France needs an "imaginative and strategic" political vision that is lacking at the present time. France must have a strong domestic programme, he says, if it is to become a credible partner in a proposed international collaboration to sequence the entire genome (see *Nature* **375,** 93; 1995).

"We can sequence the genome in three years", predicts Barateau, who also argues that such a large-scale approach will ultimately work out cheaper than the current strategy of hunting for individual disease genes. "There isn't enough money on the face of the Earth to find all human disease genes using the current approach."

For their part, French companies have begun to multiply their initiatives to exploit genome research. In particular, the French/US drug conglomerate Rhône-Poulenc Rorer has created an ambitious international network of academic research groups and biotechnology companies to speed up the commercialization of gene therapy (see *Nature* **372**, 210; 1994).

This move coincides with a decision by the ministries of health and research to coordinate their support for genome research and its clinical applications under the umbrella of a single so-called 'Génome-Santé' programme.

**Declan Butler**

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# Two centres, one approach

**Two new research centres illustrate the similarities between the way genetics-related research is being carried out in industrial and academic environments.**

**London**. The increasing importance of genetics to the pharmaceutical industry is becoming reflected in a growing convergence not merely between the interests of researchers in the industry and in the academic community, but also in their respective working practices.

Two factors are becoming particularly significant. One is the growing interdisciplinarity of research into deciphering the information contained in the human genome, which — whether in universities or in industry — uses a combination of skills, from genetic analysis through protein engineering to computer science.

The second, related, factor is size. The arrival of genomics — and the enthusiasm for sequencing the hundreds of thousands of nucleotide bases that make up human, animal and plant genomes — has turned biology into a 'big science' for academic and pharmaceutical researchers alike.

This convergence is reflected in the similarities between two new research facilities recently launched in Britain. One is a research centre opened last month by the pharmaceutical company Glaxo Wellcome in Stevenage, 40 miles north of London. The second is an independent complex currently under development by the Wellcome Trust, with support from the Medical Research Centre and the European Molecular Biology Laboratory, at Hinxton Hall, south of Cambridge.

Wellcome Trust

**Gene analysis at the Sanger Centre.**

The two centres have very different functions. The Glaxo centre is intended to become the main focus of the company's research efforts in Britain aimed at producing new drugs. The Hinxton Hall complex, which will include the Sanger Centre and EMBL's European Bioinformatics Institute, remains a basic research facility.

But the Glaxo centre, which will eventually provide high-tech working environment for several hundred scientists, also has something of the air of a university campus, for example through the deliberate inclusion in it design of multiple meeting points (or 'nodes') on the main thoroughfares between laboratories.

"Our goal is to maximize interaction between biologists and chemists, scientists and engineers, or visiting academics and staff researchers," says Alan Baxter, UK research director for the newly formed Glaxo Wellcome. "Our aim has been to provide an environment in which our scientists will spend much more of their time either sitting in front of a personal computer, or at a node discussing new findings in the literature, than in a laboratory."

Hinxton Hall, while engaged in more 'product-oriented' activities than traditional universities laboratories — such as large-scale sequencing and data storage — will similarly strive to maintain a strong feeling as an academic environment.

"In principle there will be more non-PhD scientists than in a traditional institutions, and those working there will have fewer degrees of freedom than they might have at universities," says Michael Morgan of the Wellcome Trust. "But there will still be academic research going on at the same time, and this will be essential to attract top scientists to the different institutions on the campus." **David Dickson**

# Europe faces lack of skilled recruits

**Employment in genetics-related industries is expected to grow rapidly across the European Union. Will the production of suitably qualified graduates keep up?**

**Paris**. The growth of biotechnology industries will create 2 million jobs in the 15 member states of the European Union by the year 2000, according to the European Commission. The food, chemistry and pharmaceutical sectors, it claims, already account for almost a fifth of all European jobs — a total of 15 million positions.

This optimistic outlook has been confirmed by a recent survey of European biotechnology, carried out by the management consultants Ernst and Young. The survey estimated that at present 184,000 people work directly in biotechnology-related industrial activities. It also predicted that overall growth in employment in this area will grow at 1 per cent a year, considerably higher than the general European industry average.

Most of this growth is expected to come from small companies, whose pay-rolls will grow by 6.5 per cent a year. In contrast, those of large companies will grow at a more modest rate of 0.5 per cent, and some may indeed see their workforce reduced as part of the current restructuring of the pharmaceutical industry.

This trend is confirmed by a recent study of several hundred small European biotechnology companies, carried out by the EU-supported programme Biotechnology in Europe, Manpower, Education and Training (BEMET), which showed that over three-quarters of such firms increased their workforces over the period 1991–92.

But the lack of an adequate supply of highly skilled staff is considered to be one of the main obstacles to the development of the European biotechnology industry. Both the Commission itself and its Industrial R&D Advisory Committee (IRDAC) have predicted a skills shortage, in particular because of a decline in the number of postgraduates.

The BEMET study also revealed that over one-third of companies were unable to meet their recruitment targets, mainly because of a lack of the required qualities among applicants. **Declan Butler**