New Stem Cell with Half a Genome Generated in Lab

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by Seth Augenstein, Digital Reporter

An embryonic stem cell with just half a genome was generated by scientists, according to findings published in the journal Nature.

The haploid stem cells are the first human cells capable of cell division with just one copy of the genome, allowing easier genetic manipulation and analysis, according to the American and Israeli researchers.

"One of the greatest advantages of using haploid human cells is that it is much easier to edit their genes," said Ido Sagi, the also of the Hebrew University of Jerusalem, who corresponded briefly with *Laboratory Equipment* by email.

The technique involved triggering unfertilized human egg cells, highlighting the genome with a fluorescent dye and then isolating the haploid stem cells, according to the scientists, some of whom are from Columbia University Medical Center and the New York Stem Cell Foundation Research Institute.

The stem cells are pluripotent, with the ability to become a litany of other kinds of cells, including those of major organs.

"This study has given us a new type of human stem cell which will have an important impact on human genetic and medical research," said Nissim Benvenisty, director of the Azrieli Center for Stem Cells and Genetic Research at the Hebrew University of Jerusalem. "These cells will provide researchers with a novel tool for improving our understanding of human development."

Sagi told *Laboratory Equipment* that the easiest application of the technique would be for genetic screening. The haploid cells were easier to scan for a particular mutation which allowed resistance to certain cellular toxicity – and the analysis could translate to all sorts of genetic variants, he said.

"Unlike many previous genetic studies in humans, which focused on editing specific genes, with haploid cells we are not limited to predetermined, targeted genetic changes," said Sagi. "This means that we can generate millions of different mutations, forming a library of mutants that can help us understand what genes in the genome are involved in specific biological processes that interest us."

Because the 23-chromosome stem cells are easier to work with than the natural diploid cells humans developed through evolution, it could provide a new look into the fundamentals of life, they add.

"We expect that haploid human embryonic stem cells will provide novel means for studying human functional genomics and development," the authors conclude.

Previous breakthroughs have produced haploid stem cells from fish and mice - which have proven valuable in genetic analysis, according to the scientific literature.

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