Contents

2 Message from the Premier and Minister
4 Victoria’s Technology Plan for the Future
6 Victoria’s Technology Plan for the Future – Biotechnology
6 The view from the sector
7 Future opportunities and challenges
8 Our vision for biotechnology in Victoria
10 Capability development
11 World-class R&D
13 Skilled and innovative people
14 Pursuing international trade and investment opportunities
16 Biotechnology-enabled innovation
18 Demand-driven product development
19 Linking industry to capability
22 Improving competitiveness
24 Delivering the plan
24 Partnership with industry
27 Measuring success
28 General support for technology businesses
Population growth is now slowing in Victoria, and economic growth needs to be built on increased productivity. The three technology streams – biotechnology, information and communication technology (ICT), and small technologies – and their convergence, are essential in generating higher levels of productivity, new business opportunities and economic growth.

We have appointed a dedicated Minister for Technology to ensure that the development and application of technology is linked directly with the Government’s economic agenda. Victoria’s Technology Plan for the Future reflects this commitment through the implementation of integrated plans for biotechnology, ICT and small technologies. By actively promoting this powerful trio of technologies, we expect to generate substantial benefits for Victorian industry, increase innovation in our businesses and provide solutions to challenges facing our State.

Biotechnology is emerging as one of the most transforming technologies of our time, with great potential to deliver benefits in a wide range of areas – from the diagnosis and treatment of debilitating diseases and injuries to improvements in agricultural production and environmental management. In many countries, governments are recognising this potential and stepping-up their support for biotechnology.

Victoria’s biotechnology sector is one of the most innovative in the world and we enjoy an international reputation as a leading location for biotechnology. But the pace of change is rapid and relentless. Victoria’s Technology Plan for the Future will consolidate our leadership in biotechnology, while positioning the sector for the next stage of growth and ensuring that it remains competitive in a challenging global environment. Most importantly, the plan will promote biotechnology-enabled innovation and the convergence of technologies to improve productivity across other Victorian industries.
The Victorian Government strongly believes that the biotechnology sector is best-placed to determine its own priorities, goals and needs. Through the Department of Business and Innovation, Victorian biotechnology companies, researchers and industry groups have played a significant part in setting future directions and priorities for the sector. This plan reflects their contribution.

The plan also reflects the sector’s desire for better collaboration between biotechnology innovators and industry, and for greater coordination of policies, activities and investment related to biotechnology. The plan complements our commitment to establish a new Victorian Biotechnology Advisory Council to ensure that industry is actively engaged in decisions that affect the biotechnology sector.

Victoria’s Technology Plan for the Future charts an exciting new direction for Victorian biotechnology. Through the plan, the Victorian Government will ensure that our biotechnology businesses have access to the infrastructure and skills they need to grow, expand into new markets and take up new opportunities. We will ensure that companies working in other sectors, such as our manufacturing and environmental management industries, can take full advantage of advances in biotechnology to create new products and services, improve their productivity and solve problems.

Victoria’s Technology Plan for the Future reflects the Victorian Government’s view that biotechnology and other new technologies are ‘keys to the future’ for Victoria, capable of unlocking the potential of many industries and businesses. We are committed to working with the ICT, small technologies and biotechnology sectors to ensure that they have every opportunity to succeed in the years ahead and make an increasing contribution to a highly competitive, productive and growing Victorian economy.

Ted Baillieu MLA  Gordon Rich-Phillips MLC
Premier of Victoria  Minister for Technology
Victoria’s Technology Plan for the Future

Our vision is to harness the potential of enabling technologies to transform Victorian businesses, industries and services and to contribute to a competitive, productive and growing Victorian economy.

As well as becoming a world-leading developer and exporter of biotechnology, ICT and small technologies, Victoria will promote the enabling power of these technologies to support continued economic growth more broadly. Through support for the creation of new products, processes and services using these technologies, Victoria’s industries will become more productive and the State’s knowledge and skills base will be enhanced.

Victoria’s Technology Plan for the Future acknowledges that these technologies are essential enabling capabilities for growth, productivity and competitiveness in other industries as well as being important industries in their own right. They require leadership from government in promoting opportunities to enable transformation and innovation in other industries. As industries, these technologies require support from government in creating the conditions for ongoing success and growth.

Victoria’s Technology Plan for the Future promotes the convergence of biotechnology, ICT and small technologies to drive productivity growth across Victoria’s existing industry base and foster new businesses in areas such as health, agribusiness, manufacturing, design and environmental management. Bringing together the transformative powers of these technologies will not only boost our economy, but also contribute to the development of solutions to major challenges in health, agriculture, and the environment.

Figure 1: Victoria’s Technology Plan for the Future
Technology convergence – the way of the future

Convergence is the merging of distinct technologies to create new pathways and opportunities. It involves the coming together of different fields of study – particularly engineering, physical sciences and life sciences – through collaboration among research groups, the sharing of knowledge and the integration of different approaches.

The Massachusetts Institute of Technology calls convergence ‘a blueprint for innovation’, noting that it does not simply involve a transfer of tool sets from one science to another, but a ‘cross-pollination’ of different conceptual approaches. Convergence opens the door to new ideas and applications, and has the potential to dramatically change the way Victorians consume, learn, conduct business, generate ideas, create and market products, and deliver health and other vital services.

In particular, rapid advances in ICT are currently a strong driving force in technology convergence, with new modes of ICT underpinning the development of new products and services with broader application. For example, the development of powerful portable computing devices continues to lead to new wireless tools for diagnosing and monitoring chronic health conditions.

Bringing together ICT with biotechnology and small technologies drives innovative advances in a number of industries. As each of these technologies continues to mature, their convergence will generate even greater transformative power, leading to new combinations of materials, structures, devices, processes and tools, as well as ‘breakthrough’ discoveries and solutions in areas such as medicine, energy, food, water and the environment.

Taking full advantage of the convergence of these three powerful enabling technologies – and harnessing the convergence between life sciences and physical sciences more broadly – will position Victoria to become a global leader in new industries, boost the productivity and efficiency of our existing industries, and create more highly skilled jobs. It will also be increasingly important in maintaining a high standard of living and quality of life for Victorians.

1 Massachusetts Institute of Technology (2011), The Third Revolution: The convergence of the life sciences, physical sciences and engineering
Biotechnology is a vitally important Victorian industry and an area of competitive advantage for the State, with the potential to make a major contribution to future economic growth and increased productivity. Biotechnology is an enabling technology that is already generating substantial benefits in many areas. They include new treatments for diseases and injuries, more sustainable and productive industrial and agricultural processes, and better environmental management practices.

The view from the sector

Victoria’s biotechnology sector has been closely involved with the Victorian Government in setting the future direction for the sector. Through a robust process of consultation and industry participation, the Government has developed a market-driven approach to determining biotechnology policy, setting targets and developing initiatives. The Government has also taken into account other inputs relevant to biotechnology industry development policy, including internal and external policy and program reviews and an independent strategic assessment by KPMG commissioned to explore the value of further government involvement in the development of Victoria’s biotechnology sector.

This rigorous approach found that Victoria’s biotechnology sector is in the ‘growth’ phase of its development. The sector identified a number of areas where a strong rationale existed for further targeted initiatives by government to improve collaboration within the sector and between the sector and other priority sectors in the Victorian economy, and diffuse biotechnology expertise, capabilities and knowledge. In keeping with its approach in recent years, the Government will continue to work with international leaders in the area of evaluation, such as the OECD and the United Kingdom’s National Endowment for Science Technology and the Arts (NESTA), to ensure its approach to measurement of the benefits from investment in biotechnology is in line with international best practice.

Victoria’s Technology Plan for the Future – Biotechnology

Victoria’s Technology Plan for the Future – Biotechnology will help position the biotechnology sector for the next stage of growth. The $55 million plan will support the sector in overcoming current and future challenges, while promoting biotechnology-enabled innovation more broadly across Victorian industry and generating opportunities from technology convergence.
Future opportunities and challenges

The Government, in collaboration with the biotechnology sector, has identified a number of challenges facing Victoria, Australia and the world where biotechnology-related solutions may prove highly beneficial.

> Along with the rest of the world, Victoria faces environmental challenges, including projected food, feed and fuel shortages. There is opportunity for Victoria through the development of sustainable industries to move towards using our water and energy resources more efficiently.

> An ageing population presents major challenges to many communities and nations, including managing the more frequent use of health services by older people. Victoria will also need to respond to the trend towards personalised medicine and the growing long-term demand for therapies, as clinical advances convert diseases that were previously life-threatening into chronic conditions.

> Other critical challenges identified include maintaining the quality of life in our cities as they grow, boosting productivity levels across our industries and making sure that we have the ability to innovate and adapt to rapidly changing global circumstances.

Technology convergence in action: biotech businesses apply small technologies

Biotechnology companies that are applying small technologies and ICT to develop new products and solutions are among the first projects to receive trial vouchers under Victoria’s Small Technologies Industry Uptake Program.

> Global Kinetics Corporation is developing a micro-electro-mechanical wristband device for people with Parkinson’s disease. The device will report data about a patient’s Parkinson’s disease symptoms to their treating neurologist, assisting the routine management of their drug therapy and the management of surgical interventions.

> Starpharma, a Victorian-based company with a world leading position in dendrimer technology, is leading the development of enhanced agrochemicals incorporating dendrimers. Key results arising from their work to date in this field indicate an improvement in pesticide effectiveness. Further studies hope to develop enhanced pesticide formulations to improve their performance and efficiency.

> AdAlta is undertaking a project to identify and manufacture nano-scale antibodies to reduce drug discovery timelines.
Our vision for biotechnology in Victoria

Victoria’s Technology Plan for the Future – Biotechnology supports the Government’s vision:

> Victoria will have world-class biotechnology capabilities that drive innovation, increase productivity and improve the competitiveness of Victorian industries and businesses

> Victorian biotechnology will contribute to improvements in the health, wellbeing and quality of life of Victorians and help to advance solutions to major health, agricultural, industry and environmental challenges

> Victoria will continue to be a leading location for biotechnology, with globally recognised strengths and areas of expertise

> the Victorian biotechnology sector will continue to grow, with biotechnology companies becoming more innovative and entrepreneurial, increasing their participation in global partnerships and alliances, and securing new international markets.

The plan reflects the concerns, ambitions and ideas of the sector and takes into account the tools available to government in adopting a market-driven approach in two critical areas:

> **Capability development**

   Working closely with the biotechnology sector, to ensure that the right conditions exist in Victoria to support our world-class R&D base, ensure the growth of internationally competitive and recognised biotechnology businesses, as well as attract, train and retain skilled and innovative people.

> **Biotechnology-enabled innovation**

   Working with industry and the public sector to ensure high level biotechnology capabilities are in place to support innovation across the economy by promoting demand-driven product development, improving access to R&D infrastructure and expertise, and working to improve Victoria’s competitiveness and productivity.

In implementing the plan, the Government will invest more than $55 million to deliver new initiatives while continuing to support ongoing activities identified by the sector as being important to future growth and success.
### Victoria’s Technology Plan for the Future – Biotechnology

#### CAPABILITY DEVELOPMENT

<table>
<thead>
<tr>
<th>World-class R&amp;D</th>
<th>BIOTECHNOLOGY-ENABLED INNOVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; eResearch agenda (new)</td>
<td>&gt; Health Market Validation Program (new)</td>
</tr>
<tr>
<td>&gt; Systems biology approach (new)</td>
<td>&gt; Industrial Biotechnology Uptake Program (new)</td>
</tr>
<tr>
<td>&gt; Accelerate clinical translational research (new)</td>
<td>&gt; Small Technologies Industry Uptake Program (Victoria’s Technology Plan for the Future – Small Technologies initiative)</td>
</tr>
<tr>
<td>&gt; Science research infrastructure and capability</td>
<td></td>
</tr>
<tr>
<td>&gt; Victorian AgriBiosciences Centre and AgriBio – The Centre for AgriBioscience (under construction)</td>
<td></td>
</tr>
</tbody>
</table>

#### Skilled and innovative people

<table>
<thead>
<tr>
<th>Linking industry to capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Expand commercial skills base (new)</td>
</tr>
<tr>
<td>&gt; Supporting skilled migration</td>
</tr>
<tr>
<td>&gt; Undergraduate Research Opportunities Program</td>
</tr>
<tr>
<td>&gt; Industrial Biotechnology Demonstration Project (new)</td>
</tr>
<tr>
<td>&gt; Victorian Platform Technologies Network</td>
</tr>
<tr>
<td>&gt; Victorian Data Linkages and BioGrid</td>
</tr>
<tr>
<td>&gt; Victorian BioPortal</td>
</tr>
</tbody>
</table>

#### Pursuing international trade and investment opportunities

<table>
<thead>
<tr>
<th>Improving competitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; New approaches to investment facilitation (new)</td>
</tr>
<tr>
<td>&gt; Technology Trade and International Partnering Program</td>
</tr>
<tr>
<td>&gt; Encourage and attract investment</td>
</tr>
<tr>
<td>&gt; Support for international collaborations</td>
</tr>
<tr>
<td>&gt; Advocacy for reform</td>
</tr>
<tr>
<td>&gt; Public awareness and understanding of biotechnology</td>
</tr>
<tr>
<td>&gt; Streamlining and reciprocal recognition of ethical review for clinical trials</td>
</tr>
</tbody>
</table>

#### Victorian Biotechnology Advisory Council

<table>
<thead>
<tr>
<th>BioSciences Victoria Collaborative</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 TARGETS</td>
</tr>
<tr>
<td>&gt; A 25 per cent increase in product development activity</td>
</tr>
<tr>
<td>&gt; 600 new biotechnology-related jobs in Victoria</td>
</tr>
<tr>
<td>&gt; A 25 per cent increase in the value of biotechnology-related exports</td>
</tr>
<tr>
<td>&gt; At least three projects to increase the breadth and depth of Victoria’s biotechnology talent pool</td>
</tr>
<tr>
<td>&gt; At least three projects that demonstrate improvements to human health from the practical application of Victorian research</td>
</tr>
<tr>
<td>&gt; At least five Victorian-based companies undertaking activity to develop biotechnology solutions that improve sustainability</td>
</tr>
<tr>
<td>&gt; At least 20 formal collaborations within the biotechnology sector or with broader industry</td>
</tr>
</tbody>
</table>

#### GENERAL BUSINESS SUPPORT PROGRAMS

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Smart SMEs Innovation Commercialisation Program</td>
</tr>
<tr>
<td>&gt; Competitive Business Fund</td>
</tr>
<tr>
<td>&gt; CRC support program</td>
</tr>
<tr>
<td>&gt; Grow Your Business</td>
</tr>
<tr>
<td>&gt; Small Business Victoria</td>
</tr>
<tr>
<td>&gt; Super trade missions</td>
</tr>
<tr>
<td>&gt; Victorian Government Business Offices</td>
</tr>
</tbody>
</table>
A strong and mature biotechnology sector is essential to a competitive and productive Victorian economy and to driving innovation across industry. Through Victoria’s Technology Plan for the Future – Biotechnology, the Government will support the State’s biotechnology capability to overcome barriers to growth, attract international investors and partners, and improve access to commercial skills.

Victoria’s biotechnology sector has continued to grow and perform strongly despite recent difficult global conditions. At 30 June 2011, Victoria had around 40 listed life sciences companies with a combined market capitalisation of about $23 billion. We are home to CSL, Australia’s largest biotech company and one of the top ten biopharmaceutical companies in the world.

Victoria’s biotechnology sector is experiencing strong revenue growth, with Victorian companies recording $8.8 billion in sales in 2009–10 and multinational companies manufacturing products in Victoria adding a further $1.97 billion. The sector’s increasing maturity and growing international reputation is reflected in an ongoing rise in annual export revenue. In 2009–10, Australia exported $1.7 billion of life sciences-related goods that were manufactured in Victoria, up from $1.3 billion in 2006–07.

Despite recent difficult global conditions, our biotech companies have sustained high levels of investment in R&D. Listed companies invested more than $600 million in R&D in 2009–10, and more than 230 biotechnology-related products are in the developmental pipeline. Clinical trial activity in Victoria also continues to grow. The greater number of Phase II and III trials now underway reflects a more mature sector with growing capabilities to move products along the path to market.

Victorian life sciences companies directly employ about 7,300 people, and Victoria’s broader life sciences sector employs more than 22,000 people across more than 150 life sciences companies, 13 major medical research institutes, ten teaching hospitals, nine universities, and a large pool of supporting service providers such as clinical trials operators.

Victoria’s medical researchers consistently secure at least 40 per cent of National Health and Medical Research Council funds and we are home to five medical research institutes with annual incomes in excess of $25 million.
Victoria’s leadership in agricultural biotechnology has been affirmed by the Victorian Government’s largest ever international agricultural biotechnology alliance for crop innovation established between the Victorian Department of Primary Industries and Dow AgroSciences.

To sustain this growth and support biotechnology’s potential to increase innovation and productivity, the sector needs to sustain key drivers of investment: high quality research and development infrastructure, access to capital and markets, a skilled workforce, stronger connections between researchers and innovators, and closer collaborations with other industry sectors.

With demand for biotechnology-enabled solutions, goods and services predicted to grow strongly over the next decade, the Victorian Government has an important role to play in creating the right environment to support biotechnology businesses as they seek to capture these opportunities, leverage local strengths and expand into new areas.

**World-class R&D**

While Victorian biotechnology has a strong R&D foundation including many world-leading facilities, further action will be needed to sustain and improve the sector’s ability to keep up with global developments and work with industry to solve problems and translate research into commercial outcomes. Victoria will also need to ensure that we have the right conditions, skills and access to facilities to support the growing demand for collaboration across scientific disciplines, technologies and geographic locations.

**eResearch agenda**

By harnessing the power of ICT, eResearch offers a wealth of new opportunities for the biotechnology sector. eResearch improves access to research data, more powerful analysis and increased opportunities for collaborative research, enabling more efficient and more productive research that reaches the public, providers and industry more quickly. The Government will develop an eResearch agenda to improve multidisciplinary collaboration and continue Victoria’s progress towards sustainable and mainstream adoption of eResearch.
Science research infrastructure and capability

The Government will work alongside the sector to maintain Victoria’s world-class science research infrastructure and capability, focusing on areas where Victoria has acknowledged strengths, advantages and expertise, including:

- the Australian Synchrotron, which is building a strong international reputation for supporting ground breaking research and breakthrough discoveries of global significance
- the $100 million Victorian Life Sciences Computation Initiative (VLSCI), which – together with the IBM life sciences collaboratory – will enhance the provision of world-leading high-performance computing services to life sciences researchers
- Victoria’s biomedical imaging capability, which is elevating Victoria to an elite biomedical imaging location and providing major downstream benefits to the biotechnology and health care sectors.

The Government will ensure that Victorian researchers and biotechnology companies are aware of and can access the opportunities for ICT-enabled R&D being generated by the National ICT Australia-Victoria Research Laboratory (NICTA VRL) and the Institute for a Broadband-Enabled Society (IBES).

The Victorian Government will continue to support the Operational Infrastructure Support program which funds the indirect costs of undertaking medical research at Victoria’s independent medical research institutes. The Government will advocate for a whole-of-Australian-Government national policy on funding the full cost of research – including indirect research costs – to maintain Australia’s competitiveness with other countries.

Support a systems biology approach

Systems biology reflects a paradigm shift in the way research is being carried out globally. It is focused on integrating the discrete disciplines of biology (such as genomics, metabolomics and proteomics) to understand the function (normal or diseased) and behaviour of an organism. The Government will work with the BioSciences Victoria Collaborative to ensure Victoria has the necessary capability (skills, infrastructure and linkages) to support Victoria’s researchers and companies to use a systems biology approach to fast-track life sciences R&D.

Accelerate clinical translational research

Victoria’s strengths in fundamental biomedical research should translate into clinical and public health interventions that generate new health treatments, products and services. It is also important to ensure that the knowledge gained from biomedical research is diffused as broadly as possible across the Victorian community and industry to improve the health and wellbeing of Victorians.

Victoria’s Hospital Research Directors Forum will play a leading role in boosting Victoria’s capability for delivering innovation through clinical research. The Government will work with the forum to develop initiatives designed to improve the skills, infrastructure and coordination needed to turn research into practical health outcomes and to attract international pharmaceutical companies and investors.
Victorian AgriBiosciences Centre and AgriBio – The Centre for AgriBioscience

The Victorian AgriBiosciences Centre and AgriBio (under construction) are based in Victoria’s northern biotechnology precinct at Bundoora. This is a world-class facility for agricultural biosciences R&D, integrated in a systems biology context for productivity and biosecurity outcomes in plant and animal industries. When fully operational in 2012, AgriBio will house up to 400 biosciences researchers and staff from Victoria’s Department of Primary Industries and La Trobe University.

The Victorian Government is committed to ensuring that discoveries in agribiotechnology translate into practical benefits and opportunities for Victoria’s primary producers and agricultural companies. As well as supporting the work of AgriBio, the Government will ensure that Victorian dairy farmers are aware of (and can apply the results of) research led by the Dairy Futures Cooperative Research Centre in Bundoora to improve their profitability, productivity and sustainability.

Skilled and innovative people

The biotechnology sector’s success is dependent upon companies being able to attract and retain highly skilled people, including talented researchers and technicians, biostatisticians, data managers and people with business management skills. As the sector matures, skills will be critical to the success of Victorian business and improving productivity in Victoria’s economy. The Victorian Government will support companies to ensure that they have access to the right skill base to excel in a dynamic global market place.

Expand Victorian biotechnology’s commercial skills base

The independent Victorian biotechnology skills review conducted in 2010 identified key skills requirements to grow the sector and found that the sector expects increased demand for all occupations and skills in the short- to medium-term future. The review identified a critical need for highly qualified, highly experienced people to fill a small number of key positions. Demand is greatest in the skills areas of regulatory affairs, clinical strategy and project management.
To expand the breadth and depth of Victoria’s talent pool in biotechnology, the Government will develop a suite of programs that target the development of skills and practical experience in product development, commercialisation and regulation, entrepreneurship and across converging technologies.

The Government will work with industry to develop a systematic approach to transferring knowledge from globally experienced personnel to the local sector. This will provide a strong foundation for a mature and globally connected local biotechnology sector.

Skills and expertise

The Government will continue to support a program operated by Medicines Development Limited (through the Smart SMEs Innovation Commercialisation Program). This program places project managers trained in internationally proven drug development processes in Victorian biotechnology companies to manage drug development activities. The program will strengthen drug development expertise and skills across the biotechnology sector, improve product development and help to attract investors.

The Government will support the Undergraduate Research Opportunities Program (UROP) conducted by the Bio21 Cluster. UROP aims to grow and enhance Victoria’s biomedical and biotechnology capability by providing cross-discipline graduates with practical research experience.

The Government will also continue to review Victoria’s approaches to skilled migration to ensure that Victoria attracts highly skilled biotechnology workers.

Pursuing international trade and investment opportunities

Attracting a higher level of investment into the Victorian biotechnology sector is critical for its future development. Regardless of size, companies need assistance to showcase their achievements and potential to international and institutional investors in order to access the capital they need to grow. More broadly, greater understanding by investors of the opportunities on offer in Victorian biotechnology will benefit both the biotechnology sector and the Victorian economy.

Mesoblast – going global

Victorian regenerative medicine company Mesoblast faces an exciting future after forging an alliance with the global biopharmaceutical company, Cephalon, to develop and commercialise products based on Mesoblast’s adult stem cell technology. Under the terms of the alliance — the world’s biggest stem-cell deal to date — Mesoblast has received an upfront payment of US$130 million, with up to US$1.7 billion to be paid in milestone payments and will also retain its manufacturing rights.

Mesoblast is currently conducting clinical trials in Australia and the United States for a suite of products and has received Australian approval to manufacture a patient-specific product using its adult stem cell technology for the treatment of serious bone fractures. The company’s Phase II trials include trials for spinal fusion, knee osteoarthritis and congestive heart failure.

Mesoblast has achieved significant breakthroughs in manufacturing adult stem cell products that are scalable, consistent in quality and relatively inexpensive providing it with a high-margin business model akin to a pharmaceutical drug. Like many Victorian biotech businesses, Mesoblast has faced challenges in funding the opportunities it has created — the Cephalon alliance will pay for late-stage clinical trials and sales and marketing of cardiovascular and neurological products. The solid cash injection from Cephalon has enabled Mesoblast to develop on its own its proprietary adult stem cell technology platform for other major indications including for diabetes and orthopedic conditions, as well as have the potential to deliver very substantial benefits to patients with painful and debilitating conditions.
Technology Trade and International Partnering Program

The Technology Trade and International Partnering Program provides grants for Victorian companies to attend overseas biotechnology conferences and trade events. Participants are required to demonstrate market outcomes achieved as a result of attendance. The program is delivering a strong return on investment and proving successful in driving export sales for companies showcasing their products.

The program:
> targets companies working within industrial, agricultural, health and medical devices/diagnostics biotechnology, as well as small technologies
> supports Victorian companies to meet with international regulatory bodies to optimise product development strategies
> enables industry associations to participate in events to promote Victorian biotechnology internationally
> promotes biotechnology-enabled innovation by allowing non-biotech companies adopting industrial biotechnology to attend biotechnology conferences and events.

Encourage and attract investment

One of the most significant hurdles faced by the biotechnology sector is the lack of access to finance and the cost of investment capital. As well as creating a business environment conducive to investment, the Victorian Government will work with the biotechnology sector and the investment community to develop fresh approaches to increasing interest and investment in Victorian businesses and organisations undertaking biotechnology-related R&D. The Government will also work with the sector to explore the potential to increase investment in biotechnology from the philanthropic sector.

The Government will maintain support for initiatives and activities that help businesses to attract international investors and develop international alliances, such as trade missions to global biotechnology events and conferences.

Biotechnology companies will be targeted for participation in the Trade Engagement Program India as part of Victoria’s efforts to develop an expanded trade and investment program with India. The Department of Business and Innovation will also support Victorian biotechnology businesses to access the range of trade and export services provided through Austrade.

Recognising the importance of building strong capabilities in research commercialisation, the Government will continue to support the Medical Research Commercialisation Fund (MRCF) by providing $1.6 million in funding to assist its operation over the next four years. The MRCF has recently received $20 million through the Australian Government’s Innovation Investment Fund which it will invest in early-stage development and commercialisation opportunities from MRCF members, comprising Australia’s premier medical research institutes and research hospitals.

Support for international collaborations

The Victorian Government recognises the value of international collaborations and alliances in an increasingly competitive global environment. The Government will continue to support existing international biotechnology-related collaborations.

The Government will also work with the biotechnology sector to explore and develop new international collaborations, including those with broader applications in other industries.
Biotechnology-enabled innovation

Biotechnology has enormous potential to enable innovation in other industries. Flow-on benefits for businesses include reducing business costs, raising productivity levels and opening new markets. For the community, biotechnology can improve health care, support environmental remediation and create new jobs. Victoria’s Technology Plan for the Future – Biotechnology aims to deliver these benefits by facilitating access for Victorian companies to biotechnology solutions, research, infrastructure and expertise.

Victoria’s biotechnology capability provides a strong foundation for enabling innovation across industry and the economy. This capability includes:

- world-renowned medical research institutions
- access to critical platform technologies such as bioinformatics, genomics, metabolomics and industrial scale protein production
- strengths in associated industries such as data management, chemistry and agriculture
- a growing knowledge and skills base in areas of global importance and value such as drug development, biologics, biocatalysts, green chemistry and diagnostic devices.

Victoria offers world-class infrastructure to support the biotechnology sector and biotechnology-enabled innovation more broadly. Investors, researchers and businesses have access to some of the most advanced facilities in the world in a number of areas, including:

- the Australian Synchrotron – the largest stand-alone piece of scientific infrastructure in the Southern Hemisphere
- Victorian AgriBiosciences Centre (VABC) – a comprehensive systems biology research facility of the Victorian Department of Primary Industries at La Trobe University that is keeping Victoria at the forefront of global agricultural bioscience research
- the University of Melbourne’s Bio 21 Molecular Science and Biotechnology Institute – a multidisciplinary centre specialising in medical, agricultural and environmental biotechnology
- Australian Regenerative Medicine Institute (ARMI) – a state-of-the-art facility focusing on research that aims to prevent, halt and reverse damage to vital organs due to disease, injury or genetic conditions
- National Collaborative Research Infrastructure Strategy facilities – including Recombinant Protein Production (CSIRO and Monash University), Human Cells (Peter MacCallum Cancer Centre), Genomics (Australian Genomic Research Facility and the VABC), Metabolomics (University of Melbourne), Proteomics (Monash University), the Australian Phenomics Network (co-led by Monash University and including the Walter and Eliza Hall Institute) and the Population Health Research Network (Victorian Data Linkages Unit).
Creating the right environment for biotechnology-enabled innovation will deliver substantial benefits in key Victorian industries such as manufacturing, agriculture, energy and water. Expanding the reach of biotechnology – and leveraging Victoria’s current strengths in medical research and agricultural biotechnology – will require improved connections between the research and business communities, greater understanding of industrial and cross-sector biotechnology applications and a supportive regulatory environment.

Businesses will need access to knowledge, advice and information to help them to identify how they can apply biotechnology to develop new processes and products.

With technology convergence playing an increasingly important part in enabling innovation, Victoria will also need to promote greater collaboration among research groups and between industry and research, support multidisciplinary research, and encourage integration across industry sectors to identify opportunities where the merging of biotechnology with other technologies can generate fresh ideas and solutions.

Technology convergence in action: wireless health care

As portable communications devices become more powerful, exciting new health care applications are emerging.

Wireless health care is growing rapidly, driven largely by the increasing sophistication of smartphones, many of which have more computing power than expensive diagnostic machines based in hospitals or medical centres. Smartphone technology is relatively cheap for health care providers to purchase, offers fast, easy connections to a variety of diagnostic sensors, and product development times are significantly reduced compared to other medical equipment and technologies.

In early 2011, the US Food and Drug Administration approved the first diagnostic radiology application for mobile devices, which will allow specialists to view medical images and make diagnoses based on scans delivered to the device. The application will enable specialists to make an accurate diagnosis from CT, MRI and PET scans irrespective of location – with particular benefits for patients living in remote areas.

In Victoria, local software and product design firm Hydrix is working on a foetal ultrasound monitor that connects wirelessly to an iPhone to display and record a foetus’s heartbeat. The application will also provide for the transmission of the recorded heartbeat to an expectant mother’s family or friends to share, and could also be sent to an obstetrician for analysis and diagnosis.

In this rapidly changing landscape, Victoria’s focus on technology convergence aims to give researchers and businesses a leading edge in developing wireless health care solutions – generating economic benefits and business value and improving access to state-of-the-art health care for Victorians.
Demand-driven product development

The demand for biotechnology-enabled solutions for industry problems is likely to increase substantially in the coming years. This demand will be influenced by factors largely beyond the control of the biotechnology sector and driven by the changing requirements and expectations of businesses, consumers, markets and supply chains. The Government will support Victoria’s biotechnology sector to develop the capabilities and relationships they need to respond to market demand for technology solutions.

Health Market Validation Program

A new Health Market Validation Program will take advantage of the Government’s plan for solutions to drive biotechnology-enabled innovation in Victoria’s health care system and in the delivery of health services. The program will follow on from the existing Smart SMEs Market Validation Program and target areas of health priority for Victoria as determined by the State’s health care service providers. The program will generate significant new opportunities for Victoria’s biotech and medical device companies, as well as leading to improved productivity within the State’s health care system and better health outcomes for Victorians.

An Industrial Biotechnology Uptake Program

The Government will work to broaden the reach of biotechnology, and facilitate the adoption of biotechnology solutions by industry sectors such as food processing and chemicals, plastics and pharmaceutical manufacturing. The Industrial Biotechnology Uptake Program will achieve this by:

> assisting Victorian businesses to access industrial biotechnology facilities, services, advice or expertise from local suppliers

> helping companies to reduce costs, improve productivity and minimise environmental impacts by providing access to biotechnologies that reduce energy, waste and/or water use

> improving industry access to the research, advice and support needed to develop and implement practical solutions

> helping businesses to build stronger links with Victoria’s publicly funded R&D organisations to advance biotechnology innovations to commercial products and services.
**Small Technologies Industry Uptake Program**

The *Small Technologies Industry Uptake Program*, an initiative from *Victoria’s Technology Plan for the Future – Small Technologies*, provides vouchers to Victorian businesses that can be exchanged for access to small technologies facilities, services, advice or expertise. Recognising the significant opportunities to apply small technologies to biotechnology, particularly in the field of medical devices, the Government will ensure that biotechnology companies are aware of and supported to access the program.

**Linking industry to capability**

In order to drive the broader use of biotechnology across the economy, Victoria’s industry base must be better linked to the State’s biotechnology capabilities. The Government will focus on activities that improve these linkages and those within the biotechnology sector, demonstrate the value of biotechnology to industry and provide access to technology platforms, information and know-how to facilitate biotechnology-enabled innovation.

**Industrial Biotechnology Demonstration Project**

A new *Industrial Biotechnology Demonstration Project* will improve industry understanding of the growing range of new biotechnology-related techniques and processes and encourage businesses to explore the potential of biotechnology to improve industrial practices, create new products and enhance sustainability.

---

**Technology convergence in action: medical devices**

Medical devices are instruments, tools, appliances or material used to diagnose, prevent, treat or monitor a disease, injury, disability or state of wellbeing. These devices are almost always the result of technology convergence, especially between biotechnology and small technologies or between biotechnology and ICT.

The global market for medical devices was estimated to be around US$3 billion in sales and revenue in 2009-10 and the industry is expected to continue to grow as the demand for health care rises to cope with an ageing population.

While the major markets for medical devices are in the developed economies of the Northern Hemisphere (North America, Europe, the United Kingdom and Japan), the broader Asian market is predicted to overtake these markets within 15 years, giving Australia a potentially significant geographic advantage.

Alongside our geographic position within the Asia Pacific region, Victoria’s medical devices industry has competitive advantages in having access to a comparatively highly skilled workforce, a high quality clinical trials environment, a strong advanced manufacturing base and internationally renowned medical research in areas where devices are likely to deliver significant benefits.

To take advantage of the growing global market in medical devices, Victoria will focus on improving local collaborations (between universities, government and industry, and between sectors), facilitating international alliances and export activities in developing and marketing devices, and helping local medical device companies to leverage greater support from state and Commonwealth trade, investment and commercialisation programs.
**Victorian BioPortal**

The Victorian BioPortal — www.vicbioportal.org — is Australia’s first biotechnology industry portal, providing a ‘one-stop-web-shop’ that offers a comprehensive and regularly updated directory of the State’s biotechnology sector. The portal links users with biotechnology companies, research organisations and universities, industry events, statistics, news and relevant government programs, departments and agencies.

The BioPortal also connects with the Victorian Platform Technologies Network (VPTN), which provides information about the biomedical platform technologies available in Victoria. Through the portal’s link with the VPTN, users can directly access the network of facilities that provide platform technology infrastructure, services and expertise to the biotechnology sector.

The BioPortal covers all types of bioindustry, including: bioprocessing, biomanufacturing, health biotechnology, industrial biotechnology, medical devices and diagnostics, and agricultural biotechnology.

For biotech companies and researchers, the BioPortal provides a central point for sharing information and news, and locating available technologies and infrastructure. It provides a ‘toolkit’ to link companies to the range of services and information they might need to do business in Victoria. In addition, the BioPortal raises the profiles of Victorian organisations and assists them to find collaborators and access government programs and funding.

The BioPortal also acts as a public showcase for Victorian biotechnology, providing news about breakthroughs and discoveries, new commercial products and processes, and conferences, events and awards.
Biotechnology uptake skills

A skilled workforce is critical for businesses to be able to solve problems by adopting and integrating biotechnology. Particular skills will need to be available in biotechnology companies and across a broad range of businesses and industry sectors. The Government will support new initiatives designed to improve the available skills mix and range within the Victorian workforce to support the uptake of biotechnology by businesses and industry.

Access to information and infrastructure

The Victorian Government recognises the importance of industry-led initiatives that facilitate access to biotechnology-related information and capabilities. The Government will continue to support the Victorian BioPortal, which operates as a central ‘gateway’ to information about Victorian biotechnology and provides an important resource linking biotechnology companies with specialist service providers, government support programs and industry associations. The Government will also continue support for the Victorian Platform Technologies Network, which provides a single access point to biotechnology infrastructure (platform technologies) and expertise available in Victoria, as well as supporting continuous improvement of platform operations.

Data Linkages

Jointly funded by the Victorian Government Department of Business and Innovation and the Australian Government’s National Collaborative Research Infrastructure Strategy (NCRIS), Victorian Data Linkages (VDL) will create new opportunities for Victorian researchers to undertake innovative, world-leading research by linking together data from many sources at the levels of individual persons, populations, events or places. As a node of the national Population Health Research Network, VDL will develop a state-of-the-art system in Victoria to give researchers access to population-wide linkable data, create tools to facilitate the use of linkable datasets by researchers and develop privacy protocols and procedures to ensure that the use of data adheres to privacy principles.

Victorian biotechnology will also benefit from the opportunities for collaborative research offered by BioGrid Australia, a platform that enables researchers to access and share clinical data across multiple organisations. The depth and breadth of data provided by BioGrid Australia offers researchers a highly advanced tool to improve understanding of many diseases and their current and potential treatments. The Australian Cancer Grid (ACG), a ‘flagship’ of the BioGrid platform, provides a virtual repository of patient and scientific data linking Victoria’s cancer researchers, health professionals, cancer institutes and health services into one of the world’s largest cancer control networks. The Victorian Government will be supporting BioGrid’s transition to an integrated data platform for translational cancer research in Victoria.
Improving competitiveness

A supportive business environment is essential for biotechnology-enabled innovation to flourish and for biotechnology businesses to increase their global competitiveness. The Victorian Government is committed to taking action to sustain a competitive biotechnology sector, including reducing the regulatory burden on industry, enhancing Victoria’s reputation as an attractive investment location and maintaining public support for biotechnology.

Advocacy for reform

The Government will advocate for national reforms to support a competitive biotechnology sector, including:

> working with other state governments and the Australian Government to advance the Harmonisation of Multi-site Ethical Review (HoMER) and national governance processes for clinical trials

> advocating on issues relating to the Australian Government’s Patent Amendment (Human Genes and Biological Materials) Bill 2010 to ensure that it addresses the affordability of diagnostic testing, does not increase risks around the patenting of human genes and biological materials, and will not impede the development of Victorian innovation policy

> contributing to the development of the 2011 Strategic Roadmap for Australian Research Infrastructure by the Australian Government Department of Innovation, Industry, Science and Research. The new Roadmap follows the 2006 and 2008 Roadmaps and will outline priorities for national research infrastructure investments for the next five to ten years. The Victorian Government is providing input into the Roadmap process to maximise alignment with Victoria’s research infrastructure needs, to ensure that the State’s areas of strength are acknowledged and supported, and that national investment in infrastructure reinforces Victoria’s leadership in science research.
Streamlining and reciprocal recognition of clinical trials

Victoria continues to implement its streamlined process for ethical review of multi-site clinical trials. More than 200 ethics applications have been processed under the scheme since December 2009, with 70 per cent meeting the 30 working day benchmark for approval time, allowing trials to begin more quickly and reinforcing Victoria’s position as the premier location for clinical trials in the Asia Pacific region.

Victoria, NSW and Queensland have recently signed a Memorandum of Understanding that enables public hospitals and health services in each state to accept a single ethical review for multi-centre clinical trials from approved committees within the three states. This MoU became operational in mid-2011 and is improving timelines for approvals, reducing duplication of ethical review and giving patients earlier access to new treatments.

Public awareness and understanding of biotechnology

Public understanding of and support for biotechnology is vitally important to the future growth and competitiveness of the sector in Victoria. The Government will undertake a range of activities to sustain this support, including engaging with Victoria’s non-government organisations, as well as ensuring that Victorian biotech businesses have the opportunity to engage in public forums, community events and other public awareness activities related to biotechnology.

The Government is also committed to increasing public recognition of the efforts of Victorian researchers. From 2012-13, the Government will double the number of Victoria Fellowships to 12 (enabling more young leaders in engineering, science or technology to study overseas) and increase the Victoria Prize to two (awarding prizes of $50,000 to a scientific discovery or technological innovation that has produced, or has the clear potential to produce, a commercial outcome or other benefit to the community).
The Victorian Government believes that the biotechnology sector is best placed to identify its own priorities, goals and needs. With supportive investment of $55 million, the Government will ensure that the sector continues to be actively engaged in setting future directions for biotechnology in Victoria and in determining the best ways to achieve the targets and benefits identified in Victoria’s Technology Plan for the Future – Biotechnology.

The Government will continue to work in partnership with industry to deliver Victoria’s Technology Plan for the Future – Biotechnology. The Government will ensure that the sector continues to provide input into biotechnology policy and investment, and that it plays a leading role in the development and growth of biotechnology in Victoria.

Partnership with industry
Victoria’s leadership in biotechnology is actively supported by two key biotechnology industry associations active in Victoria, BioMelbourne Network and AusBiotech. The Government will continue to work with industry associations and with other established and new stakeholder groups in order to support development of Victoria’s biotechnology industry and to drive biotechnology-enabled innovation across the economy.

Victorian Biotechnology Advisory Council
A new Victorian Biotechnology Advisory Council will provide an industry-led and coordinated approach to the development of the biotechnology sector in Victoria. The Council will be composed of 10 to 15 industry stakeholders covering a wide range of sector perspectives and will be appointed by the Minister for Technology. It will provide advice to assist in overcoming persistent market failures in biotechnology, leveraging opportunities and supporting the growth of a dynamic and vibrant biotechnology sector.

The Council’s advice will also assist in implementing Victoria’s Technology Plan for the Future – Biotechnology.

Delivering the plan
The Council’s activities will include:

- providing advice to the Victorian Government on issues and trends that present opportunities and/or threats to the industry, including identifying ways to improve productivity within the sector, and attract global and venture capital investment for Victorian biotechnology, and identifying opportunities for the sector from the convergence of biotechnology with other technologies

- providing a sounding board for the Government’s biotechnology industry initiatives and supporting the implementation of the Government’s industry policy

- acting as ambassadors for Victoria’s biotechnology sector by promoting biotechnology as a cornerstone of Victoria’s knowledge economy and encouraging biotechnology-enabled innovation across broader industry sectors

- supporting the development of Victorian trade by identifying opportunities, using overseas networks and recommending strategies for developing the export capabilities of Victorian biotechnology companies.

In adopting an industry-focused approach to advising the Government, the Council will complement the work of the research-focused BioSciences Victoria Collaborative.

BioSciences Victoria Collaborative

The BioSciences Victoria Collaborative brings together Victoria’s four major bioscience precincts: the Central Precinct (based around the historic Parkville Precinct in inner Melbourne and including the University of Melbourne and RMIT and Swinburne Universities), the South East Precinct (centred around Monash University), the South West Precinct (clustered around Deakin University in Geelong) and the North Precinct (based in and around Bundoora). The Collaborative is independent of government and is supported by a secretariat housed at BioMelbourne Network.

The Collaborative provides a forum for the four precincts to discuss, plan, facilitate and coordinate projects and activities that support Victoria’s progress as a world leader in biosciences. The Collaborative aims to encourage closer collaboration and information dissemination between the precincts, contribute to planning for major scientific developments and projects, and ensure a coordinated approach to the development of bioscience infrastructure across Victoria.
The Government will continue to support the work of the Collaborative. In particular, the Government will work with the Collaborative to support a systems biology approach to fast-track life sciences R&D, develop a strategic approach to future statewide infrastructure needs, forge closer links between research in universities, hospitals and medical research institutes (and, where appropriate, industry), and increase awareness of Victoria’s biotechnology research capabilities to attract investment and skilled personnel.

**Office of the Lead Scientist**

The Government will establish the Office of the Lead Scientist to support the development and direction of innovation and science policy in Victoria and to coordinate science-related activities with relevant federal agencies.

**Industry Sustainability Working Committee**

The Government is establishing an Industry Sustainability Working Committee to support Victorian businesses and industry to meet challenges and secure the opportunities associated with the ongoing discourse surrounding climate change, sustainability and the move to a low carbon economy. As industrial biotechnology is a critical technology for clean products and processes and industry sustainability, the Government and the Victorian Biotechnology Advisory Council will work with the Industry Sustainability Working Committee to leverage greater benefits for Victorian industries, the community and the environment.
**Measuring success**

The success of initiatives delivered through *Victoria’s Technology Plan for the Future – Biotechnology* will be evaluated against a set of leading indicator targets that focus on the strength of the Victorian biotechnology sector (product development activity and exports) and the impact of the Government’s activities on economic development, increased capability and improved health and environmental outcomes. The Government will report progress against these targets annually.

<table>
<thead>
<tr>
<th>2015 TARGETS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAPABILITY DEVELOPMENT</strong></td>
</tr>
</tbody>
</table>
| A 25 per cent increase in product development activity  
The biotechnology sector will have an improved ability to translate research into practical health outcomes (by way of preventative measures, diagnostics and/or treatments) and develop effective responses to global challenges. This target is indicative of a healthy and competitive biotechnology business environment. |
| A 25 per cent increase in the value of biotechnology-related exports  
The general health of Victoria’s biotechnology-related businesses is reflected by a substantial increase in exports as companies are operating in a more cohesive export environment and more Victorian products become market ready. Progress against this target will be tracked for Victorian companies and non-Victorian companies with Victorian operations. |
| 600 new biotechnology-related jobs  
The Government will directly facilitate biotechnology-related jobs by supporting Victoria’s companies and research base, and focusing on biotechnology-enabled innovation and technology convergence. |
| At least three projects to increase the breadth and depth of Victoria’s biotechnology talent pool  
The Government will directly support Victoria’s talent pool by funding targeted skills development projects responding to industry need. |
| **BIOTECHNOLOGY-ENABLED INNOVATION** |
| At least three projects that demonstrate improvements to human health from the practical application of Victorian research  
Through government programs, Victoria’s leadership in medical research will be translated into products and treatments that reach patients faster. |
| At least five Victorian-based companies undertaking activity to develop biotechnology solutions that improve sustainability  
Government initiatives will enable biotechnology solutions to be applied to tackle problems in other industries, improve the sustainability and productivity of our economy, and deliver lasting benefits to the broader community. |
| At least 20 formal collaborations within the biotechnology sector or with broader industry  
The Government will facilitate collaborations between key players in the biotechnology sector and broader industry, particularly in order to drive biotechnology-enabled innovation and technology convergence across Victoria’s economy. |
General support for technology businesses

Victorian biotechnology businesses have access to a wide range of business support programs. However, many businesses – especially small to medium-sized enterprises (SMEs) – are unaware of the opportunities available to them through these programs. As part of its commitment to an industry-led and market-driven approach to the development of the biotechnology sector in Victoria, the Government will actively work with the sector to ensure that biotechnology businesses are aware of and can access these programs and that industry activities related to technology convergence and biotechnology-enabled innovation are identified and supported by these programs.

Business programs available to biotechnology businesses include:

> **Smart SMEs Innovation Commercialisation Program** – supporting SMEs to progress products along the commercialisation pathway, attract investors and enter new markets

> **Competitive Business Fund** – assisting companies and supply chains to invest in equipment, infrastructure, technologies and innovation that will strengthen their competitiveness

> **Cooperative Research Centres support program** – helping established and potential CRCs with a strong Victorian focus to gain funds from the Australian Government’s CRC program

> **Grow Your Business** – providing planning and management services to help small businesses to develop strategies to grow and become internationally competitive

> **Small Business Victoria** – providing a range of services to facilitate the growth of an efficient and viable business sector in Victoria including:

  - business enquiry, information and referral ‘hotline’ services

  - the Victoria Consumer and Business Centre (located at 113 Exhibition Street, Melbourne) that offers a wide range of business publications and access to small business information resources

  - workshops and seminars on topics such as starting a business, marketing and growth, getting and keeping the right staff, financial controls and selling or closing your business

  - Victoria’s annual Small Business Festival

> **Trade Engagement Program India (TEPI)** – a dedicated initiative to strengthen the trade relationship with India. TEPI will showcase Victorian business capabilities in key industry sectors including education, tourism, ICT, aviation, life sciences, financial services, sustainable urban design, automotive, and food and beverages

> **Victorian Government Business Offices** – providing services and advice to Victorian businesses through offices located in metropolitan and regional Victoria and at 12 international locations (including the United States, the United Kingdom, India, China and Japan).

Information about these and other business support programs and resources can be accessed through Business Victoria at www.business.vic.gov.au