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## For Stem Cells, Half a Genome Is Better Than None



...VIDEO: Haploid Human Embryonic Stem Ce



Scientists from The Hebrew University of Jerusalem, Columbia University Medical Center, and The New York Stem Cell Foundation (NYSCF) Research Institute say they succeeded in generating a new type of embryonic stem cell that carries a single copy of the human genome instead of the two copies typically found in normal stem cells. The scientists reported their findings (“Derivation and Differentiation of Haploid Human Embryonic Stem Cells”) in *Nature*.

The stem cells described in this paper are the first human cells that are known to be capable of cell division with just one copy of the parent cell's genome. Previous efforts to generate embryonic stem cells using human egg cells had resulted in diploid stem cells. In this study, the scientists triggered unfertilized human egg cells into dividing. They then highlighted the DNA with a fluorescent dye and isolated the haploid stem cells, which were scattered among the more populous diploid cells.

The researchers showed that these haploid stem cells were pluripotent while retaining a single set of chromosomes. Since the stem cells described in this study were a genetic match to the egg cell donor, they could also be used to develop cell-based therapies for diseases such as blindness, diabetes, or other conditions in which genetically identical cells offer a therapeutic advantage. Because their genetic content is

equivalent to germ cells, they might also be useful for reproductive purposes.

"This work is an outstanding example of how collaborations between different institutions, on different continents, can solve fundamental problems in biomedicine," said Dieter Egli, Ph.D., principal co-author of the study, and assistant professor of developmental cell biology in pediatrics at Columbia University Medical Center and a senior research fellow at the NYSCF Research Institute and a NYSCF–Robertson Investigator.

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