

## Biotechnology: Migration feeds culture of growth

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Vivek Malhotra is exactly the kind of energetic scientist that Barcelona is eager to attract in its drive to promote itself as an international centre for biotechnology and biomedicine.

Mr Malhotra, an Indian-born American, moved to Barcelona last year from the University of California, San Diego to pursue research into the structure of human cells – and brought a team of half a dozen experts with him.

"I'm mostly interested in how proteins are released from cells, and how cells are compartmentalised," he says in his office in the airy and modern seaside building of the Barcelona Biomedical Research Park (PRBB), where he heads the Centre for Genome Regulation's cell and developmental biology programme.

Despite decades of research, the way cells actually function is surprisingly little understood. Yet the topic remains of obvious significance for human health and the pharmaceutical industry. "It's important for almost everything," says Mr Malhotra.

He is among the scientists who have migrated to Barcelona in recent years because of its compelling combination of government research funds and a pleasant lifestyle.

"The Catalans are a very talented lot, but their talent has always been in the areas of architecture, wine and food – and they have been great in tourism. But unfortunately they have not made an impact in science," he says. "I think they wanted to start this with a big bang."

The PRBB – which was opened three years ago next to a university hospital by the Catalan and Barcelona authorities and Pompeu Fabra University – hosts 1,200 staff and researchers and is only one of several public initiatives aimed at creating a self-sustaining biotech hub centred on Barcelona.

Among the human and hardware resources advertised by the BioRegion of Catalonia (Biocat), the regional biotech promotion authority, are some of Spain's leading universities and hospitals, nine science and technology parks or zones and an established pharmaceutical industry.

There is also equipment such as the MareNostrum supercomputer and a synchrotron, a particle accelerator now under construction near Barcelona. The PRBB has in its basement a modern, robotised facility for animals used in experiments, and currently has 22,000 mice and 15,000 zebrafish.

Despite its Roman Catholic heritage, Spain also has the attraction for scientists of a relatively liberal attitude towards stem cell research.

Barcelona's medical skills and its international connections were on display last year in a pioneering transplant of a "tissue-engineered" human airway for Claudia Castillo, a Colombian woman with breathing difficulties, at the city's Hospital Clinic.

Ms Castillo's stem cells were cultivated in Bristol, England and flown to Barcelona, where they were applied to the "scaffold" of a donor's trachea (previously cleaned of the donor's cells) in a device called a bioreactor, designed in Milan. The hybrid trachea was then successfully transplanted – and not rejected by Ms Castillo's immune system because it had been colonised with her own cells.

Barcelona, of course, is not the only place trying to become a biotech hub, and faces intense competition from other centres – as well as the challenge of possible public spending constraints as a result of the global economic downturn.

It is hard to compete against rivals such as Cambridge in the UK or Flanders in Belgium, let alone US biotech powerhouses such as Boston, even if you advertise the cultural and climatic

advantages of Barcelona's Mediterranean location.

"Of course half the planet wants to be in biotech," says Jordi Camí i Morell, director general of the PRBB. "Scientists don't move somewhere for aesthetic reasons or the climate. There is good science in Minnesota which is freezing cold ... And there are north Americans here and they don't come for the beach."

The challenges include the complexities of establishing a company in Spain – a problem not confined to the biotech sector – and the relatively small size of the region's 60 or so existing companies in pure biotech. Researchers and analysts say there is also a shortage of international financing despite the existence of local funds such as the €67m (\$88m) biotech fund launched by Ysios Capital Partners.

Above all, the region's fast-growing biotech sector is in a race to reach the size at which it can become financially self-sustaining, so that projects can move smoothly from the research stage – most Spanish biotech research and development is still publicly-funded – to commercial applications.

"We know our weaknesses and we are working to overcome them. They are not in expertise, but in technology transfer ... the interface between research and industry," says Manel Balcells, who heads Biocat's executive committee. "There have been lots of [research] papers and few patents. We don't need more research centres or hospitals, we need ways of creating value."

Núria Mas, an economist and assistant professor at Iese business school who studies the sector, suggests that one way to do this would be to put more focus on so-called "white" or industrial biotech rather than the "red" medical biotech that currently accounts for about 65 per cent of Catalonia's efforts – because Catalonia has a big industrial base and "white" biotech tends to generate quicker commercial returns.

Biomedicine, however, looks set to remain at the centre of Catalonia's biotech push.

At the PRBB, Mr Camí says it is essential to keep expanding research and the infrastructure supporting it in order to reach "critical mass" before expecting significant commercial results. "We've made great progress, but from a very small base," he says. "We are approaching the inflection point."

In five years, concludes Biocat's Dr Balcells, "we'll probably be in a very competitive position with the rest of Europe and the US, or some centres in the US ... There's a long way to go. But it's on the political agenda of the Catalan and Spanish governments and the European Union. We want to be a key city for Europe in this sector."

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