

New method to detect genetic defects in egg cells could double the success rate of IVF

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Infertility affects up to 15 percent of couples around the world, and in vitro fertilization (IVF) is one way to treat this common condition. A study published by Cell Press December 19th in the journal *Cell* reveals a safe, accurate, and low-cost method to select genetically normal embryos for the IVF procedure and thereby increase a couple's chance of producing a healthy child.

Through whole-genome sequencing of individual [egg cells](#), the new method detects [chromosomal abnormalities](#) and DNA sequence variations associated with genetic disorders. "In this way, we kill two birds with one stone: one set of deep sequencing analysis to avoid two types of genetic problems," says study author Jie Qiao of Third Hospital, Peking University. "Theoretically, if this works perfectly, we will be able to double the success rate of test tube baby technology from 30 percent to 60 percent or even more."

The IVF procedure involves joining a woman's egg and a man's sperm in a laboratory dish and then transferring embryos into the woman's womb. Various procedures are currently available to detect genetic defects in embryos prior to implantation, but these approaches are often invasive, requiring the removal of cells from the growing embryo, and do not simultaneously detect both chromosomal abnormalities and DNA sequence variations associated with genetic disorders.

Researchers have recently developed whole-genome sequencing methods to simultaneously detect both types of defects in single human sperm

cells, but until now, an analogous approach had not been applied to egg cells, even though chromosomal abnormalities are much more common in egg cells than in sperm cells.

In the new study, Sunney Xie of Peking University and Harvard University teamed up with Qiao and Fuchou Tang of Peking University to develop a method for sequencing the entire genomes of polar bodies—cells that arise as a byproduct of egg cell division and often die later on. Because polar bodies are dispensable for human embryonic development, they can be safely removed without harming the embryo. "We are now starting a clinical trial based on this approach," Xie says. "If the clinical trial works, this technique could enormously increase the success rate of IVF, especially for older women or women who have had recurrent miscarriages."

More information: Cell, Hou et al.: "Genome Analyses of Single Human Oocytes." [dx.doi.org/10.1016/j.cell.2013.11.040](https://doi.org/10.1016/j.cell.2013.11.040)

Provided by Cell Press

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