SIBCB Researchers Generate Human Haploid Embryonic Stem Cells

Mammalian haploid embryonic stem cells (haESCs), as demonstrated by previous efforts, can be derived from androgenetic or parthenogenetic embryos of different species, including mouse, rat and monkey. However, whether or not haploid ESCs can be generated from human remained unknown—until very recent.

On May 17th, a joint team of researchers led by Prof. LI Jinsong from the Institute of Biochemistry and Cell Biology (SIBCB), Shanghai Institutes for Biological Sciences, CAS and Profs. CHEN Zi-Jiang and WU Keliang from Ren Ji Hospital, Shanghai Jiao Tong University, broke through and reported online the generation of human haploid embryonic stem cells in *Cell Research*.

To generate human haploid embryos, ZHONG Cuiqing, ZHANG Meiling and their colleagues adopted two different methods. First, they obtained parthenogenetic (PG) haploid blastocysts by chemical activation of human oocytes. From PG blastocysts, they derived 3 ESC lines. However, no haploid cells could be enriched in these cells. Second, they produced PG haploid blastocysts by removal of male pronucleus from zygotes. They derived 4 ESC lines, two of which contained substantial haploid cells. The haploids could be well maintained in these cells for over 30 passages via fluorescence-activated cell sorting (FACS)-enrichment of haploid cells.

These PG haploid ESCs expressed classical human ESC markers and could differentiate into various cell types of all three embryonic layers in vitro and in vivo. Interestingly, different from mouse PG haploid ESCs, in which DNA methylation was quickly lost at maternally imprinted loci (ZHONG *et al*; *Cell Res*, 2016, 26: 131), human PG haploid ESCs stably sustained maternal imprinting state during cell proliferation. The generation of human haploid ESCs provides a novel tool for genetic analysis in human.

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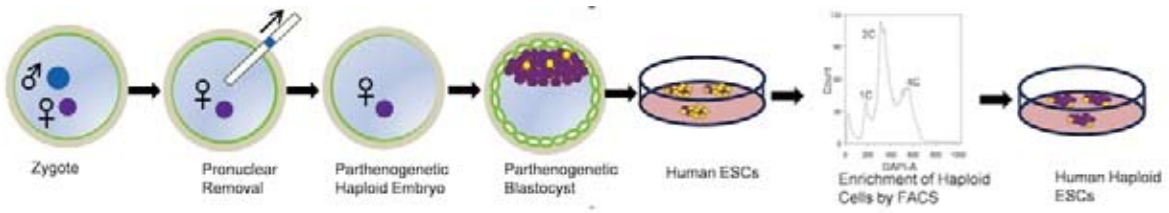

Generation of human haploid embryonic stem cells from parthenogenetic embryos obtained by microsurgical removal of male pronucleus. (Image: by Prof. LI Jinsong's lab)