

When Australian biotechnologists sit down to discuss the future of their industry, size is inevitably on the agenda. Australia may be a large country, but its population is just half the size of that of California. Niall Byrne looks at how Australia's small companies could assert themselves, despite being the underdogs.

Future outlook

Business confidence in Australia's biotechnology sector is growing, and many small, energetic biotech companies are now entering Australia's equity markets. Some see these underfunded companies as a weakness in the sector. But it may be these small firms that deliver on the promise of Australian biotechnology.

Many of Australia's research successes have come from small, underfunded research groups — for instance, the discovery of the role of the bacterium *Helicobacter pylori* in stomach ulcers, the development of the world's first bionic ear and the use of lithium to treat bipolar disorder. Perhaps the biotech flagship that investors are looking for will come from small upstarts, such as two Brisbane companies: Benitec, which hopes to treat disease by using gene silencing; or the even smaller Tissue Therapies, which uses natural protein complexes to promote tissue growth.

Close neighbours

In biotechnology, Asia and Australia often find themselves as partners — Australia being a source of ideas and of education, Asia providing the investment and manufacturing expertise to get products onto the market.

For instance, the biopharmaceuticals company Vital Biotech is based in Hong Kong but does its clinical trials and manufacturing in mainland China, and its research in Melbourne. "Australians are very inventive," explains Vital's chairman, Thomas Ko.

Many large Asian drug companies have formed partnerships with small Australian biotech start-ups. Melbourne-based bioprospector Cerylid BioSciences has formed partnerships with two of Japan's big five pharmaceutical firms. They screen Cerylid's library of natural extracts against their targets

Australia must play to its strengths. It has broad biodiversity and a rich research heritage, and there is no doubt that investment over the past century in agricultural and medical research is now paying off for biotechnology. This research base is also contributing to innovation throughout the Asia-Pacific region (see 'Close neighbours').

Australia's state governments have also discovered biotechnology and are competing to build the biggest, brightest laboratories. Highlights include Queensland's Institute for Molecular Bioscience and Victoria's Bio21 Molecular Science and Biotechnology Institute. But many Australian scientists worry that as governments try to pick winners, they are not maintaining their investment in the basic research that has made the nation's science strong.

One of the biggest, and perhaps most contentious, infrastructure initiatives is the

using assays developed by the Australians. In addition, Cerylid is partially funded by Jafco Asia, an arm of Japan's largest venture-capital firm. And Sydney company Proteome Systems has built strong links with the Japanese giants Shimadzu and Itochu.

Australia's strengths in agriculture and medicine have long been a magnet for Asian students. The result has been the creation of multinational Asian networks linked by a common alma mater. One such network is run out of the University of Queensland. It uses molecular markers to develop drought-tolerant varieties of rice, and operates in Thailand, Laos and Cambodia.

As Australian biotechnology matures, the sector will become an increasingly important source of innovation for the region. **Bob Johnstone**

nation's first synchrotron, to be completed in 2007 at a cost of more than A\$200 million (US\$138 million). Some in the science community would rather have seen this money invested in basic research. But Gustav Nossal, former director of the Walter and Eliza Hall Institute in Melbourne, regards it as a "fundamental discovery tool for biotechnology and the next generation of designer drugs".

Australia is already known as a test bed for new technologies — it has a reputation as a nation of early adopters. Parallels are beginning to emerge in the biotechnology sector. Australia is becoming a popular base for translational research, clinical trials, health economics, population-based medicine and regulatory approval.

Will the next one get away?

Australian scientists often talk of 'the ones that got away'. In the 1940s, Australia built CSIRAC, one of the world's first computers. The nation was also an early player in the space race, with regular rocket launches from Woomera in South Australia. Now Australia is a bit player in both fields.

So will the next big invention slip through its fingers? Although Australia's universities remain relatively naive about technology transfer, the environment is beginning to change. National and regional support groups such as Ausbiotech and the BioMelbourne Network are showing increasing skill in promoting and supporting commercialization. PhD students are being rewarded with equity. And governments are investing in microtechnology and the devices that will deliver the next generation of discoveries. The future is looking good for biotechnology in Australia. ■

Niall Byrne is a science and technology writer based in Melbourne, Australia.