

# Artificial womb created to save premature babies

Tom Whipple Science Editor

An artificial womb and placenta has been developed by scientists who hope that it can dramatically improve the survival chances of extremely premature babies.

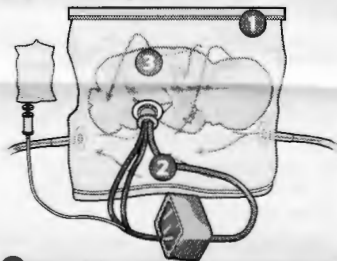
The earliest that babies routinely survive birth is after 22 to 23 weeks' gestation. Even then between 80 and 90 per cent quickly die, and most of the survivors have disabilities — many caused by the fact their lungs cannot cope with breathing and their immune systems cannot deal with exposure to the air.

Now a US team has shown they can incubate premature lambs in a device that mimics the wombs of their mothers. Alan Flake, from the Children's Hospital of Philadelphia, said he hoped it would one day help to save human babies. "When premature babies are delivered, they are ventilated with gas, which impairs lung development, exposed to pathogens, and their very immature organs are not ready to be delivered," he said. Many develop severe respiratory problems and infections as a result.

In research published in *Nature Communications*, he and his colleagues showed they could transfer lamb foetuses to a bag filled with artificial amniotic fluid and connect their umbilical cords to an artificial placenta that circulated oxygenated blood. Rather than suffer the developmental problems that would be expected with lambs removed

## How it works

1 Foetus transferred into fluid-filled bag mimicking the womb



2 Its heart pumps oxygenated blood through an artificial placenta

3 Organs can develop with minimal exposure to pathogens

so early, they survived and thrived.

"They appear to have normal development in all respects," said Dr Flake. "We've bottle-fed them, grown them up. There's no intelligence test for lambs, but we think they are pretty smart lambs."

If the same technique could be shown to work in humans it would be revolutionary. In Britain, about one baby in 300 is born extremely prematurely, defined as before 28 weeks' gestation.

Parents are warned that such babies' prognosis is not good, and whatever the outcome the children are very costly to the health service.

Any babies who might benefit from this would need to be delivered by Caesarean section and transferred across to the womb immediately in the operating theatre.

This new approach offers a far closer approximation to the natural environment, right down to the fact that it is the foetus's own heart that pushes the blood through the placenta.

Dr Flake hopes to move to human trials in a few years, and argued that because of the extreme mortality rates using current apparatus it was important to move fast. However, other researchers said it might still

be some time before artificial wombs are seen in hospitals.

"This is a really attractive concept and this study is a very important step forward," said Colin Duncan, from the University of Edinburgh. "There are still huge challenges to refine the technique, to

make good results more consistent. This will require a lot of additional pre-clinical research and development and this treatment will not enter the clinic any time soon."

