

Cloning the male genome may help infertile men

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Artificially replicating the male genome could help men with very low sperm counts become fathers, a scientist told the 23rd annual conference of the European Society of Human Reproduction and Embryology (Tuesday 3 July).

Professor Takumi Takeuchi, of Weill Medical College, Cornell University, New York, USA, said that mouse experiments by his team, led by Professor Gianpiero D. Palermo, had shown that offspring born as a result of such replication had shown a level of abnormalities consistent with that shown in cloned animals.

Where the man in a couple has problems making any significant level of sperm, doctors are often confronted with the challenge of retrieving a single viable sperm to inject into each egg. Such a sperm is therefore precious to couples wishing to conceive, said Professor Takeuchi. "If we were able to propagate it, while maintaining its normal chromosomal make-up, its ability to fertilise and to participate in full-term embryo development, we would be able to enhance the number of chances of conception of many couples, and hence improve the chances of an on-going pregnancy."

Professor Takeuchi and his team injected a single healthy mouse sperm into a mouse egg from which the nucleus had been removed, and by doing so cloned the male genome. The process worked well in almost all cases and the sperm genome was found to be chromosomally identical to its originator in over 80% of the clones analysed. The resulting cells

were fused with an egg that had been previously chemically activated.

The cells so derived had chromosomes from both parents and these were allowed to develop into blastocysts, where each early embryo contains between 70 and 100 cells. “64 blastocysts were transferred to 6 foster-mother mice, and so far 4 offspring have grown into normal adults”, said Professor Takeuchi, “therefore proving that it is possible to replicate the male genome, and that such a cloned genome has the ability to develop to term.”

The team is now investigating whether they can make the procedure more efficient by enhancing the number of mouse pups obtained by a single sperm, and thus reducing embryo wastage. “We believe that replication of the male genome, in addition to providing hope for infertile couples, could also provide the opportunity to use replicates of the sperm nucleus for diagnostic purposes. If you only have one healthy sperm you would be reluctant to use it for anything but fertilisation. But with this technique it should be possible to create enough to be sure that the embryo which is implanted is healthy.”

“Since this work aims at preserving the contribution of both parents to the generation of embryos, I feel that, when it is further developed and refined, it should elicit a favourable response from those involved in ethical issues”, said Professor Takeuchi. “But we are a long way from the time when this will be able to be used in humans. There is much work still to be done to understand why impaired development and abnormalities in the embryo occur, and to take steps to avoid that occurrence.”

Source: European Society for Human Reproduction and Embryology

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