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Popular Article

Production of disease resistant genetically modified (GM) animal

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Abstract

The host and the pathogen are primarily considered in disease control measures. Traditionally, controlling animal sickness entails either eliminating the pathogen or the vector that spreads it, whether through immunization, treatment with antibiotics and other medications, or the application of pesticides to eliminate mosquitoes. Even though these traditional methods have been effective in eradicating a particular disease, there are still several problems with animal health and sickness. Additionally, pathogens become resistant and their genomes change due to the indiscriminate use of antibiotics, anthelminthic, etc., making control strategies ineffective. Due to mutations in the cause-causing agents' genetic structures, dengue, malaria, and chikungunya control in India has recently become challenging.

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Introduction

Strong genetic tools are becoming accessible to help counter disease as an alternative to the traditional methods. Humans domesticated some wild herbivore species a few thousand years ago. Through selection, we indirectly altered the genetic makeup of these species for our own needs. The striking distinctions between animals now and their ancestors are, in large part, evidence of how well selection and genetic improvement occurred. Animals were chosen based on their observable traits before the molecular basis of heredity was known. The development of molecular tools, better animal breeding techniques, and computational tools have made it possible to choose desired genotypes that regulate the economic features of farm animals for genetic improvement in the future.

Although it's still challenging to measure and improve qualities like fertility and disease resistance. In the traditional breeding process, some unwanted features, such as poor reproductive efficiency and lesser disease resistance, are automatically incorporated in order to select for desired characters like growth, production, etc. The range and scope of genetic improvement are severely constrained by QTLs transferred from the parents to the next generation of selecting progenies. Gene insertion through transgenic technology might provide a way to get beyond these restrictions. An alternative to traditional animal breeding is genetic modification.

Genetically Modified Technology

With this approach, it is possible to improve the ability of the animals to mount an appropriate immune response against the pathogen or to create an efficient system that would directly block the entry of pathogen and destroy them. This technology can be applied for specific applications where genetic variation does not exist significantly in a population toward a holistic genetic improvement programme. Additionally, the best course of action may turn out to be a combination of techniques.

Genetically Modified Animal

Due to the availability of functional alleles for the creation of a strong antiviral state in response to infection by a certain set of viruses, including influenza, possibly due to interaction-induced antiviral mechanisms, the mx genes of vertebrates were first discovered in mice.

In 1990, Herman Bull produced the first transgenic, genetically altered bovine. In 1994, eight calves were born, and each of their descendants had the lactoferrin gene altered. 83 more children were born to this superior bull. Argentina and China both produced GM dairy cows in 2011. These experiments sought to generate cow milk that had been genetically altered to match human breast milk by introducing human milk genes.

Uses of Genetically Modified Animal

1. GM animals could be used for model for studies on disease progression and its control.
2. Gm based resistant livestock and their produce could be used in food chain.

Techniques For Production of Genetically Modified Animal

1. Dominant-negative protein
2. Ribonuclease acid interference (RNAi)
3. Ribonucleic acid decoys

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Conclusion

Genetic improvement programmes may choose to to select disease-tolerant breeds of dairy animals that are compatible with the current climate change environment for sustainable production and reproduction performance toward maximising profitability using conventional, molecular, reproductive, and genetically modified technology.

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