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UK drafts rules for three-parent IVF babies

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The UK government have drafted and published, for public consultation, how the creation of three-person babies using new IVF techniques - called mitochondrial replacement - will be regulated.

The new techniques are intended to prevent mothers passing on serious inherited diseases caused by flaws in mitochondrial DNA to their children.

The purpose of the consultation is to gather views about the draft regulations from all those with an interest, say the Department of Health.

Chief Medical Officer Prof. Dame Sally Davies says:

"Allowing mitochondrial donation would give women who carry severe mitochondrial disease the opportunity to have children without passing on devastating genetic disorders. It would also keep the UK at the forefront of scientific development in this area."

"I want to encourage contributions to this consultation so that we have as many views as possible before introducing our final regulations," she adds.

The consultation documents can be viewed online, and the open consultation runs for 12 weeks and closes at 5 pm on May 21, 2014.

Mitochondrial disorders affect 1 in 200 children

Estimates show that around 1 in 200 children born in the UK every year have some form of disorder due to inherited flaws in mitochondrial DNA.

These serious disorders can affect the heart, the liver, cause loss of muscle coordination and other conditions that have a devastating, sometimes fatal impact.

Mitochondria are the powerhouses inside cells. They have their own DNA that is separate from that of the nucleus.

In normal human reproduction, mitochondria are usually inherited exclusively from the mother; the small amount that exists in sperm is just enough to fuel the passage to the egg and is normally destroyed by the egg cell after fertilization.

But thanks to pioneering work by two professors, Doug Turnbull and Mary Herbert at Newcastle University, England, there is now an IVF (in vitro fertilization) technique called mitochondrial replacement that allows mitochondrial DNA from a female donor to replace that of the mother, so she does not pass on mitochondrial diseases to her children.

The technique results in healthy embryos with DNA from three people: most from the biological father and mother (the nuclear DNA), and a tiny amount, less than 1% of the embryo's genes, from the female donor (the mitochondrial DNA). The embryos can then be implanted in the mother using normal IVF treatment.

Change in law is required to allow mitochondrial replacement

Currently in the UK, while it is legal to carry out mitochondrial replacement techniques in the lab, the embryos cannot be used in fertility treatments. As such, a change in the law would be needed.

The draft regulations amend the Human Fertilisation & Embryology Act 1990 to allow such treatments to be carried out.

In June 2013, the UK government announced it was backing the idea of three-person IVF using mitochondrial replacement, and that the procedure would probably be available in 2015, after draft regulations have been produced.

The decision followed a public consultation by the Human Fertilisation and Embryology Authority (HFEA) that found there was general public support for the idea.

Those against the move say it opens door to designer babies

Use of the technique affects what the HFEA describes as the "germ line," that is, the donor's mitochondrial DNA would then be inherited by future generations of the "three-parent" child.

A UK-based campaigning watchdog called Human Genetics Alert is against the legalization of mitochondrial replacement, mainly because of the deliberate changes it introduces to the germline of children born using this method.

They see it as opening the door to "enhanced designer babies" and although the techniques are not the same as genetic modification, once this line is crossed, they say, it will become

difficult to oppose genetic modification.

They add that a further reason to oppose the techniques is there has not been enough research on their safety.

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References

Open consultation: Serious mitochondrial disease: new techniques to prevent transmission; Department of Health, GOV.UK, 27 February 2014.

Additional sources: Department of Health press release 27 February 2014; Human Genetics Alert.

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