New local invention extracts stem cells with placenta 'juicer'

The 2 NUS academics behind it were inspired by an orange juicer while on coffee break

By Judith Tan

TWO Singapore academics – inspired by an orange juicer – have invented a device which they claim can extract more stem cells from the placenta than current methods, which do so only from the umbilical cord.

Three companies – from Singapore, Japan and Britain – are already keen to develop it. They are in talks with the inventors, Professor Ng Soon Chye and Associate Professor Tan Kok Kiong, who patented the device late last year.

The light bulb flashed during a coffee break the two academics shared – when their eyes fell on an orange juicer.

Said Prof Ng, who is an adjunct professor at the National University of Singapore: "We then had an idea: squeeze as much as possible, like the juicer."

His brainstorming with Assoc Prof Tan, from the department of electrical and computer engineering, resulted in the placenta "juicer". The device similarly presses down and squeezes on the placenta – to extract as much cord blood as possible (see diagram).

Stem cells can be extracted from the umbilical cord after a birth. They can be used to treat people who have blood diseases and can be used in bone marrow transplants to produce healthy white blood cells.

Some parents in fact "buy insurance" for their child in adulthood by having such cords, which would otherwise be discarded, stored.

Others make donations to the Singapore Cord Blood Bank (SCBB), the first public cord blood bank here. There are more than 2,500 cords stored at SCBB, while each of the two private banks here has about a million stored.

Current extraction methods use a syringe to suck up as much blood as possible from the umbilical cord.

Dr Ang Peng Tiam, chief executive of private cord blood bank StemCord, said between 80ml and 100ml of cord blood may be extracted this way shortly after childbirth. "This is typically between 600 and 800 million cells," he said.

However, syringes do not extract enough stem cells from one cord to treat an adult, explained Prof Ng, director of the O&G Partners Fertility Centre at Gleneagles Hospital.

"The minimum requirement for a stem cell transplant is 15 million cells per kilo of patient body weight. You do the math," he said.

He said about 97 per cent of cord blood, which is rich in stem cells, is found in the placenta, a temporary organ that nourishes the developing foetus in the mother's uterus.

But when The Straits Times spoke to private companies which provide cord blood services, some were sceptical that a greater amount of stem cells would be extracted using the new device.

Dr Andrew Wu, technical director of CordLife, another private cord blood bank, said that more cord blood drawn does not necessarily mean more stem cells.

He said: "A smaller cord blood volume unit may have as many stem cells as a larger one. So doctors look not at the volume, but at the number of stem cells inside the blood."

Nevertheless, both Prof Ng and Prof Tan insist their device can extract as much as 10 times the amount of cord blood, that is, 10 times the amount of stem cells.

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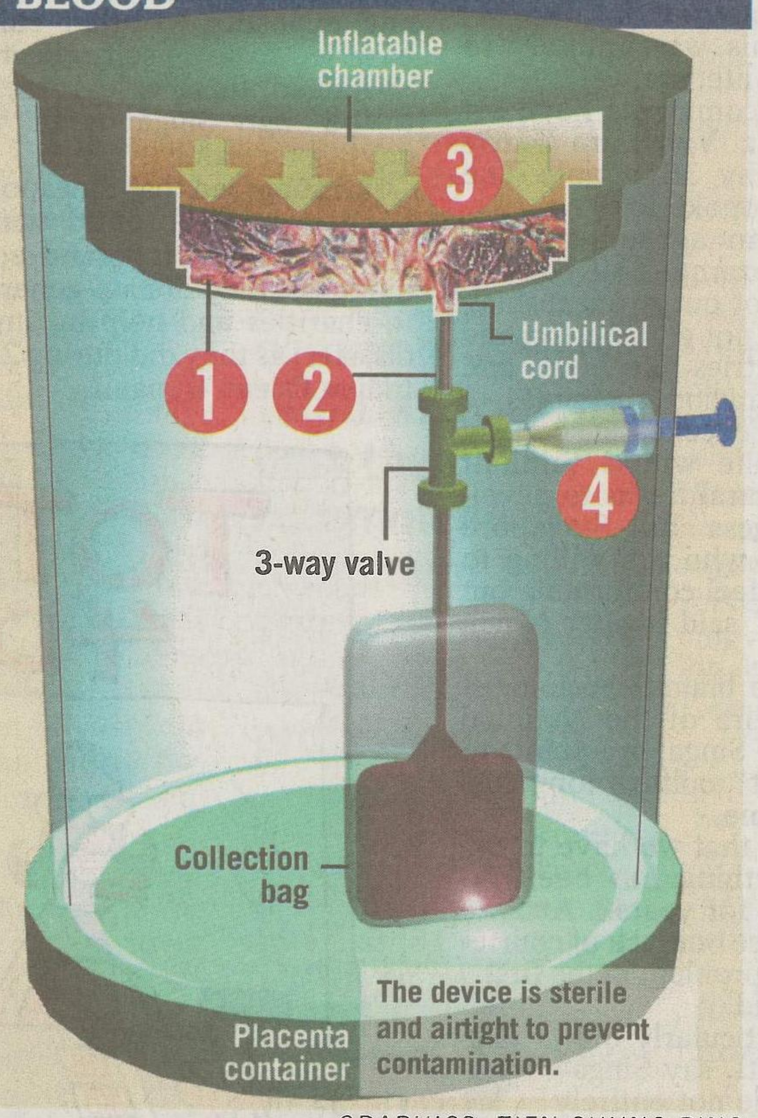
» MILKING THE PLACENTA FOR CORD BLOOD

1. The placenta is placed in a container at the top of the collection device, with the cord facing downwards.
2. A catheter – a thin, flexible, hollow tube – is inserted into a vein in the umbilical cord, allowing the blood to flow into a collection bag.
3. Air pressure is applied to the placenta to squeeze as much cord blood from the placenta as possible.
4. To prevent the blood from clotting too early, a valve attached to a syringe containing anticoagulant drugs is activated when the technician deems it necessary.



SOURCE: PROF TAN KOK KIONG, NUS

GRAPHICS: TIEN CHUNG PING