's ethical or nonethical?" he asks.

Therapies Criticized as 'Extreme Nonsense'

Beike claims to treat a wide range of conditions with stem-cell therapy — from spinal-cord injuries to epilepsy to cerebral palsy to neurodegenerative disorders. But critics have their doubts.

Bruce Dobkin is director of the neurologic rehabilitation and research program at the University of California, Los Angeles. In response to questions from NPR, he writes in an e-mail that "it is extreme nonsense to think that cells can be incorporated into the complex nervous system and do so much, when we cannot even get cells in mice and rats to do very much."

Chinese scientists are worried, too.

Dr. Naihe Jing is the deputy director of one of China's top stem-cell research labs and a member of the prestigious Chinese Academy of Sciences. He fears Beike could ruin the reputation of China's entire biotech industry.

"We think money is mainly behind this," he says, adding that he is concerned that one company's pursuit of profit will create a bad reputation for the whole country.

Providing Help, Providing Hope

Already, 600 foreigners have come to China and paid about \$20,000 each for the stem-cell therapy, while even more Chinese patients are flocking for treatment.

The venture capital is flooding in, too. Hu, Beike's chairman, says he has raised about \$15 million in funding, although NPR could not verify the claim. He admits making a calculated decision to go into stem-cell research: As he puts it, you have to choose the area with the best return.

"Obviously, [stem-cell research] is the most important area in biotech research in the future, because it's going to create a huge market, even bigger than the whole pharmaceutical industry. Stem-cell and regenerative medicine is the future of medicine," Hu says.

And parents continue to bring their children to Beike in the hopes of finding a cure for their ailments.

The results of Beike's experimental therapy may be uneven and unproven. Yet for patients and their families, hope is, perhaps, the most important commodity on sale in China — even if it costs tens of thousands of dollars.

Childhood Blindness: What Are the Options?

By: Joel Neel

Some U.S. experts say there is no evidence that the stem-cell therapy being offered in China will work in one of the most common causes of childhood blindness, optic-nerve hypoplasia (ONH). We asked Dr. Mark Borchert, head of the vision center at Children's Hospital Los Angeles, to explain more about the disease and possible treatments.

What is ONH?

Optic-nerve hypoplasia is a failure of development of the optic nerves of one or both eyes. It's associated with the failure of development of the connections of the neurons with parts of the brain. ONH is a major cause of congenital blindness in children.

What causes it?

We do not know what causes it. We know that it is almost certainly not genetic.

Is it on the rise?

Most of us in pediatric ophthalmology who see a lot of children with congenital blindness think it's increasing in frequency. We don't have good statistics in the U.S. on the prevalence of vision loss in children. But statistics from Europe, especially the Scandinavian countries, show it is the only cause of visual impairment — congenital

visual impairment — that is actually increasing. All the other causes are decreasing. But we don't have good information for the U.S.

ONH is not just blindness, is it?

Not at all. It's a brain-development problem. Children with optic-nerve hypoplasia have a whole host of systemic and neurological problems. The most obvious are problems in controlling the pituitary gland, which controls most of the hormones in the body, including sex hormones, growth hormone, steroid hormones for your body to deal with stress, thyroid hormone, and anti-diuretic hormone. Of these children with ONH, about 80 percent have abnormal function of their pituitary gland and ultimately need some sort of treatment with replacement hormones.

In addition to that, children with ONH have a lot of developmental problems — learning disabilities, motor disabilities and speech and communication problems. And these often don't become apparent until the child is a little older, sometimes long after the diagnosis of optic-nerve hypoplasia has been made.

Does treating the hormone problems help with vision?

We don't know the answer to that. We're in the process of studying that right now. There's certainly a suggestion that early recognition and treatment of some of the hormone problems leads to better outcomes — in particular, early recognition and treatment of the thyroid-hormone deficiency. However, the children with optic-nerve hypoplasia have thyroid-hormone dysfunction due to a problem with the hypothalamus that controls the pituitary gland. And hypothyroidism due to this is not picked up with the current neonatal-screening procedures.

Consequently, the hypothyroidism in these children is not detected until after the optic-nerve hypoplasia is detected, and that is usually when the child is old enough for the parents and doctors to recognize that there's a vision problem. That's usually at several months of age and is too late to prevent the major effects of hypothyroidism. Presumably, if you could diagnose them earlier with a better neonatal-screening test you could prevent a lot of the cognitive and intelligence problems that afflict these children. We're also doing studies on whether or not early treatment with thyroid hormone or growth hormone impacts their vision development or their cognitive development as well as their growth.

What happens in children who are getting an experimental treatment?

We currently know that regardless of whether or not they are treated, at least 50 percent of children get some improvement up until five years of age. We don't know whether they can improve beyond that.

So it's hard to tell if a treatment is working or if they're just improving naturally?

Absolutely, and that's why a controlled study needs to be done, such as we're doing with the growth-hormone study. We're trying to determine whether it's the growth hormone that's actually improving their vision beyond what they would normally improve.

In those who do improve, how much better is their vision?

Most children do not have a miraculous improvement. A child will not go from light perception to 20/40 vision or driving vision or reading vision. That would be extremely unusual. However, it is extremely common for children to go from no light perception or bare light perception to being able to see very large objects, such as automobiles, or being able to navigate around a room without a cane or a dog.

What are you telling parents who are asking about the Chinese stem-cell therapy?

That I have two problems with this therapy.

First, from a scientific point of view, there is no evidence that cord-blood stem cells can ever form neurons, at least not in any peer-reviewed scientific literature. And I can assure you anyone doing legitimate research in this area is not withholding information to the contrary, because obviously this would be a major breakthrough if neurons could form from cord-blood stem cells.

Even if they could form neurons, there's no evidence that these neurons could ever make it to the eye where they could form new ganglion cells that are the cells that form the optic nerve, because the eye is a very protected environment from foreign material.

Second, from an ethical point of view, it is really not appropriate to be treating children who cannot give assent to the procedure themselves with a therapy that has no basis even in the laboratory for its use. Also, there are real risks with any procedure in which you are injecting foreign material into the body, especially if you're injecting it into the cerebrospinal fluid, which is my understanding of what they're doing in China. Because this foreign material can cause inflammation, can cause meningitis and cause serious brain injury.

It's also an ethical problem because I do not think that thorough and formal consent is obtained.

Finally, there's no scientific oversight of this work. In this country and Europe, this type of research could never be done without scientific oversight, even making sure that they're actually doing what they say they're doing. There is no way of knowing that they're actually purifying stem cells appropriately, that they're injecting stem cells, that they have any sort of monitoring of adverse affects from this. So this is really an inappropriate way to do any research, especially on innocent children.