



Scientists: Artificial Wombs Could Replace Women

Technocrats invent because they can, not because there is a pressing need to do so. This is a precursor to incubator reproduction as described in Huxley's 1932 book, *Brave New World* and is already linked to gay men being able to 'have babies'. □ TN Editor

The idea of growing babies outside the body has inspired [novels and movies](#) for decades.

Now, research groups around the world are exploring the possibility of artificial gestation. For instance, one group [successfully grew](#) a lamb in an artificial womb [for four weeks](#). Australian researchers have also experimented with [artificial gestation for lambs](#) and [sharks](#).

And in recent weeks, researchers in The Netherlands [have received €2.9m](#) (\$4.66m) to develop a prototype for gestating premature babies.

So it's important to consider some of the ethical issues this technology might bring.

What is an artificial womb?

Growing a baby outside the womb is known as ectogenesis (or exogenesis). And we're already using a form of it. When premature infants are transferred to humidicribs to continue their development in a neonatal unit, that's partial ectogenesis.

But an artificial womb could extend the period a fetus could be gestated outside the body. Eventually, we might be able to do away with human wombs altogether.

This may sound far-fetched, but many scientists working in reproductive biotechnology believe that with the necessary scientific and legal support, full ectogenesis is a real possibility for the future.

What would an artificial womb contain?

An artificial womb would need an outer shell or chamber. That's somewhere to implant the embryo and protect it as it grows. So far, animal experiments have used [acrylic tanks](#), [plastics bags](#) and uterine tissues removed from an organism and artificially kept alive.

An artificial womb would also need a synthetic replacement for amniotic fluid, a shock absorber in the womb during natural pregnancy.

Finally, there would have to be a way to exchange oxygen and nutrients (so oxygen and nutrients in and carbon dioxide and waste products out). In other words, researchers would have to build an [artificial placenta](#).

Animal experiments have used a complex [catheter and pump systems](#). But there are plans to use a mini version of [extracorporeal membrane oxygenation](#), a technique that allows blood to be oxygenated outside the body.

Once these are in place, artificial gestation could one day [become as common as IVF](#) is today, a technique [considered revolutionary](#) a few decades ago.

And just as in the case of IVF, there are many who are concerned about

what this new realm of reproductive medicine might mean for the future of creating a family.

So what are some of the ethical considerations?

Artificial wombs could help premature babies

The main discussion about artificial wombs has focused on their potential benefit in increasing the survival rate of extremely premature babies.

[Currently](#), those born earlier than 22 weeks gestation have little-to-no hope of survival. And those born at 23 weeks are likely to suffer a range of disabilities.

Using a sealed "[biobag](#)," which mimics the maternal womb might help extremely premature babies survive and improve their quality of life.

A biobag provides oxygen, a type of substitute amniotic fluid, umbilical cord access and all necessary water and nutrients (and medicine, if required). This could potentially allow the gestational period to be prolonged outside the womb until the baby has developed sufficiently to live independently and with good health prospects.

An artificial womb might provide an optimum environment for the fetus to grow, providing it with the appropriate balance of hormones and nutrients. It would also avoid exposing the growing fetus to external harms such as infectious diseases.

The technology might also make it easier to [perform surgery on the fetus](#) if needed.

And it could see the end of long-term hospital stays for premature infants, saving health care dollars in the process. This is particularly noteworthy considering some of the [largest private insurance payments](#) are currently for neonatal intensive care unit expenses.

Artificial wombs could help with infertility and fertility

This emerging reproductive technology may allow women who are infertile, either due to [physiological or social reasons](#), with the chance of having a child. It may also offer opportunities for transgender women and other women born without a uterus, or those who have lost their uterus due to cancer, injury or medical conditions, to have children.

Similarly, it could allow single men and gay male couples to become parents without needing a surrogate.

Will this lead to a broader discussion about [gender roles and equality](#) in reproduction? Will it remove potential risks and expectations of pregnancy and childbirth currently only affecting women? Will this eliminate commercial surrogacy?

Equally, artificial wombs could help fertile women who for health or personal reasons choose not to be pregnant. It would allow those whose career choices, medication or lifestyle might otherwise expose a developing fetus to malformation or abnormality.

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