

Interferon production

Japan now

International agreements for the manufacture of interferon appear to be catching on. Last week, the Wellcome Foundation Limited (whose sole shareholder is the British foundation known as the Wellcome Trust) announced an agreement with the Sumitomo Chemical Company of Japan that will in due course enable the Japanese company to use Wellcome technology for manufacturing lymphoblastoid interferon.

The project, which is thought to be potentially worth several million pounds to the British company, will first of all involve clinical trials in Japan based on interferon supplied by Wellcome. Thereafter, the Japanese company will decide whether or not to go ahead with the building of a plant for producing interferon commercially, using the techniques developed at the Wellcome Foundation over the past few years.

Broadly speaking, the technique is to infect a culture of lymphoblastoid cells with Sendai virus, which stimulates interferon production, and to extract lymphoblastoid interferon on chromatography columns loaded with antibodies against the type of interferon being produced.

So far there has been no opportunity to decide whether the recently announced technique for raising monoclonal antibodies against interferon (Secher, D. S. and Burke, D. C., *Nature*, 285, 446; 1980) will make this process efficient.

The cost of interferon plants of this kind is likely to be of the order of £5 million. It is thought that the production of interferon by the Wellcome Foundation now exceeds the total production of Finland, hitherto the chief source of interferon. For those drug houses manufacturing interferon from tissue cultures, the overriding question for the future must be whether cloning techniques will lead to more efficient and cheaper manufacture.

If it is possible to obtain as many as a hundred molecules of interferon from a bacterium such as *Escherichia coli* carrying an interferon gene, the capital costs of the manufacturing plants required to produce a given amount of interferon will be reduced at least in proportion to the ratio of the generation times of bacteria and cells in culture — 20 minutes to three days, or a factor of a hundred. Drug houses using tissue culture techniques (which are thought to include Roche and Merck as well as Wellcome) appear however to be counting on the length of the period of clinical investigation of cloned interferon that would be needed before these could be put on the market.

As things are, there is no direct evidence that cloned interferon is equivalent to that from tissue culture and in any case the multiplicity of interferon molecules now

being identified will need to be distinguished from each other physiologically and clinically, a process thought by the existing manufacturers to require five years or so.

Although the agreement with the Sumitomo Chemical Company has been formally signed, there are some grounds for anxiety that the arrangement may be frustrated by difficulties in Japan about the widespread use of whatever materials the Wellcome Foundation's Japanese partner eventually seeks to put on the market.

Occupational safety

Cuts ahead

Britain's Health and Safety Executive (HSE) is expecting difficulty in cutting its coat according to its cloth. In its latest annual report, published earlier this week, the HSE says that the government's plan to set its 1981-83 grant at 6% below the grant for 1979-80 will mean a reduction in the amount of work it can carry out.

Most of the savings will be made on staff, probably by reducing numbers from 4200 to 3800, and on internal office costs. But, says the report, some of its work of direct relevance to employers and workers, in particular that of the Factory Inspectorate, is bound to suffer. The research budget is also expected to come off particularly badly, with cuts of 18 per cent or about £2.2 million expected for the main research and development budget.

The main fear of John Locke, Director of the HSE, is that its work will become more reactive, dealing only with problems retrospectively. Such a move would be contrary to the policy of anticipating problems adopted by the executive since its creation in 1974.

Locke regards the anticipation of problems through extensive visits to workplaces and an active research programme a priority, even above some of the daily demands on the executive's time. In the report, he says that longer term work on problems with no immediate obvious effects on employers and workers, especially those of occupational exposure to chemicals, noise and radiation, must continue even if cuts have to be made elsewhere. Such a policy would be in line with the changing emphasis of the executive's work over recent years from accidents at work to longer term health problems.

The plan is to make most of the cuts in the research budget fall in those areas, commonly involving standard testing, where industry could be persuaded to step in with funds. Hence, the HSE hopes that industry will make up for the £1.6 million reduction in the research division's direct support to the inspectorates by arranging for its own tests to be done. Industry is also to be encouraged to pay for and conduct some of the work done under three of the executive's major current research projects;

a study on the toxic effects of low levels of isocyanates, a study on mortality in the rubber industry and a project at Porton Down to study the dispersal of heavy gas clouds. To avoid industry totally controlling studies on its own problems, the HSE still intends to be responsible for designing and monitoring research projects. Industry, however, will be encouraged to provide its own data for them or to pay for research that is done independently.

One of the executive's problems in defining a coherent programme of future work is that with the increasing public awareness of health and safety issues, largely fostered by its previous work, increasing demands are constantly being made on its resources and new problems are brought to its attention. One of the major areas in which it will be stepping up its work is nuclear safety to cope with the government's plans to increase the nuclear power programme and to build a pressurized water reactor. Additional resources are to be put into the Nuclear Installations Inspectorate and almost all the work on fast reactor safety is to cease so that resources can be transferred to studies of PWR design. Work will also increase on toxic chemicals and major hazards, both of which are part of EEC programmes of research.

In a plea for kinder cuts by the government, the report argues that a major reduction in its services could lead to increased expenditure elsewhere, especially in the health services and sickness pay. It says that if further cuts, beyond 6% are planned then the Health and Safety Commission, the body to which the executive is responsible, would look to the government for suggestions as to which areas of its work it should reduce.

The executive does have some statistics to support its case. The number of fatal accidents for those industries covered by the executive throughout its five year life, fell from 651 in 1974 to 544 in 1979. Non-fatal accidents have also dropped by about 25% over the period.

Judy Redfearn

Graduate students

Places sought

Demand from new British graduates for research grants is surprisingly buoyant this year. Half-way through the short season during which the research councils make awards, the Science Research Council at least is modestly encouraged by the volume of applications, which is well up on that of last year.

Part of the explanation is the relaxation of the rules for the awards in the gift of the SRC Engineering Board. For the second year, awards of engineering studentships both for research and for advanced study (usually leading to an MSc degree) are being made on the principle of "first come,

first served”.

Now that word of the new regulations has percolated to the universities, the Engineering Board's objective of increasing the amount of postgraduate study seems well on the way to being achieved. The Engineering Board has set itself a target for this year of 435 research studentships and 535 advanced course studentships, and gives the impression of being prepared to spend more in future years if only it can attract suitable applicants.

In science subjects, where the rules are unchanged, the target for the award-making season is virtually the same as last year — 769 research studentships and 435 advanced course studentships. These awards are made on the nomination of university and polytechnic departments on the basis of quota allocations by the various subject committees of the Science Research Council. Even so, there is some evidence that the volume of applications is greater than in 1979.

The parallel operation of these two systems is likely to throw an interesting light on the workings of the quota system. Although (outside engineering) the quotas are fixed by the SRC subject committees after a necessarily subjective estimate of the capacity of individual departments to provide training in research, many of those who wish to see a further concentration of research support on departments with high reputations have regarded the quota system as an impediment to change. Would-be engineering research students are in the circumstances more free to decide where to settle, for which reason a comparison of the distribution of research students in science and engineering will be of some interest when the award-making process is over.

Applications for postgraduate awards have also increased under the SRC's scheme for Cooperative Awards for Science and Engineering (CASE) although a relaxation of the rules may again have helped. CASE studentships involve research projects worked out in partnership by a university department and an industrial company, which in previous years have had to be approved by the SRC before a student award can be made. For the first time this year, university departments have been allowed to nominate a student while seeking approval for a project, although an award remains conditional on the students' performance in the degree examinations.

The target for CASE studentships this year is 760, but clearly the SRC would again spend more if there were a sustained demand. It is, however, something of a surprise that the council has been able to build up to 700 awards a year in less than a decade of CASE studentships.

The apparent buoyancy of demand for postgraduate awards is somewhat at odds with reports that many new graduates are this year more anxious to find permanent

jobs than to remain in research. By the end of the summer, it is also possible that much of the demand may have melted away. One of the hazards of the process is that awards offered are not always taken up, sometimes because applications are made in duplicate. The SRC's record of this kind is that of a husband and wife who each made sixteen separate applications.

NPT review conference

Smooth start

The Second Review Conference of the Non-Proliferation Treaty (NPT) got off to a smooth and predictable start in Geneva last week. From the opening declarations which delegates to the conference were making in the first six working days, it is plain that the non-nuclear weapons states which are parties to the treaty will be urging that the nuclear powers have made too little progress too slowly towards strategic disarmament, and that the restrictions imposed on trade in nuclear materials in recent years are both a violation of the treaty and discriminatory against developing countries.

Delegates from nuclear weapons states are however heartened that these protests have been couched in moderate language. For their part, the nuclear weapons states (the Soviet Union, the United Kingdom and the United States) have been making much of the report on the comprehensive test-ban negotiations submitted to the Committee on Disarmament at the end of July and of the Committee on Assurance of Supply set up under the International Atomic Energy Agency and due to hold its first meeting at the end of September.

Procedural matters appear to have caused so far the few anxieties that have flitted across delegates' minds at Geneva. As planned by the preparatory conferences, however, the Iraqi delegate was in the end appointed charman of the conference. It has been agreed that most of the work will be done by two committees which met for the first time on Tuesday and which are concerned respectively with progress towards disarmament and security of supply.

Work on the drafting of the conference report will begin next week, and although everybody seems reconciled to the notion that the report will refer to the discontents of the non-nuclear powers, it was hoped last week that a consensus document would be agreed.

For the most part the nuclear powers presented a united front in their formal speeches, drawing attention to the need to strengthen the NPT system and to the detailed character of the report on the comprehensive test-ban negotiations. At one point, however, the Soviet delegate did seek to embarrass the United States by pointing out that Salt II would by now have been ratified had it not been for the United States Congress.

The discontents of the non-nuclear powers, expressed in several of the formal statements, were eloquently put by Mr Domingo Siazon, the leader of the Philippine delegation, who argued forcefully that restrictions on the supply of nuclear materials devised in the past few years by nuclear suppliers were a violation of the NPT, and that signatories of the treaty such as the Philippines, having signed in good faith, had every reason to expect that the nuclear powers would honour their undertaking to provide nuclear materials, fuel and equipment, without discrimination.

It is planned that the review conference will end on 5 September.

Windmill power

UK gets wind

Windmills seem to be on the march in Britain. Officials at the Central Electricity Generating Board (CEGB) will embark this summer on the choice of a site for a large windmill which the board plans to order in 1983 and commission by 1985.

The decision to buy a windmill, announced last week, seems to indicate that the board has decided to take wind power seriously. It is the first piece of alternative energy technology to be bought by the board, Britain's sole electricity utility, on a commercial basis. The early announcement of the plan is intended to stimulate British industry to develop an improved machine by 1983.

The CEGB's plan is to choose a site where other windmills could be built later to assess the characteristics of windmill arrays. It is prepared to spend about £10 million on building ten 1-MW machines. The first windmill will be a 1-MW machine, probably of horizontal axis, with a blade span of no less than 200 ft suspended 150 ft above ground. While industry is busy working on new designs to compete for the order, the CEGB will be gaining operating experience on a smaller 100-kW machine which it hopes to buy as soon as possible.

The apparent sudden interest in wind power has been stimulated by recent developments in the United States. Hamilton Standard, an American company which has pioneered wind-turbine technology, has recently claimed to have designed a windmill which could bring down the cost of wind-generated electricity to as little as 1–2 pence per kWh. Previous best estimates of cost have been about 3–4 pence per kWh.

Undoubtedly, these low estimated costs have stimulated interest in wind power within the CEGB. It is too soon to know what part windmills will eventually play in the pattern of the CEGB's electricity generation. Intermittent generation is an obvious problem unless pumped storage is available. The CEGB says that the chief contribution will be in saving fuel.

Costs of generating electricity from