Biotechnology

Insulin on tap

Insulin has become the first product of genetically manipulated bacteria to be marketed for human use. Now that Eli Lilly has official approval for sale in the United Kingdom of bacterially-produced human insulin, it will try to wrest from Novo Industry some of the £20 million annual market for insulin in the United Kingdom.

Approval has come one month after publication in *The Lancet* of a double-blind clinical trial involving five UK hospitals and 94 insulin-dependent diabetics. The trial demonstrated only slight differences between Lilly's new insulin, which has the exact structure of the human hormone, and conventional preparations purified from pig or cow pancreas. Probably because it is absorbed slightly more rapidly from the site of injection, rather more of the new insulin was needed to produce the same reduction of blood sugar. That slight disadvantage, however, is offset by corresponding advantages, according to Professor Harry Keen of Guy's Hospital Medical College in London.

The possible advantages are two-fold. First, the few diabetics who develop an allergy to animal insulins may not do so to human insulin. And second, the new insulin is slightly better than the old at hastening the removal of ketones from the bloodstream.

Availability and cost, therefore, will determine the choice of insulin in the market. On the basis of a 1978 report of the US National Diabetes Advisory Board, Eli Lilly believes that the demand for insulin will outstrip conventional supplies before the end of the century, mainly because of the likely increase in insulin-dependent diabetes.

As regards cost, Eli Lilly claims to be undercutting by about 10 per cent the cost of Novo Industry's "humanized" insulin. Novo, which dominates the European insulin market, recently perfected the trick of chemically converting purified pig insulin into human insulin. Its "humanized" insulin beat Lilly's human insulin to the marketplace when it received UK approval last June.

In an attempt to beat off the opposition from Lilly, Novo had contemplated withdrawing all its conventional animal insulins, thereby forcing a switch to its human version. If that had happened, one reason for not switching to the Lilly insulin — that it was human in structure — would have been removed before it arose. However, Novo's mooted switch would have meant an increase in price, and for that reason at least the idea was dropped.

Eli Lilly will now try to muscle in on the UK insulin market with its new product, having spent a great deal of money on softening up the medical consumers by

ostentatious image advertising in medical journals before approval was granted. It is less clear what will happen in the United States where Lilly has about 85 per cent of the market already. A spokesman for Lilly said he could not comment on the question of whether approval for its new insulin has yet been sought in the United States.

It has taken just four years for Lilly to scale up the process developed by Genentech for the production of human insulin from two bacterially-produced fragments. The bacteria are supplied with synthetic genes for either the A or the B fragment of insulin. After the two fragments are produced by the bacteria at Lilly's Indianapolis site they are chemically combined either there or at the site in Speke, near Liverpool. Final purification is carried out at Speke. **Peter Newmark**

Indian space effort

Falling flat

New Delhi

from a correspondent

India's grandiose scheme for satellite-based domestic communications and direct television broadcasts has received a jolt following the sudden demise of the INSAT-1A satellite. The \$60 million multi-purpose satellite, which had a design life of seven years, was abandoned on 5 September after only four months in space. The Indian Space Research Organization (ISRO), which was responsible for its operation, said the satellite had become useless because it had no more fuel left for on-orbit control.

Ever since its launch from Cape Canaveral on 10 April, INSAT-1A had been plagued by a series of problems. For several days, the INSAT control team at Hassan near Bangalore struggled with the jammed C-band antenna and a stuck solar sail. The antenna was deployed after much expenditure of fuel but the team had no luck with the solar sail, an umbrella-shaped device meant to offset the imbalance caused by INSAT-1A's asymmetrical solar panels. In the absence of the solar sail, on-board thrusters were fired more frequently to keep the satellite balanced, so depleting the fuel. ISRO estimated in mid-June that the fuel would last until the middle of 1984, but this calculation was upset by yet another problem detected early in September. The isolation valve in the fuel manifold got stuck and the fuel simply vented into space, leaving ISRO with no alternative but to abandon the satellite.

The satellite had been partly operational since 15 June from its geostationary parking slot at 74°E, although its capacity was largely under-utilized because of problems on board the spacecraft and non-readiness of the ground segment. INSAT-1A was used to provide 200 long-distance telephone circuits (against its capacity of 4,000) and television relaying was restricted to four hours a day because of overheating

of the television transponder on board.

The loss of INSAT-1A has placed the Indian government in a difficult position. Apart from the monetary loss (part of which is covered by insurance) the country faces the prospect of keeping idle the 31 Earth stations set up at a cost of more than \$60 million. The enormous preparations for live television broadcasts of the Asian Games scheduled for November have also been jeopardized by the failure of INSAT-1A. While the radio and television networking should await the launching of INSAT-1B, the impact on the Indian Meteorological Department is minimal as it continues to get cloud pictures and cyclone warnings from the United States weather satellites.

To restore a semblance of domestic communications and to lessen the impact of INSAT-1A's failure on the Asian Games coverage, India is planning to lease two transponders of Intelsat's Indian Ocean satellite at a cost of about \$16 million a year.

NMR tomography

One of the latest images produced by the rapidly developing technique of nuclear magnetic resonance (NMR) tomography. This image was obtained in the Erlangen Laboratories of the German company Siemens AG, which hopes to market a machine for hospital use early next year, some months after the first machines are expected to be sold by Picker International. The images reflect the precessing movement and dipole characteristics of protons subjected to a high frequency magnetic field. The relaxation time of protons so affected depends upon their environment. Different environments are imaged as different shades of grey. Because it detects protons, NMR tomography provides a different picture from that of the X-ray tomography used in current brain and body scanners. Furthermore, there are no known hazards of magnetic fields to rival those of X-rays. On the other hand, the resolution of NMR tomography is inherently less good than that of the X-ray scanners (and it will wipe out credit cards — including those of potential customers with about £0.5 million to spare).