



A Note on the Genetic Engineering

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DESCRIPTION

Genetic engineering, also known as genetic modification or genetic manipulation, is the use of biotechnology to directly manipulate an organism's DNA. It refers to a range of techniques for altering the genetic makeup of cells, including as gene transfer within and across species borders, in order to create better or novel organisms. New DNA is created by isolating or duplicating the genetic material of interest *via* recombinant DNA technologies, or by synthesising the DNA artificially. To introduce this DNA into the host organism, a construct is normally built. By mixing DNA from the monkey virus SV40 with DNA from the lambda virus, the first recombinant DNA molecule was created. The method can also be used to remove genes, or "knock out" genes, in addition to adding them. The new DNA might be put into the genome at random or targeted to a specific region.

Genetically Modified Organisms (GMO) are the organisms that have been created through genetic engineering. The first GMO was created by bacteria. When he put foreign DNA into a mouse in 1974, he created the first GM animal. The company that was the first to focus on genetic engineering and begin producing human proteins. Human insulin was genetically modified in 1978, and insulin-producing bacteria were commercialised in 1982. Since the release of the Flavr Savr tomato in 1994, genetically modified food has been available for purchase. Although most current GM crops are developed to boost insect and herbicide resistance, they are engineered to have a longer shelf life. The first GMO intended for use as a pet was sold in the United States.

Many sectors, including science, health, industrial biotechnology, and agriculture, have used genetic engineering. GMOs are used in research to explore gene function and expression through experiments such as loss of function, gain of function, tracking, and expression. It is feasible to construct animal model organisms of human diseases by knocking out genes relevant for specific ailments. Hereditary engineering offers the potential to heal genetic illnesses through gene therapy, in addition to creating hormones, vaccines, and other medications. The same procedures that are used to make

pharmaceuticals can also be utilised to make enzymes for laundry detergent, cheeses, and other items in the industrial sector.

The introduction of genetically modified crops has benefited farmers in a variety of countries, but it has also sparked much of the debate surrounding the technology. This has existed since the beginning of its use; anti-GM demonstrators destroyed the initial field testing. GM food safety is a major issue among sceptics, despite scientific consensus that currently available food derived from GM crops presents no more danger to human health than conventional food. Gene flow, non-target organism influence, food supply regulation, and intellectual property rights have all been mentioned as possible difficulties. As a result of these issues, a regulatory framework has been created. It resulted in the adoption of the Cartagena Protocol on Biosafety in 2000, which is an international treaty. Individual countries have evolved their own GMO regulatory frameworks, with the United States and Europe having the most significant disparities.

Genetic engineering

Genetic engineering is a technique for changing an organism's genetic structure by removing or adding DNA. Unlike traditional animal and plant breeding, which entails performing several crossings and then selecting the creature with the desired trait, genetic engineering transfers a gene from one organism to another. This method is substantially faster, may be used to introduce genes from any organism (including those from different domains), and prevents the addition of unwanted genes.

By replacing the damaged gene with a functional one, genetic engineering may be able to treat serious genetic illnesses in humans. It is an important research tool that allows researchers to investigate the function of certain genes. Drugs, vaccines, and other items have been extracted from creatures that have been genetically modified to make them. Crops that increase production, nutritional value, and resistance to environmental challenges have been created to help with food security.

The DNA can be directly implanted into the host organism or into a cell that is fused or hybridised with the host. This

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technique uses recombinant nucleic acid procedures to create new combinations of heritable genetic material, which is then

included either indirectly *via* a vector system or directly *via* micro-injection, macro-injection, or micro-encapsulation.