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From foetus to full term - without a mother's touch

Ainsley Newson

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ARTIFICIAL wombs, to bring a foetus of a human being to full term outside a woman's body, could become a reality within 20 years, scientists have predicted.

This could present great advantages in the case of very premature babies, which could be nurtured to full pregnancy term in artificial wombs, thereby reducing the risk of long-term developmental problems.

Such technology might also appeal to those who cannot have children naturally, such as women with a damaged uterus or no uterus at all, or to gay couples. The need for surrogate mothers could disappear.

Experiments with human embryos, mice and goats have already had some success. But the technology raises significant ethical challenges and should not proceed without full ethical debate, Frida Simonstein, of Ben Gurion University in Israel, said.

She told a weekend conference in Barcelona on ethics and emerging medical technologies that these problems were not insurmountable.

"Society now expects better outcomes for premature babies. Society also demands improvement in IVF effectiveness. Yet society should be equally aware that these demands require research that leads to the development of an artificial womb.

"We must start discussing this topic now while we have still enough time to decide what we may want, and why."

In 2002 Hung-Ching Liu, at Cornell University, in the United States, announced that her team had successfully grown a sample of cells from the lining of a human uterus and had used tissue engineering technologies to shape them like a womb.

When a fertilised human egg was introduced into the womb, it implanted into the uterus wall as it would in a natural pregnancy. The experiment was ceased at six days' gestation, because of legal limits on human embryo experimentation.

Japanese scientists brought goat foetuses to full term using so-called "uterine tanks" after removing them mid-pregnancy from their mother's womb.

In further womb research by Dr Liu's team, mouse embryos were grown nearly to term in artificial wombs but, as in the Japanese experiments, the newborn animals did not survive.

Artificial wombs are not yet safe for human pregnancies. But if, as expected, the technology can one day be applied in human beings, scientific advantages may result.

But Richard Ashcroft, reader in medical ethics at Imperial College London, fears a "foetal rescue act" to force drug or alcohol-addicted mothers to have their foetuses surgically removed. "I couldn't think of anything worse," he said.

It is also feared that scientists involved in cloning could continue their experiments without the need for surrogate mothers.

There is a danger too that some women who want babies but cannot face pregnancy or childbirth could take advantage of the artificial wombs -one step beyond being "too posh to push". If they see their babies growing in a tank, would they bond with their newborns, or view them as commodities?

Dr Ashcroft said: "Is creating children with artificial wombs having children at all, or is it a kind of manufacturing of children? It is deeply dangerous."

The issue will add fresh fuel to the abortion debate.

* HOW ARTIFICIAL WOMBS MIGHT WORK

1. A pregnant woman has her baby removed at about 20 weeks gestation
2. The baby is put into a tank containing warm, synthetic amniotic fluid
3. A network of fine tubes is inserted into the baby's umbilical cord. These lead to an artificial placenta that delivers oxygen and nutrients and clears waste
4. The baby continues to grow until it reaches full term. The baby is born and is given back to the mother

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