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METHODS FOR THE PRODUCTION OF TRANSGENIC ANIMALS REVIEW

[1]N. Kondanda Ram*, [2]T. Pavankalyani, [3]K. Anusha, [4]k. jessy karunya, [5]B. Kotu, [6]Sk.Gaffor, [7]J.N. Suresh kumar

[1,2,3,4,5,6] Department of pharmacology, Narasaraopeta institute of pharmaceutical sciences, Narasaraopet, Kotappakonda raod, Guntur district.

Abstract:

Transgenic animals are created by deliberately inserting a gene into the genome of an animal. Recombinant DNA methodology is used to construct the gene that is intended to express desirable qualities during the growth and development of the recipient animal. The is termed “transgenesis” which includes the addition of foreign genetic. Information to animals and specific inhibition of endogenous gene expression.

Transgenic animal models allow unprecedented control over manipulation and visualization of genes and gene product.

Transgenic animals are certainly a good turn of events since transgenic technology holds great potential in many fields, including agriculture, medicine, and industry.

Keywords: Transgenic animals, lenti virus, DNA Microinjection.

Introduction:

Transgenic animal is one that is genetically modified to carry genes from another species

Process of mixing up of genes is called transgenesis. Foreign genes are inserted into the germ line of animal so it can be e transmitted to the progeny

First transgenic animal was a super mouse created by bhai Rahul Brinster from University of Pennsylvania and Richard Palmiter from University of Washington in 1982.

Transgenic technology is a field that is under constant evolution. It holds great potential in many fields including agriculture medicine and industry. Development of transgenic animals has been part of biotechnological research

Transgenic animals are produced with the purpose of producing better and good quality breed such as increase milk yield. Transgenic animals are used to produce organs to meet the demand of organ transplantation.

Methods:

There are different methods are present for the production of the transgenic animals some of them are the.

1.DNA micro injection method:

Procedure:

Eggs are obtained from a donor female and invitro made to fuse with sperms

↓

Transgene is microinjected to male pronucleus in premature zygote

↓

Zygote transplanted to uterus of pseudo-pregnant female

Limitations:

- Success rate is very less
- Transgenic off strengths are produced
- Technique is not popular

2. Embryonic stem cell radiated gene transfer method:

Procedure:

Totipotent stem cells are isolated from donor pregnant female

↓

Cultured invitro and later transfected with desire gene

↓

Pure population of transfected ES cells is micro injected to the blastocyst

↓

Finally implanted into uterus off pseudo pregnant recipient animal

Limitations:

- Progeny produce it by this technique is chimeric
- Contain both normal cells and genetically modified cells

Examples:

- Mice
- Rat

3. Retrovirus mediated gene transfection:

Vectors of retrovirus like lentivirus and adenovirus are used for transfection

↓

There are modified by incorporating the desired gene into its genome

↓

Later recombinant virus is micro injected into embryo of animal

↓

Grown up to blastocyst in invitro

↓

Later blastocyst is implanted into pseudo-pregnant female

Limitations:

- Progeny produce is chemic in F generation
- Probably of offspring with transgene is very low

Examples:

- Pigs
- Mice

4. Transposons:

Small DNA sequence used as vector can jump from one place to another place in simply but cut and paste mechanism

↓

Recombinant transfers are micro injected into embryo of animal to have desired gene in progeny

Limitations:

- Transposons are unable to integrate the genome completely

Examples:

- Zebra
- Fish
- Chicken
- Cattle

5. Somatic cell nuclear transfer:

Oocytes are arrested in meiosis 2 of cell cycle at metaphase / telophase

↓

These are reprogrammed with nucleus of somatic cell

↓

Cells stimulated with an electric shock to begin cell cycle

Limitations:

- Inefficient due to stresses placed on both egg cell and introducing nucleus
- Results decreases of successfully programmed cells

Examples:

- Dolly
- Sheep

6. Sperm mediated gene transfer (SMGT):

Mature Spermatozoa are allowed to bind to exogenous transfected DNA

↓

Injected to cytoplasm of oocyte through ICSI (intracytoplasmic sperm injection)

Limitations:

- Whole production is dependent upon binding of sperm to DNA without losing activity

Examples:

- Cattle
- Pigs

7.Testis cell implantation:

Testis is in removed from donor male and transfected with desirable gene

↓

Cells are cultured and micro injected to lumen of seminiferous tubules of recipient animal

↓

Receipt was followed to meet mate

8. RNA interference (RNAi):

siRNA has complementary sequence which attaches covalently with specific sequence on principle mRNA

↓

Agronaut not destroys complimentary sequence on principle mRNA stand

↓

Silences particular gene

Examples:

- Salt sensitive rats used in hypersensitive.

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Conclusion:

Transgenic processes have been adopted to increase the disease resistance in animals, such as genetic immunization with recombinant plasmid containing gene for antigen of interest has been attempted for prevention of infectious diseases, e.g., rabies, pseudo rabies virus, etc.

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