Human Insulin

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The discovery of Insulin by Banting and Best in 1921 revolutionised the management of Type I diabetes. The early Insulins were made in very dilute strengths and contained many contaminants. The main problems associated with the use of Insulin were allergic reactions, Insulin resistance, lypodystrophy and the short life of the product.

The purity of Insulins improved by using re-crystallisation methods. The concentration of Insulin increased and is available in U-40, U-80, U-100, U-500 units/ml. Insulin U-100 is utilised with specially manufactured injections. This makes measurement easier and diminishes confusion of patients with the different concentrations of Insulin products. The second step in purification came with the use of chromatographic techniques to produce the single peak products.

Insulin more than 99% pure is available which is the mono-component of NOVO and single component of LILLY. Pure Insulins are less immunogenic and cause less allergy and resistance. Furthermore, by purifying Insulin it was possible to produce a regular Insulin with Neutral PH which makes mixing short-acting and intermediate-action Insulins possible, this can then be given in a single injection.

In 1955 the structure of Insulin was discovered and in 1960 the sequence of amino acids were known. The difference between Human, Porcine and Bovine Insulin was also recognised. Since then the research for production of Human Insulin has been effective and now that this aim has been achieved, Human Insulin is available.

Human Insulin is produced by two methods : The first, by modification of Porcine Insulin chemically. The product is manufactured by NOVO Company and available by the trade name Mono-component H.M. The second method is by recombination of D.N.A. technology. By genetic engineering it was possible to obtain Insulin from E. coli. The product is manufactured by LILLY Company under the trade name of HUMULIN.

Studies did not show any great advantages in diabetic control by using Human Insulin. Human Insulin is absorbed more rapidly via the subcutaneous route than Porcine Insulin. Human Insulin has a shorter duration of action. Studies also suggested that Human Insulin causes a greater decrease in hepatic glucose production than Porcine Insuline. Human Insulin is the least immunogenic Insulin. Patients treated by Human Insulin from the beginning of management have lower circulating Immunoglobulin G and Immunoglobulin GE Insulin antibodies if compared to the patients treated with Porcine Insulin.

Studies indicate that the anti-insulin anti-bodies levels decrease when one changes the Insulin administered to Human Insulin. Some patients with Insulin allergy and Insulin resistance have responded beneficially to changing to Human Insulin.

In summary Human Insulin is indicated for patients with Insulin allergy, patients with Insulin resistance and it is wise to use Human Insulin when the patient needs Insulin therapy in the short term e.g., gestational diabetics and Type II diabetics undergoing surgery or suffering from infection. On changing the patient to mono-component or Human Insulin it is advisable to lower the dose by 20% and adjust the dose in accordance with the level of blood sugar. In such circumstances monitoring of the patient's blood sugar levels and not the urine is imperative.