

Chinese Experts Successfully Produced Transgenic Animals from Haploid Embryonic Stem Cells

Individual animals produced by haploid stem cells are ideal models for studying recessive genes. Haploid stem cells not only can maintain haploidy, but also are capable of replicating themselves infinitely. Modified genes can be passed on to future generations through genetic engineering of haploid embryonic stem cells, which thus avoids the germline chimerism caused by other transgenic methods and greatly improves the analysis efficiency of the function of gene modification. However, natural haploids are only restricted to germline cells in mammals. Currently in mammals, only the embryonic stem cells in rats and mice can be used as the carrier of gene modification, but the embryonic stem cells of other mammals, including primates, cannot guarantee germline transmission, which has seriously hindered the establishment of disease models by using these species.

Prof. Zhou Qi and Prof. Zhao Xiaoyang of the Institute of Zoology, Chinese Academy of Sciences, successfully established androgenetic haploid embryonic stem cell lines in transgenic mice and proved that the ahES cells can produce zygotes and live decedents, functionally similar to gametes. Their research results were published in *Nature* online on September 30, 2012.

The technology of using haploid stem cells for inheritable gene modification raised the possibility of surpassing the difficulty in producing stably inheritable non-rodent genetically modified animals and provide a new approach to produce disease models for the study of gene functions for primates and other large animals. It may also contribute to the development of new medicines and the study of the pathogenesis of many diseases, and shed new light on the identification of human disease genes and gene augmentation through assisted reproduction.

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