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Editorial Open Access

Methods Introduction of Transgenic Animal

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Editorial

Transgenic animal is the animal whose genome contains exogenous gene. It adds the exogenous gene into sperm, egg cell or fertilized egg cell through cell fusion, cell reorganization, genetic material transfer, chromosome engineering and gene engineering in according with the pre-design. Then there may be bred transgenic animal with further reproductive engineering technology.

This method can also be carried out at the blastocyst stage. It get a chimera transgenic animal.

Pronuclear Microinjection (The Nucleus of Two Fertilized Egg Cells are not Fused)

At present, the most common used method for producing transgenic animal is known as DNA microinjection. It directly injects the exogenous gene into fertilized egg cells by using a syringe with micromanipulation instrument. With the exogenous gene integrated into DNA, a transgenic animal is produced. The founders of this method are Jaenisch, Mintz etc. Gordon and Palmiter [1] successively obtained transgenic animals by this method. This method is commonly used at present, and now the transgenic animal research is mostly going based on the Palmiter method, or the method on its improvement. Wang Minhua [2] reported he produced transgenic rabbits with microinjection method transferring anti plague virus nucleic acid enzyme gene. Application of Krimpenfort produced transgenic bovine using both embryos cultured in vitro and microinjection methods.

The characteristic of this method is high efficiency of exogenous gene integration, no carrier needed and directly transferring gene. It can directly obtain pure line (not necessary, such as the situation of fish above), so it's a short experimental period. But it needs expensive equipment, difficult technical operation, and it's difficult to control the copy number and the integration sites of exogenous gene, easy causing insertion changes in the corresponding characters of the host animal genome, giving rise to heavy death.

ES Cell Based Gene Overexpression

It is a method to add the genes into embryonic stem cells, and then inject the transgenic embryonic stem cell into animal blastocyst involved in host embryos formulation, forming a chimera, until germline. Therefore, it can be used as a carrier, with the introduction of exogenous genes to obtain transgenic animal. That is to say, inner cell mass of early embryos establishes pluripotent cell lines after culture in vitro.

The advantages: It can choose a particular genotype in vitro before putting embryonic stem cells into embryonic. Embryonic stem cells can be cloned after transfection of exogenous DNA, then filtering cells containing integration exogenous DNA for cell fusion. So we can get a lot of genetically identical transgenic animals. The disadvantage is that many mosaic transgenic animals do not contain transgenosis.

At present, embryonic stem cell method is mature in mice, but late in big animals. Evans [3] parted and established pluripotent stem cell clones from the inner cell mass of mouse with different culture system. Stice and Strelchenko [4] received bovine embryonic stem cells.

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