

T H I *knags* W E E K

Biotechnology brings hope for haemophiliacs

Genes
at work

HAEMOPHILIACS may soon be able to look forward to a normal life—thanks to the technical achievement of a small British biotechnology firm. Scientists at Speywood Laboratories claim to be the first in the race to purify human "factor VIIIc", one of the blood-clotting factors that prevents uncontrolled bleeding.

"This is a major development in the health care of haemophiliacs," says Peter Jones, director of the Newcastle Haemophilia Centre. "For the first time we will have commercial quantities of pure factor VIII to convert severe haemophilia into a mild disease."

Children, says Jones, will benefit most. With large amounts of the pure product, he says, doctors will be able to start treatment early in life. Children will be able to take part in sports, without the danger of the profuse bleeding into the joints that often cripples them before they reach early adulthood.

Earlier, this month Speywood signed an agreement with Genentech, the San Francisco based genetic engineering firm. Genentech will "clone" the gene for Factor VIII and could be manufacturing on a large scale inside three years.

Britain's haemophiliacs, whose supplies have been under pressure because of health service cutbacks, may eventually be assured of a constant supply. And the prospect for treating patients in the Third World is much brighter.

Factor VIIIc is one of two active components of Factor VIII, a major blood clotting protein. Classic "bleeders" have little or no VIIIc in their blood, while a lack of VIIIa causes a variant of haemophilia called von Willebrand's disease. Altogether there are about 3500 "classic" cases of haemophilia in Britain.

Most of the Factor VIIIc used to

treat these haemophiliacs comes from human blood. While there is no shortage of human plasma, the extraction procedure is expensive and tedious. Most of the available supplies of VIIIc are used by haemophiliacs in developed countries. Jones estimates that some 3500 haemophiliacs in India alone go untreated.

The Speywood team achieved their breakthrough in less than a year. Speywood's process depends on passing blood over beads coated with monoclonal antibodies that can pluck VIIIc and VIIIa out of the mixture of other proteins in human blood. These columns, developed by Dr Allison Goodall at the

Stephanie Yanchinski

Royal Free Hospital and Frances Rotblat at the Haemophilia Centre, remove 95 per cent of VIIIc and 90 per cent of VIIIa from normal plasma.

At least half a dozen companies in the United States and Europe, including major genetic engineering firms such as Genentech and Biogen, have tried without success to purify factor VIIIc. David Heath, Speywood's founder and managing director, foresees a worldwide market worth at least £200 million. Eastern Europe may be especially lucrative.

Half of the 54 million units required by Britain's haemophiliacs last year came from the United States. They cost

about £3 million. This blood often carries hepatitis B virus which, if given to haemophiliacs regularly, can lead to chronic liver disease, even cirrhosis and cancer, according to Jones. The purer Speywood product will be much safer.

Jones says that development now depends on work to perfect a preparation which can be taken orally or through the skin, instead of by injection into a vein.

Under the new agreement Speywood hands over the pure protein and monoclonal antibodies to Genentech's scientists. By breaking the protein down into its constituent amino acids, Genentech will be able to make a genetic probe to fish for the VIIIc gene in a bank of human gene sequences. It can then insert the gene into a suitable "host". Mammalian genes, not bacteria or yeasts, will be used.

However, William Costello, director of special projects at Speywood, warns that although Genentech may have an "expressing" clone making protein within 27 months, the process may not yet be economic. Or the protein may turn out not to be active. Charles Rizza, director of the Oxford Haemophilia Centre, says that unless the new product is much cheaper and entirely free of bacterial contaminants "we may be swapping one set of problems for another."