

CSIRO's expertise helps Australia's biotech industry

Biotech companies can harness world-class capabilities to develop their research programs through the Australian Biotech Growth Partnership Program.

Picture this: a small Australian biotechnology company has a promising innovation, but not enough funds to develop it. It cannot invest millions in new laboratories or build a large research team to drive a capital-intensive, multi-year project.

The biotech company struggles to raise venture capital due to the small size of this funding market in Australia. Even if it could raise significant equity capital, the company is concerned about diluting ownership at such an early stage. It wants to raise capital when the technology is further developed.

Management considers outsourcing the research component to a private provider, but is concerned about being locked into a long-term, inflexible contract. An offer to partner with a larger biotech is rejected because it would lead to intellectual property (IP) loss.

Another challenge is the biotech company's small network. It does not have the capital or connections to take a multi-disciplinary research approach that would expose its discovery to other potential applications across industry. And its executive team, strong in scientific research, recognises that greater expertise is needed on IP and commercialisation strategies.

The above scenario has played out too many times in an Australian biotech industry characterised by a handful of billion-dollar, ASX-listed companies, and a long tail of small and medium-size enterprises that often lack the capital to develop exciting innovations.

It is also a key reason that more biotech companies are accessing the world-class research capabilities, networks, and commercialisation expertise of Australia's national science agency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

Biotechs take advantage of CSIRO resources

More than 50 biotechs are harnessing CSIRO's research infrastructure to develop and add value to their research programs through its pioneering Australian Biotech Growth Partnership Program. Designed to support the growth of Australia's biotechnology industry, the program gives smaller biotech companies cost-effective access to state-of-the-art laboratories, some of the world's leading biotech researchers, and CSIRO's unique multi-disciplinary network.

'Working in partnership with CSIRO means a tiny biotech start-up, for example, can have a large research-and-development capability behind it, and the capacity to do more high-level R&D,' says Dr Paul Savage, Program Director of the Australian Biotech Growth Partnerships initiative at CSIRO. 'The biotech company can also access CSIRO's network across a range of disciplines, and across global and local university and research bodies, giving its innovation a better chance of being commercialised.'

CSIRO has a proud history in biotech research. Its expertise in determining protein structure and therapeutic design led to the development of Relenza™, the first drug successful in treating the

flu. CSIRO was also a major contributor to the development of extended-wear contact lenses as a partner in the Vision CRC. It has also helped smaller Australian biotech companies – notably Peplin, which LEO Pharma acquired in 2009 for US\$287.5 million.

CSIRO is not resting on these and/or several other impressive bioscience achievements. It believes that collaborative R&D projects that link small and medium-size enterprises with CSIRO and other research organisations will help Australia to 'create the next generation of world-leading companies such as ResMed and Cochlear'.

Savage says four key factors attract biotech companies to the Australian Biotech Growth Partnerships Program.

Depth of expertise

The first factor is the scale of CSIRO's biotech resources and expertise, which covers protein and synthetic chemistry to discover new biological and chemical entities for pharmaceutical applications; gene cloning and protein engineering/ expression; an in-demand fermentation facility for scale-up production; stem cell sciences; and structural biology.

CSIRO's Frontier Science research develops new biotech discoveries for its health, agricultural and veterinary partners. 'A biotech company that engages CSIRO can harness a depth and breadth of research capability and expertise to manage technical risks that cannot be easily replicated,' says Savage. 'It's a powerful asset available to small and large biotech organisations.'

Program flexibility

The second attraction is flexibility. Savage says that some biotech companies use CSIRO for contract research projects that last months; others use it for multi-year projects. 'CSIRO has a very flexible approach to how it shares risks and rewards with its partners. We understand the needs of emerging biotech companies that do not have a lot of capital to work with.'

This flexibility extends to IP ownership – a critical issue for technology companies. 'It's often really important that the biotech company owns its IP, because it becomes an asset on the balance sheet. CSIRO does not expect to own the research IP,' says Savage. 'We take a very pragmatic approach to IP, rather than apply a one-size-fits-all model, and have developed several co-investment options to suit different types of projects.'

CSIRO's network

The third attraction is CSIRO's network. Its multi-disciplinary approach and linkages with universities and research providers such as Bio21 Institute and the Synchrotron can help biotech partners expose their research to a wider network in Australia and offshore. This can attract new research or commercialisation partners, or find applications for an innovation in a field that the biotech company might not have considered. CSIRO says the 'multi-disciplinary integration of these capabilities with an outcome focus is unique in Australia'.

Pragmatic approach

A collaborative approach that extends beyond laboratory research is the program's fourth attraction. Savage says CSIRO can help biotech companies with

their growth strategies, IP development and patent applications, and can provide advice around technology spin-offs. 'We are not in the business of only doing more fundamental research. Our focus is working to our biotech partners' budgets and timeframes, ensuring they achieve key project milestones, and ultimately helping them take their ideas and products to the market.'

Savage believes that these four CSIRO capabilities can help develop promising biotech companies, and he is optimistic on the industry's future. 'The Australian biotech sector has a very bright outlook.'

We have a rich culture of R&D, lots of talented people, and lots of great ideas. The challenge is to help smaller biotech companies access the resources they need, and create a stronger culture of commercialisation in this country. It's not enough to produce a large body of high-quality research; we must turn more of it into products, companies and outcomes, through innovative approaches to partnerships and collaborations.' ●

To learn more about the Australian Biotech Growth Partnership Program, visit csiro.au.

Other examples of CSIRO's biosciences achievements include:

- a strategic research alliance with Vegenics, a subsidiary of the Australian biotechnology company Circadian Technologies, for the development of biological therapeutics for cancer
- fragment screening and structure-based drug design for Australian biotechnology and international pharmaceutical companies
- working with Medical Developments International, developed a new industrial process for the manufacture of the active ingredient in the Pentrox™ analgesia inhaler
- science innovation in the areas of polymer science and biology, leading to the successful formation and spin-off of PolyNovo Biomaterials Ltd and Polyactiva Ltd
- developed a photo-cross-linking platform technology for tissue sealants and scaffolds for regenerative medicine
- contributed to the formation of Avipep, a result of its expertise in small, recombinant forms of antibodies that can be applied in areas such as cancer diagnostics and therapeutic delivery

CSIRO's bioscience capabilities include:

- developing novel biomaterials as implants and as delivery and diagnostic agents
- translating gene-expression signatures into candidate protein biomarkers
- molecular and cellular biology of biomaterials and matrix biology
- stem-cell biology
- production of large numbers of stem cells in controlled culture systems
- protein and scaffold display technology
- protein bioconjugation
- mammalian cell culture and fermentation
- protein crystallisation
- biophysical characterisation of proteins and protein complexes
- recombinant antibody engineering
- tissue scaffold design
- producing recombinant proteins for structural and therapeutic studies
- structural elucidation of proteins
- protein modelling
- small molecule-protein interactions.

Biomedical manufacturing at CSIRO

Biomedical manufacturing is one of Australia's most innovative and rapidly-growing industries. Partnering with CSIRO provides growth opportunities for Australian biotechnology, pharmaceutical and medical technology businesses.

Our expertise includes:

- biocompatible material development
- protein engineering, purification, scale-up and crystallisation
- medicinal chemistry
- flow chemistry replacing batch processes
- high throughput materials design through RAMP
(our Rapid Automated Materials and Processing Centre)

Together with our partners we deliver new medical technologies that benefit millions of people in Australia and overseas, helping them live longer, healthier and more productive lives.

Our success stories include extended wear contact lenses, St Jude pacemaker leads, polymers for sustained drug release, polymer surfaces for medical devices and stem cell culture, 3D-printed titanium implants, multiple medicinal products and spinout companies PolyNovo, Polyactiva and Evogenix.



CONTACT US

Charles Lindall, CSIRO

t +61 2 9490 5056

e charles.lindall@csiro.au

w www.csiro.au