

Stem cell breakthrough may prevent the need for three-parent babies

By Sarah Knapton
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THE creation of three-parent babies might not be necessary after scientists discovered a potential cure for mitochondrial diseases such as muscular dystrophy.

In February the Government changed the law to allow IVF clinics to use donor DNA from a “second mother” to repair the defective eggs of women at risk of passing on mitochondrial disease to their children.

The procedure is controversial because it will result in babies with the DNA of three people for the first time in human history.

The new discovery by American scientists suggests that using genetic material from a third person may not be necessary after all. They found that patients with mitochondrial disease can still produce healthy mitochondrial DNA which can be used to mend the defects.

Mitochondria act like batteries, pow-

ering cells. But in mitochondrial disease the DNA does not fuel cells fully, causing problems such as muscle wasting, as in muscular dystrophy.

Dr Shoukhrat Mitalipov, of the Centre for Embryonic Cell and Gene Therapy at Oregon Health & Science University, said it is possible to turn damaged cells back into their original stem cell form with no mutations. Those cells can then be multiplied in a lab and transplanted back into the body to repair damaged tissue.

“To families with a loved one born with a mitochondrial disease waiting for a cure, today we can say that a cure is on the horizon,” said Dr Mitalipov. “Over the past several years, we have been working to generate stem cells for use in combating disease.

“This critical first step toward treating these diseases using gene therapy will put us on the path to curing them.”

Mitochondrial mutations can cause diseases including diabetes, deafness, eye disorders, gastrointestinal disorders, heart disease and dementia. Al-

though the new method has only been conducted in the lab, the team is hopeful it could soon be tested in patients.

Prof Darren Griffin, professor of genetics and director of the Centre for Interdisciplinary Studies of Reproduction (CISoR) at the University of Kent, welcomed the “very exciting study” but warned that it would be “some time before it can be applied clinically given the need for clinical trials”.

Dr Dusko Ilic, a reader in stem cell science at King’s College London, added that the study was “beautifully executed” and could allow mothers at risk of passing on diseases to use their own healthy mitochondria to repair their eggs.

“Following this approach, theoretically, one might be able to generate eggs with all healthy mitochondria from the mitochondrial disease carrier and in such a way eliminate a need for the healthy donor mitochondria or ‘the third parent,’” he said.

The research was published in the journal *Nature*.