

postgrads and postdocs because they may have worked on their own for so long," explains Andrew Sandham, president and chief operating officer of the recently established British functional genomics company, Hexagen (Cambridge, United Kingdom).

Like other biotechnology start-up companies, Hexagen has ambitions to develop a research critical mass as quickly as possible, growing from six employees this summer to 20 by the end of this year and between 35 and 40 planned by the end of 1997. Hexagen is looking to recruit scientists with strong fundamental skills and a talent for information technology. Being based in the United Kingdom means that Hexagen, in common with other local companies, will have an easier time attracting recruits with experience beyond academic research, although the relative closeness of gene-sequencing and bioinformatics institutes such as the Sanger Centre and the European Bioinformatics Institute (EBI) could be a fertile source of recruits who want to hone their skills in an entrepreneurial setting.

That is not to say that the institutes themselves do not have ambitious recruitment programmes. Paolo Zanella, director of the EBI, has marshalled the institute's rapid growth in the past three years from 20 to 80 employees and expects the head-count to rise to between 100 and 120 by the end of 1998. A mathematical physicist by training, Zanella is aware that recruitment policies should not be too scientifically exclusive. "The last time we advertised we asked for graduates and postgraduates in a relevant scientific discipline, such as information scientists, biologists, chemists, biochemists, but we would not exclude mathematicians or physicists as we believe they also could make a contribution," he says. "It really does not matter what their formal university education was if they are intelligent and are keen, as we can offer in-house training."

Zanella's needs are slightly different from his industrial counterparts, as the latter are seeking experts focused on one aspect of science whereas he is keen to attract multi-skilled individuals. "We need people who have a good knowledge of biology, information technology and information science. These are difficult to find, although the universities are beginning to introduce bioinformatics courses where students are taught how to handle databases, conduct similarity searches and which mix information technology/science with molecular biology."

EBI has three foci. Half its staff work in the services area, collecting sequencing data, inputting into databases and distributing that information. About a quarter are employed to carry out its in-house research, which tackles the problems associated with biological structure and function. The last quarter provides industry support, helping companies develop coherent bioinformatics activities. Most of the people recruited in research positions tend to be postdocs, while graduates and postgraduates populate the

EBI's service and support functions. Demand is fairly high, however. "We had more than 100 applicants for 10 positions we recently advertised," says Zanella.

Multinational pharmaceutical companies are also stepping up their own in-house molecular biology capabilities. The international pharmaceutical industry is in the process of significant consolidation. Companies are merging with each other as they attempt to lever out more value from their organizations. And although the numbers employed in research by the merged companies may not be increasing, the skills base and functions are changing. Many pharmaceutical companies are now recruiting more microbiologists than before, for example.

Earlier this year, Glaxo Wellcome (Greenford, United Kingdom), the world's largest pharmaceuticals company, launched a recruitment campaign to attract people who could bring new skills to the company's research capabilities. "We were looking for scientists who wanted to discover new drugs

faster than before, who were prepared to embrace new technologies and work in multidisciplinary teams," a spokesman explains. So the company advertised for immunologists, molecular virologists, molecular biologists and cell biologists, as well as for more conventional specialists in medicinal chemistry and pharmacology. From its advertisements in *Nature* and elsewhere, the company received 2,139 applications. It took on 35 new recruits.

Most pharmaceutical companies are reorganizing their research efforts so that there is more cross-fertilization of disciplines. Glaxo Wellcome has deliberately arranged its working environment at its Medicines Research Centre in Stevenage, United Kingdom, so that scientists from different disciplines cannot avoid working alongside each other. "Molecular biologists now meet and work with synthetic organic chemists — this is something that would not have happened in the past," says a company spokesman. **Mike Ward**

## Germans learn to bet on biotech

**Munich.** When Ernst-Ludwig Winnaker, head of Munich University's Genzentrum (Gene Centre), looks out of his office window, he sees the evidence of Germany's new biotechnology offensive. He views a huge building site that will extend the Gründerzentrum, a so-called incubator for new biotechnology companies. The German state of Bavaria is pouring DM28 million (US\$43 million) into this scheme.

Why are things suddenly in motion in Germany, where social forces have for so many years hindered the development of biotechnology? Restrictive laws have been relaxed, and public acceptance of genetics and biotechnology has slowly increased. The government is determined that Germany should catch up internationally.

Worldwide turnover of the biotechnology industry is expected to exceed US\$50 billion by 2000. The United States, reckoned to be ten years ahead of Germany, will contribute half of this sum. Germany has a lot of catching up to do. Analysts predict that its job market could double within five years. But that in the United States is also set to double — to 250,000 jobs. So the gap will widen.

If the biotechnology market is really going to increase dramatically in Germany, something has to be done to help new companies set themselves up. The biggest problem is lack of venture capital. The German government has now stepped in where private finances have traditionally feared to go. In spring it set up the European Recovery Programme (ERF), with a sum of DM1 billion, which will offer loans of up to DM15 million for small companies to develop and market innovative products.

The government has also increased its spending on technology-transfer programmes and increased research funds for

biotechnology by nearly 7 per cent — at a time when most research is being cut.

But things are also improving in the private financing sector. The establishment of two on-line stock markets should bring new funds to small biotechnology companies. Until now only well-established companies with at least three years' recorded profit were allowed on to the stock exchange.

However, according to the European Organization of the Self-employed, conditions remain bad in Germany for setting up new businesses, particularly because banks lack experts to advise on innovative technologies. Also, low-risk mentality continues to dominate in German society. As Jürgen Rüttgers, Germany's research minister, says, it is easier to raise capital on your grandmother's house than on a brilliant idea.

All this explains why there are around 1,300 biotechnology companies in the United States yet fewer than 100 in Germany. And, although Germany has approved the medical use of more biotechnologically produced pharmaceutical products than any other country, there are only six production centres.

If Germany were a gambling nation, punters would probably give low odds on the realization of Rüttgers' boast that Germany will become the biggest biotechnology force in Europe in the next decade. But there is no doubt that it will become at least a strong player in the field.

Winnaker is particularly optimistic. He would place his bet on Rüttgers coming through with his prediction. Bioinformatics is becoming much more important than sequencing technology at this stage in the human genome project, he believes, and at the moment no country has the lead. This is where Germany could shine. **Gabor Stiegler**