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Genetic Engineering and its Process

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COMMENTARY

The process of modifying the DNA in an organism's genome is known as genetic engineering, or genetic modification. This could entail modifying a single base pair, deleting a large chunk of DNA, or adding a second copy of a gene. It might also imply taking DNA from another organism's genome and mixing it with that person's DNA. Genetic engineering is used by scientists to enhance or modify the characteristics of an individual organism. Any organism, from a virus to a sheep, can be genetically modified. For example, genetic engineering can be utilised to create plants with higher nutritional value or that can withstand pesticide treatment. We've used the example of insulin, a molecule that helps regulate blood sugar levels, to describe how genetic engineering works. Insulin is normally produced in the pancreas; however insulin production is impaired in persons with Type 1 diabetes. As a result, diabetics must inject insulin to keep their blood sugar levels under control. From yeast and bacteria like Escherichia coli, genetic engineering has been utilised to develop a kind of insulin that is extremely similar to our own. In 1982, Humulin, genetically engineered insulin, was approved for human use [1].

The genetic engineering process-A plasmid is a tiny circular fragment of DNA taken from a bacteria or yeast cell. Restriction enzymes, sometimes known as molecular scissors, are used to cut a small portion of the circular plasmid. The human insulin gene is put into the plasmid's gap. This plasmid has undergone genetic modification. A fresh bacteria or yeast cell is inoculated with the genetically modified plasmid. This cell then divides quickly and begins to produce insulin. The genetically engineered bacteria or yeast are cultivated in enormous fermentation tanks that contain all of the nutrients they require to produce large volumes of cells. Insulin is produced in greater quantities as cells divide. The mixture is filtered to release the insulin after fermentation is complete. Following that, the insulin is purified and packed into bottles and insulin pens for distribution to diabetic patients. In 1973, bacteria became the first genetically engineered organism. The identical techniques were used on mice in 1974 [2]. The first genetically modified foods were released in 1994. Scientific research, agriculture, and technology are just a few of the possibilities for genetic engineering. Plants such as potatoes, tomatoes, and rice have benefited from genetic engineering to boost their resilience, nutritional value, and growth rate. Conventional evolutionary theory has had a hard time explaining the conclusions of molecular genetics. New studies about protein structure conservation function across very large taxonomic boundaries, mosaic structure of genomes and genetic loci, and molecular mechanisms of genetic change all point to a view of evolution as involving the rearrangement of basic genetic motifs. A closer look at how live cells rebuild their genomes uncovers a plethora of sophisticated biochemical systems that are controlled by complex regulatory networks. We know that cells can undergo substantial genome reconfiguration within one or a few cell generations in some situations. Antibiotic resistance in bacteria is a recent example of evolutionary change; molecular analysis of the phenomenon has revealed that it is caused by the addition and rearrangement of resistance determinants and genetic mobility systems, rather than gradual modification of pre-existing cellular genomes. Furthermore, bacteria and other species have complex repair processes in place to prevent genomic changes caused by random physicochemical damage or replication machinery mistakes [3].

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