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INNOVATION

MEDICINE

Banking On a Chance at Life

Companies that store precious blood cells taken from umbilical cords are springing up across Asia as scientists—and parents—recognize the cells' life-saving potential

By Trish Saywell/SINGAPORE

EIGHT YEARS AGO, Singaporean Steven Fang was working in business development for Baxter Healthcare Corp. in Chicago when a colleague's son was diagnosed with leukaemia. Fang and his family volunteered to donate bone marrow for a transplant but there wasn't a match. The child survived only after a successful transplant of stem cells taken from his newborn sibling's umbilical-cord blood.

Overnight, Fang became an enthusiast of stem-cell therapy. Not long after returning to Singapore, he set up Cordlife, a private cord-blood bank. For a fee, Cordlife freezes stem cells at birth for parents who believe that if their child, or another family member, contracts a serious blood disease or cancer, they could offer a cure. It's a step beyond life insurance.

Since the first successful transplant of stem cells found in umbilical-cord blood more than 13 years ago, the cells have been used in around 3,000 transplants worldwide. These cells could potentially be nurtured into different types of body tissue, and have been used to treat a range of diseases including leukaemia, blood disorders, metabolic disorders, immunodeficiency ailments and breast and other cancers.

Private cord-blood banking—popular for years in the United States and Europe—is now catching on in Asia. Companies offering the service have sprung up in places like Hong Kong and Malaysia. But



OFFERING HOPE: Cordlife's Steven Fang

this happening ranges from one in 1,000 to one in 200,000.

"The samples used from private cord-blood banks are usually used to treat a sibling," says Patrick Tan, head of the haematology department at Singapore General Hospital and an advocate of public cord-blood banks. "I haven't heard of any success stories using one's own cord blood in a transplant."

So would parents in Asia be better off putting their cash into a college fund for their kids, rather than paying a premium for a practice that may never yield a result? Maybe. Doctors also say it's uncertain how long the frozen stem cells can remain viable. So far, stem cells have survived freezing for between 15 and 18 years, but because the field is new, no one knows how much longer they can remain viable.

Critics of private cord-blood banks like Ronald Ng, a Singapore-based haematologist, also points out that stem cells taken from umbilical-cord blood cannot be stored in enough quantity to cure disease. "By the time the person is over 50 kilograms the dose of cells may not be enough if he or she needs the cells for transplantation," he argues. That's why medical researchers will have to find ways of growing the stem cells in culture—known as amplification technology.

In some cases, the use of a child's own stem cells may not be ideal. In many diseases, for instance, including the most common type of childhood leukaemia, called acute lymphoblastic leukaemia, it's better not to use one's own cord-blood stem cells—known as an "autologous transplant"—according to Tan of Singapore General Hospital. Tan notes that 90% of all childhood leukaemias are acute lymphoblastic leukaemias "and you can't use autologous transplants," in those cases, he explains. "If you put back your own stem cells with the same potentially defective immune network, then it's unlikely that it can challenge the leukaemia."

The same is true for certain congenital diseases, like thalassaemia major, a blood disease, or blood disorders like sickle-cell anaemia and Fanconi's anaemia. "If you have a defect in your genome, you don't want to use the same cells because you'll be returning the disease to yourself," he explains.

As science develops, there will be other options that could run private cord-blood

BLOOD IN THE BANK

Is depositing your child's cord-blood cells a smart investment?

- Yes, if your family has an identified health risk that may require stem-cell therapy
- But, there is slim chance children will ever need their own cells—more likely a sibling
- And there is doubt over how long the stem cells can remain frozen

Banking On a Chance at Life

Companies that store precious blood cells taken from umbilical cords are springing up across Asia as scientists--and parents--recognize the cells' life-saving potential

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Since the first successful transplant of stem cells found in umbilical-cord blood more than 13 years ago, the cells have been used in around 3,000 transplants worldwide. These cells could potentially be nurtured into different types of body tissue, and have been used to treat a range of diseases including leukaemia, blood disorders, metabolic disorders, immunodeficiency ailments and breast and other cancers.

Private cord-blood banking--popular for years in the United States and Europe--is now catching on in Asia. Companies offering the service have sprung up in places like Hong Kong and Malaysia. But the practice is raising questions: Who should be saving cord blood and how should it be stored? By companies operating on a fee for service for those who can afford to pay? Or by public banks that would serve the wider population? As more cord blood has been used to treat disorders in unrelated recipients, some doctors argue that public cord-blood banks should be created, for the benefit of everyone.

It's tough for expecting parents to ignore the sales pitch of private banks: Saving your baby's cord blood is one way of guaranteeing that you have an exact cell match for your child--or could provide a match for other close family members. And as science progresses, these cells could one day be used to treat a long list of diseases, ranging from Alzheimer's and Parkinson's to diabetes and heart disease.

Those claims aren't without controversy, however. The American Academy of Pediatrics only recommends private cord-blood banking for families with an identified risk--someone with a blood cancer for example, or when an existing child in the family has a known genetic disease that may require a bone-marrow or stem-cell transplant as part of treatment. Families may be vulnerable to "emotional marketing" at the time of their child's birth, the academy warns. What's more, there's slim chance children will ever need their own stored cells. The academy notes that the chance of this happening ranges from one in 1,000 to one in 200,000.

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As science develops, there will be other options that could run private cord-blood banks out of business, too. Stem cells are increasingly being taken from adult blood and used in surgery. In March, a 16-year-old boy in the United States who was shot in the heart with a nail gun underwent an operation in which stem cells taken from his own bloodstream were used to help repair tissue in his heart.

INNOVATION



STORING CELLS: Another form of insurance

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None of this is discouraging advocates of private cord-blood banks, or the people who use them, however. The global private cord-blood banking industry was worth \$100 million in 2001 and is expected to reach \$500 million by 2005, according to a study released this year by Swiss medical consultancy Jain PharmaBiotech. Last year, Ang Peng Tiam, a leading oncologist in Singapore, set up StemCord, a private cord-blood bank, after he and his partners--most of them doctors--failed to find matching stem cells to save a dying leukaemia patient. The bank, set up at a cost of about \$51.2 million (\$695,000), now has a collection of about 1,000 samples.

Ang argues that searching for stem cells from public cord-blood banks can be prohibitively expensive. Under the model, blood is donated and stored in a community bank, from which samples are available to anyone who needs them. Public banks are beginning to catch on--with about 15 in the U.S., one in Britain, several in Europe, and one in Australia. Some are supported through government grants, or by organizations like the American Red Cross Society, and others through charities and philanthropic donations. Once the public cord-blood bank receives the donated sample, it is tested, processed and typed according to tissue and blood categories, before being stored.

It costs about \$1,500 to perform all the necessary typing and other tests on each sample before it can be made available to the public. Physicians typically search the public registries for their patients. For every 10 samples a public bank holds, it needs to find a match for one sample in order to cover its costs. The international rate for a unit of cord blood from a public cord-blood bank is around \$15,000.

By contrast, StemCord charges only about \$27,500 for 21 years of storage, or

an average of about \$5300 a year. "If you need it, you don't need to look for a sample because you'll have a perfect match," Ang says.

For those who choose to store their child's cord blood, it's about buying peace of mind. Lai Fon-Min, an obstetrician and gynaecologist, estimates that about 5% of the couples he sees in his private practice opt to store their newborn's umbilical-cord blood and says that if he were to have another child he would do the same.

"It's like buying life insurance," says Jason Chan, who stored his daughter Shannon's cord blood when she was born in April. "You never know when you'll need it." The account manager for an electronics-manufacturing company in Singapore says that when he and his wife did the figures, the fees worked out to about \$20 a month. "It's money well spent," he says.

Attitudes like that are fuelling the industry. Fang's Cordlife, for example, gets 50-80 new clients--mostly working professionals and many from the medical profession--each month. It expects that number will grow to 300 regionally. The company, which is now profitable, charges a one-time fee of \$54,500 and an annual storage fee of \$2,500. "Our revenue model is quite a nice one," notes Fang. He muses that with 64 million babies born each year in Asia excluding India, the market potential is huge. "If we did everything perfectly in every city we would get a revenue stream of \$51.6 billion a year," Fang says.

Cordlife, which was set up in May 2001, is now building its business--with facilities in Australia, China, Thailand, Indonesia and Switzerland. It's looking to expand in the U.S., Germany, and Spain and is considering a Singapore listing in the middle of next year. It recently completed an \$11-million acquisition of Boston-based Cytomatrix, a company that is working on technology that can multiply the number of stem cells taken from cord blood. ■

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