

FACTOR VIII PRODUCED BY GENETIC ENGINEERING FOR FIRST TIME

It is jointly announced in London and San Francisco that scientists of Genentech Inc, co-operating with scientists in the UK have successfully produced functional Factor VIII through recombinant DNA technology. This is the first known 'Genetically Engineered' production of the critically needed blood-clotting protein used in treating haemophilia. It represents a dramatic step forward in the ability to provide enough pure factor VIII to enable haemophiliacs to lead more normal lives.

This major advance in biotechnology was reported at a conference at the Royal Free Hospital on Thursday 26th April. Speywood Laboratories of Wrexham have pioneered the purification of blood plasma and the Royal Free Hospital Haemophilia Centre and School of Medicine in London England, provided Factor VIII purified from over 5 tons of human plasma to enable Genentech scientists to carry out detailed characterization of the protein. Monoclonal antibodies to Factor VIII:C also produced at the Royal Free Hospital were critical in this work.

Haemophiliacs suffer from a genetic disease characterised by spontaneous bleeding and failure of their blood to clot normally. Infusions of Factor VIII are necessary to prevent uncontrolled hemorrhaging or bleeding.

Factor VIII is currently produced in relatively impure amounts by extraction from blood plasma obtained from human donors. This procedure is very costly and the resulting product carries a risk of exposing the haemophiliac patient to hepatitis and, possibly, AIDS (Acquired Immune Deficiency Syndrome). Scientists throughout the country have been zealously searching for a means of producing human Factor VIII through recombinant DNA technology in order to provide a safer, purer and more plentiful supply of this much needed blood protein.

The search has been long and difficult. While the existence of the rare protein had been known since the early 1950's, its molecular structure was not known. Several scientific teams have reported obtaining portions of the gene containing genetic information for producing the protein. However, until now no one has reported obtaining the entire gene and making biologically active human Factor VIII. Production of the biologically active protein required further substantial scientific advances, which have now been achieved.

The Genentech scientists then applied new, advanced techniques in recombinant DNA technology to produce functional human Factor VIII. This process ('cloning and expression') was extremely difficult because human Factor VIII is a very elusive, delicate and exceptionally large protein.

Factor VIII is, in fact, the largest protein ever produced through recombinant DNA technology - four times larger than human serum albumin, which was previously the largest genetically engineered protein and also was first 'expressed' by Genentech scientists. Factor VIII has over 2,300 amino acids, compared to 585 for human serum albumin. Most genetically engineered proteins are much smaller, such as alpha interferon, which is composed of only 166 amino acids.

Several years of work remains before the product will be available for use by haemophiliacs, according to Genentech estimates. In the meantime, researchers will be able to better study the biochemical basis of haemophilia and possibly develop techniques for prenatal diagnosis of the disease.

Genentech Inc, is a leading biotechnology company, focusing on the development, manufacture and marketing of pharmaceuticals produced by recombinant DNA technology. Principal human and animal health products in development include : Human Growth Hormone, Gamma Interferon, Tissue-type Plasminogen Activator and Bovine Interferon.

Speywood is a British owned company specialising in the fractionation of blood products and is the only company in the world producing Porcine Factor VIII for certain types of haemophilia unsuited to normal forms of therapy.