

## Recombinant Insulin

Insulin is prepared by recombinant DNA (rDNA) technology for medicinal purposes on a large scale. It was first produced in 1983 by an American Biotech company. The trademark name is Humulin® and it is licensed to Eli Lilly, the company which manufactured it for the first time.

Genes, which code for functional A and B peptides of insulin, were inserted in the plasmids of non-pathogenic E.coli strains. Both the chains are produced separately and joined afterwards by disulphide linkages.

Biopharming to produce insulin is being researched. Scientists have succeeded to insert insulin genes in safflower plants. It will help in reducing production cost.

Also Read: [What is Plasmid?](https://byjus.com/neet/plasmid/)

## The Need for Preparing Genetically Engineered Insulin

Insulin has been used for many years to treat diabetes. Diabetes is well managed by taking insulin. Earlier insulin was extracted from the pancreas of killed cattle and pigs. It had shortcomings. It used to stimulate allergic reactions and other immune responses due to its foreign origin in some people. Another challenge was to cater to the ever increasing demand and large scale production.

To overcome this, the production of insulin by recombinant DNA technology was done and it has proved to be very beneficial. In fact, it was the first recombinant medicine to be used in the USA.

Biosynthetic insulin produced by rDNA technology is purer than animal insulin. It reduces the formation of antibodies against it.

## Difference Between Natural and Recombinant Insulin

Insulin is a protein hormone synthesised by the 𝛃 cells of the pancreas. It is produced as a prohormone, i.e. Preproinsulin. The signal peptide cleaves to give proinsulin. Proinsulin has to be further processed to become functional. Proinsulin contains another peptide chain known as ‘C’ peptide in addition to ‘A’ and ‘B’ peptides, which are required for its functionality. From proinsulin, the C peptide is removed at the time of maturation.

The genetically engineered insulin does not contain the C peptide.

