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Transgenic animal technology: Technique and its application to improve animal productivity

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Abstract
The live stock improvement and commercial exploitation of genetically altered animal for the production of useful recombinants are major goal in animal biotechnology. The presence of foreign genes in animals are called transgenic and animals with manipulated genetic material are known as transgenic animals. Transgenic technology provides a method to rapidly introduce new genes into animals without cross breeding the transgenic animals can be used as bioreactors for the production at important drugs and other chemicals several transgenic farm animals such as cow, sheep, cattle etc, can be effectively exploited for the production of therapeutic proteins secreted into the milk in mammary Gland. Genetic manipulation of animals offers significant contribution in understanding mammalian gene expression, combating diseases, gene therapy etc.

Keywords: animal biotechnology, transgenic technique, therapeutic, gene transfer recombinant

Introduction
A transgenic animal is defined as an animal which is altered by the introduction of recombinant DNA through human intervention. The eggs used for cloning of animals can be variously modified by transfer of novel gene to develop genetically modified animals, the transgenic animals Transgenic refers to the insertion of CDNA (complimentary Deoxyribonucleic Acid) mode from specific MRNA (Messengers Ribonucleic Acid) into cells. Following are some of the uses of cloning through its application in the production of transgenic animals.

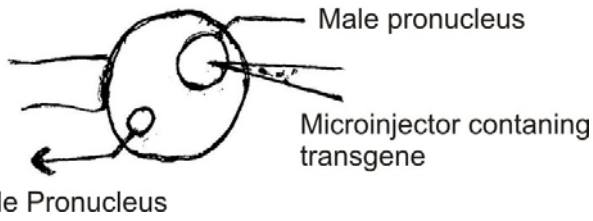
- Improvement of meal/milk production.
- Production of desire resistant animals.
- Production of biopharma Ceaticals.
- Production of protein at the industrial scale and
- Production of tissue/organs for Xenotrans plantation.

Basic Techniques of Transgenic Animals Technology
Gene Transfer Methods
Gene transfer technology involve introduction at a novel gene into the nucleus of fertilised egg. The fertilised egg carrying transfer are implanted into the relative female (Called foster mother). Implanted carrying or foster mother gives birth to progress carrying transfer finally the animals which carry transfer are identified and bred to established transgenic lines some gene transfer method carried out in animals are as following.

Retroviral Method
In retroviral method eight celled embrgo is removed and infected by defective retroviral carrying foreign gene. The retroviral is made defective in such a way that it can effectively penetrate cells without replication. The transformed embryo is then implanted back in foster method. After birth, the meting are carried out to established transgenic line.

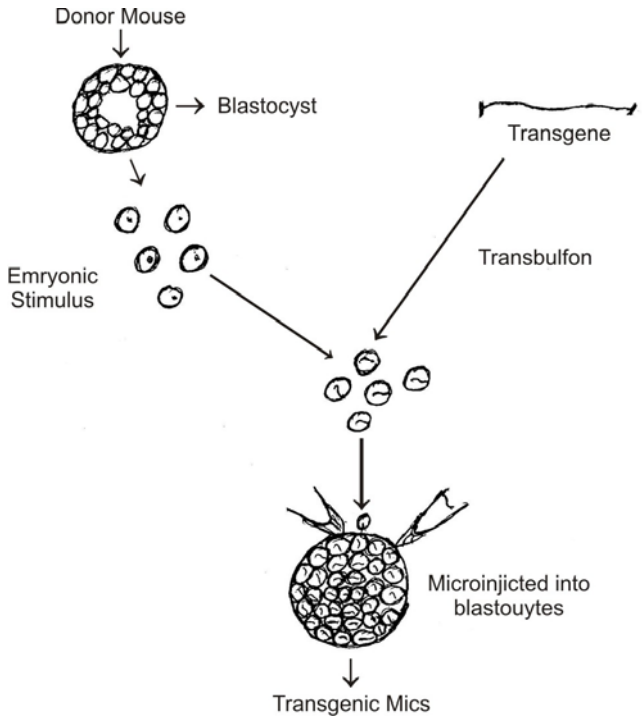
Although retrovirus is a goal choice as a vector, it can carry only limited size of the benign DNA.

Microinjection
In this method the fertilized eggs are microinjected lay DNA. Microinjection requires excess of fertilizer eggs.. The donor female is induced to super ovulate and fertilizer eggs are obtained after method with male.
Transgene is microinjected into the male pro nudes of the fertilised eggs. Male pro nucleus is clearly visible as it in larger than the female pro nucleus in the fertilised egg. Later the eggs are micro surgically implanted into the foster method. The transgenic lines are established transgenic pups.



Embryonic System
Embryonic stem cells are pleuripotent of early embryo (blestoyes) capable of giving rise to all differentiated including germ line cells. Embryonic stem cells can to cultured, maintained and are able to proliferate. The method of producing transgenic male by genetically modified embryonic stem cells includes-

i) Imitation of embryonic stem cell culture.
ii) Transfection of embryonic stem cell with transgene and screening of tramfacted ES cells PCR analysis.
iii) Transfated cells are cultured and inserted into blastocyst, which are then implanted in faster method.
iv) Transgenic lines are determined by crones from founder nice.



Application of Transgenic animals

Several dairy animals like cattle, shape, goat and buffaloes can be used as bioreactor to produce recombinant proteins. The dairy cattle produces several thousand litres of milk per year. The milk contains protein like casein and B lactoglotulin. Production of these protein is tightly regulated by promoters that limit gene exprenion only to mammary glands the transgene for therapeutic protein are tagged with this mammary gland specific promoter and the expensed proteins are then seveted into milk. Over expiration of case in transgene results in over production of casein protein which is feasible in cheese production.

Livestock are prunes to various diseases such as bacterial mastitis in cattle, and fowl cholera in some breeds. Genetic engineering offers novel approach to introduce and express transgene for monoclonal ant factors are immune protection. Transgene for interleukin, clotting factor IX, cystic bibronis transmombrance regulator (CFTR) have been cloned and expressed under the control of mammary gland specific promoters.

Transgenic Mics

The transfer of growth hormones (GH) gene. (from rest) based to the promoters for the mouse metallothionein 1 (MT) gene is the first report of transgenic animals (published in December, 1982) . Since than many transgenic animals including these in cattle, Sheep, goats, Pigs, rabbits, chicken and fish have been produced. In future these transgenic animals will be utilized for a variety of purposes: viz.

(a) Efficiency in utilized feed
(b) Ability to give baner meat
(c) Ability to grow to marketable size sooner.
(d) Resistance to certain diseases

These transgenic animals have also been used as living bio-reactions for the production of valuable recombination proteins and pharmaceuticals into their milk, blood and urine which can be used for extraction of these drugs several proteins have been obtained using transgenic mice.

i) Human alpha-1 antitrypsin (x1AT)
ii) Human tissue plasminogen activator (t-PA)
iii) Human protein C (HPC)
iv) Human fibrinogen and
v) A recombinant monoclonal antibody neutralising transmissible gastroenteritis corona virus (TGEV)

The level of synthesis of these proteins has been found 1000 bosts higher then, there syntheses through all lines. This possibility of manufacturing drugs. though transgenic animals is known as molecular barming or molecular pharming.

Table 1: A list of transgenic animals and the promoters, enhancer and structural transgenes is as follows

Transgenic Animal	Genes transferred (prometer or enhances/ structural genes)
Mouse	mMT/rGH, mMT/bGH. mMT/oGH, mMT/hGH, mMT/hGRF, mMT/hFIX
Cow	BPV, lactoferrin.
Fish	hGH, mMT/hGH, mMT/bGal, cd-crystallin, SV/hygro, AFO
Pig	mMT/hGH, mMT/bGH, hMT/pGH MLV/rGH, bPRL/bGH
Rabbit	mMT/hGH, hMT/hGH
Sheep	mMT/hGH
Goats	A variant of EPA gene (LAEPA)

AFP - Antifreeze Protein
BPV - Bovine papilloma Viras
EU - Immunoglobalin heavychoin
CXF - Growth releasing factor
FIX - Factor IX
BLG - A lactoglotailm
MT - Metallo thionain
MLP - Moloney murine leuamia virus
TPA - Tissue plasminogene antivater

Conclusion

Genetic modification of animals by recombinant DNA technologies entails the introduction of a cloned gene. The transgenic animals can be used as bioreactors for the production at important drugs and other chemical. These are numerous potential application of transgenic technology to develop new or altered strains of agriculturally important livestock. The manipulation of reproductive process using transgenic methodologies should be considered as a huge area for investigation in the future.

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