

## Tiny Liver Grown from Umbilical Cord Stem Cells

BY Liz Townsend

In a remarkable breakthrough, scientists in Britain have grown the first human liver derived from umbilical cord stem cells. The mini-livers are just the first step in the development of full artificial livers that could be used to replace diseased or damaged organs and save lives.

Such advances have led to a worldwide call for parents to donate and store umbilical cord blood after their babies' birth. The stem cells are derived without harming the donor in any way, unlike embryonic stem cells. Umbilical cord cells have also been used to treat blood disorders, such as leukemia.

Prof. Colin McGuckin and Dr. Nico Forraz of Newcastle University announced their success October 30, according to the Daily Mail. They gathered stem cells from umbilical cord blood, then placed them in a "bioreactor," a device developed by the U.S. National Aeronautics and Space Administration. The bioreactor simulates weightlessness and helps the cells to multiply quickly.

The team then added hormones and chemicals to turn the undifferentiated cells into liver cells, the Daily Mail reported. So far, they have successfully created tiny livers less than an inch in diameter.

The scientists said that within two years they expect large enough livers can be created to use in clinical trials of pharmaceuticals. "When a drug company is developing a new drug it first tests it on human cells and then tests it on animals before beginning trials on humans," McGuckin told Press Association News.

"Moving from testing on animals to humans is a massive leap and there is still a risk," he said. "But by using the mini-livers we have developed there is no need to test on animals or humans."

They hope that within five years, patients awaiting transplants could be connected to artificial livers for a short time, giving their damaged livers time to rest and prolong their lives, the Daily Mail reported.

The researchers estimate that it will take 15 years or more to develop the technology needed to transplant whole artificial livers into patients. "We have taken a little bit of umbilical cord blood and then it is all about enhancing things that already exist," Dr. Forraz told the London Times. "We cannot build a full-sized one yet—that will take about 10 years—but this is the first important step. We expect this to really take off within the next 18 months or so."

McGuckin and Forraz hope that one day soon umbilical cord blood will be routinely saved around the world, providing donor cells that could match patients worldwide. "One hundred million children are born around the world every year—that is 100 million different tissue types," McGuckin told the Daily Mail. "With that number of children being born every year, we should be able to find a tissue for me and you and every other person who doesn't have stem cells banked."

"Our dream is that every metropolitan city would have such a bank," Forraz added.

The United States is increasing its commitment to creating umbilical cord blood banks. The Health Resources and Services Administration has awarded over \$24 million to coordinate and increase the number of cord blood donations, as well as to monitor the success of cord blood use, according to the Associated Press (AP).

In addition, Congress has appropriated millions of dollars to develop an information center to assist in finding donor matches and expanding collections, the AP reported.

"The problem has been lack of access, lack of diverse specimens, and just a gross lack of capacity," Rep. Chris Smith (R-N.J.), co-sponsor of cord blood funding legislation, told the AP. "The utilization rates for cord blood are going to skyrocket."