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First 'three person baby' born using new method

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NEW HOPE FERTILITY CENTRE
Dr John Zhang holding the baby boy who was conceived thanks to the new technique that incorporates DNA from three people

The five-month-old boy has the usual DNA from his mum and dad, plus a tiny bit of genetic code from a donor.

US doctors took the unprecedented step to ensure the baby boy would be free of a genetic condition that his Jordanian mother carries in her genes.

Experts say the move heralds a new era in medicine and could help other families with rare genetic conditions.

But they warn that rigorous checks of this new and controversial technology, called mitochondrial donation, are needed.

It's not the first time scientists have created babies that have **DNA from three people** - that breakthrough began in the late 1990s - but it is an entirely new and significant method.

Three person babies

Mitochondria are tiny structures inside nearly every cell of the body that convert food into usable energy.

Some women carry genetic defects in mitochondria and they can pass these on to their children.

In the case of the Jordanian family, it was a disorder called Leigh Syndrome that would have proved fatal to any baby conceived. The family had already experienced the heartache of four miscarriages as well as the death of two children - one at eight months and the other at six years of age.

Leigh syndrome

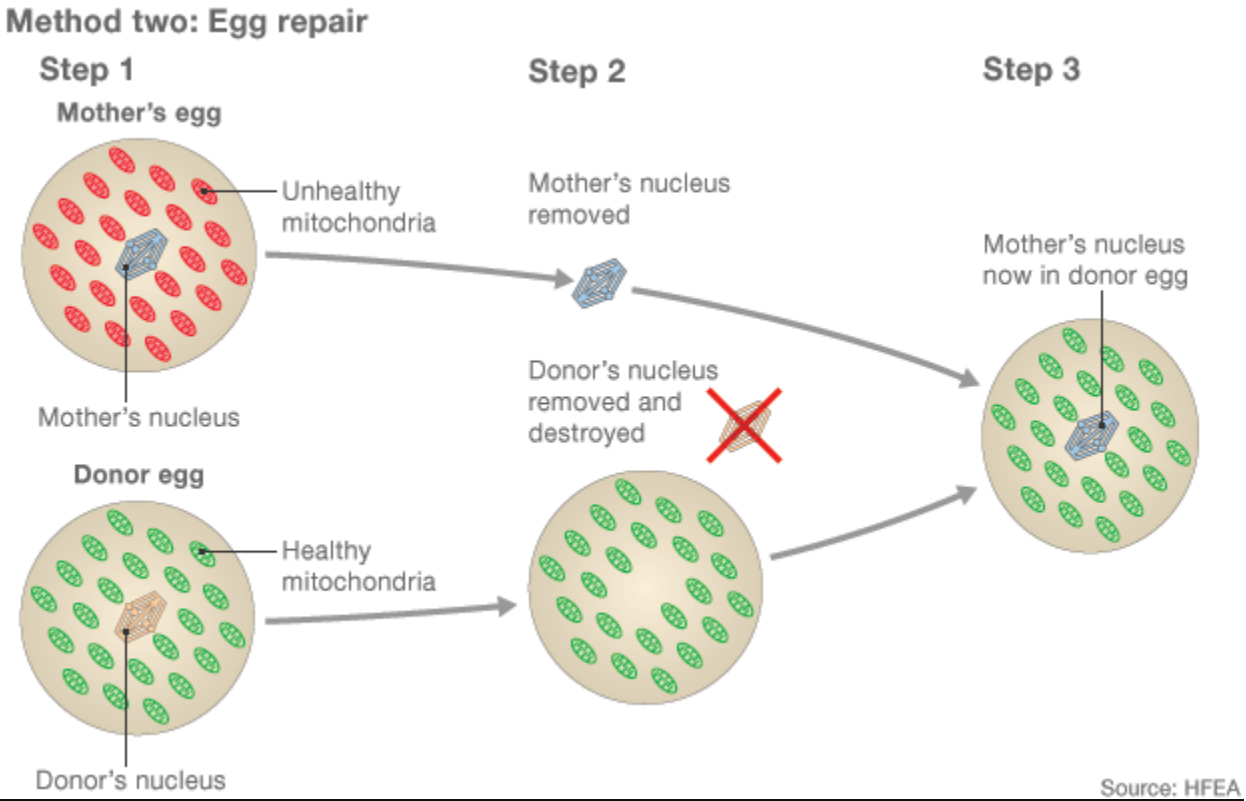
- A severe neurological disorder, affecting at least one in 40,000 new-born babies.
- Usually becomes apparent during the first year of a child's life.
- First signs include vomiting, diarrhoea and difficulty with swallowing.
- Causes the progressive loss of movement, and deterioration of mental functions.
- Symptoms are linked to the development of patches of damaged tissue which develop in the brain.
- Children with the condition usually die within two to three years, usually because of respiratory failure.
- Mutations in 75 different genes have been linked to the condition.
- Most of those mutations occur in DNA from the nucleus, but in about one in five cases the culprit is found in mitochondrial DNA.

Scientists have devised a number of fertility methods to help such families.

The US team, who travelled to Mexico to carry out the procedure because there are no laws there that prohibit it, used a method that takes all the vital DNA from the mother's egg plus healthy mitochondria from a donor egg to create a healthy new egg that can be fertilised with the father's sperm.

The result is a baby with 0.1% of their DNA from the donor (mitochondrial DNA) and all the genetic code for things like hair and eye colour from the mother and father.

Dr John Zhang, medical director at the New Hope Fertility Centre in New York City, and his colleagues used the method to make five embryos - only one of them developed normally.



1) Eggs from a mother with damaged mitochondria and a donor with healthy mitochondria are collected 2) The majority of the genetic material is removed from both eggs 3) The mother's genetic material is inserted into the donor egg, which can be fertilised by sperm.

The UK has already passed laws to allow the creation of babies from three people.

But the science does raise ethical questions, including how any child from the technique might feel about having DNA from three people.

Fertility experts say it is important to push ahead, but cautiously.

Some have questioned whether we are only now hearing the success story while failed attempts could have gone unreported.

Prof Alison Murdoch, part of the team at Newcastle University that has been at the forefront of three person IVF work in the UK, said: "The translation of mitochondrial donation to a clinical procedure is not a race but a goal to be achieved with caution to ensure both safety and reproducibility."

Critics say the work is irresponsible.

Dr David King from the pro-choice group Human Genetics Alert, said: "It is outrageous that they simply ignored the cautious approach of US regulators and went to Mexico, because they think they know better. Since when is a simplistic "to save lives is the ethical thing to do" a balanced medical ethics approach, especially when no lives were being saved?"

Dr Zhang and his team say they will answer these questions when they present their findings at a meeting of the American Society for Reproductive Medicine in October.

Prof Darren Griffin, an expert in Genetics at the University of Kent, said: "This study heralds a new era in preimplantation genetics and represents a novel means for the treatment of families at risk of transmitting genetic disease.

"With radical new treatments like this there are always challenging ethical issues, however any concerns need to be balanced against the ramifications of not implementing such a technology when families are in need of it."

The structure of a cell

Nucleus: Where the majority of our DNA is held - this determines how we look and our personality

Mitochondria: Often described as the cell's factories, these create the energy to make the cell function

Cytoplasm: The jelly like substance that contains the nucleus and mitochondria