Business Standard

New human stem cells hold hope for humanity

IANS | London March 17, 2016 Last Updated at 13:52 IST

A team of scientists has succeeded in generating new type of embryonic stem cells that carry a single copy of the human genome instead of the two copies typically found in normal stem cells.

The new stem cells can 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.

These stem cells are the first human cells that are known to be capable of cell division with just one copy of the parent cell's genome, said researchers from the Hebrew University of Jerusalem, Columbia University Medical Center (CUMC) and The New York Stem Cell Foundation Research Institute (NYSCF).

Human cells are considered "diploid" because they inherit two sets of chromosomes, 46 in total -- 23 from the mother and 23 from the father.

The only exceptions are reproductive (egg and sperm) cells, known as "haploid" cells because they contain a single set of 23 chromosomes.

These haploid cells cannot divide to make more eggs and sperm.

Previous efforts to generate embryonic stem cells using human egg cells had resulted in diploid stem cells.

In this study, the scientists triggered unfertilised 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 -- meaning they were able to differentiate into many other cell types, including nerve, heart and pancreatic cells -- while retaining a single set of chromosomes.

"This study has given us a new type of human stem cell that will have an important impact on human genetic and medical research," said Nissim Benvenisty from Hebrew University of Jerusalem and principal co-author of the study.

"These cells will provide researchers with a novel tool for improving our understanding of human development, and the reasons why we reproduce sexually, instead of from a single parent," Benvenisty reported in the journal Nature.

In diploid cells, detecting the biological effects of a single-copy mutation is difficult because the other copy is normal and serves as "backup."

Because their genetic content is equivalent to germ cells, the new stem cells might also be useful for reproductive purposes.