

# Biotechnology companies must expand their horizons beyond medical research to discover industrial applications offering faster returns.

Report: Kath Walters

● Think biotechnology, think medicine? Australia's smartest brains applied to the world's toughest health problems, such as cancer, dementia, HIV and diabetes.

It is less glamorous to imagine a mob of tiny "good" bacteria chomping their way through the nasties in the air to purify it or casting corn starch into biodegradable chocolate trays – but these are some of the other ways to use biotechnology to make money, products and maybe change the world.

Industrial biotechnology means using biotechnologies to create goods and services, such as plastics, chemicals, textiles and leather goods, waste management, water treatment, nutraceuticals, food processing, bioremediation, cosmetics and fuels.

"It is not sexy but we have all heard of the added enzymes in washing powder that make it clean better," the chief executive of biotechnology industry association AusBiotech,

Anna Lavelle, says. "Industrial biotechnology is a bit invisible to the general public."

Medical biotechnology companies struggled through their worst year on record in 2008, with publicly listed biotechs falling by 65.8 per cent in value, industry analyst Bioshares says, compared with a fall of 41.2 per cent in the S&P/ASX 300. The result prompted a call by Lavelle for these companies to consider applying their medical technology to industrial applications.

The pharmaceutical market worldwide is valued at about \$US600 billion (\$908 billion), but industries such as chemicals, paints and fuels are worth several trillion dollars. Biotechnology is well used in the pharmaceutical sector but remains under-used in industry, says Stephen Meller, head of global bioscience at Procter & Gamble, the world's largest consumer products company with annualised revenue of \$83 billion as of the December 2008 quarter. "[Consultants] estimate

about 5 per cent penetration of biotechnology tools into industries," he says.

Melbourne biotechnology company Starpharma started looking beyond the medical market for its technology – large molecules called dendrimers – about two years ago, chief executive Jackie Fairley says. Last September, it signed a licensing agreement with SSL International, makers of Durex condoms, to use one of its products, VivaGel, as a condom coating. Fairley expects the deal to result in revenue of \$100 million for the company. VivaGel's original purpose is as a protector against HIV and genital herpes, development of which will be helped by revenue from the SSL deal.

"About 50 per cent of the commercial effort of our company is focused on non-medical applications of our dendrimers," Fairley says. "Pharmaceutical development is long. If you make it through, it can be incredibly profitable. But in 2006, when we acquired Dendritic Nanotechnologies, an American company, it was to broaden the base of our commercial effort." DNT held 196 patents in dendrimers at the time.

Starpharma has also signed agreements in cardiac diagnostic and food technology and is looking at applications of dendrimers for cosmetics and water clean-up.

AusBiotech cannot provide an estimate of the value of industrial biotechnology companies, which Lavelle says tend to fall outside the usual



biotechnology categories. Bioshares analyst David Blake says he considers biotechnology companies to be those that have to traverse the regulatory pathway of the Therapeutic Goods Administration in Australia and the Food and Drugs Administration in the United States. However, companies with environmental and agricultural products also use biotechnology.

One well-established example is CleanTeQ, a company that uses bacteria in air and water filters. A member of the *BRW Fast 100* list, CleanTeQ grew by an average of 53.6 per cent a year for the previous three years to reach revenue of \$14.8 million in 2007-08.

The company was launched back in 1990 and it took its founder, Peter Voigt, many years to persuade a sceptical market. "People are used to using chemicals to fix up [water and air]," Voigt says. "We demonstrated it over and over again. Then the overseas guys got it, and our guys started to catch on."

Miners use CleanTeQ's technology to extract metals from low-grade ore. This makes up 45 per cent of the company's revenue. Another 45 per cent comes from air filters and the remaining 10 per cent from the burgeoning market of water purification.

How about an industrial disinfectant that is 1000 times cheaper than current products and more effective? This is the promise that the Environmental Biotechnology Cooperative

## Small margins, quick returns

Investors love the enormous profit potential of medical science but hate the long lead times and high risks.

Investment companies such as Agritechnology and Cleantech Ventures are busy pouring money into non-medical biotechnology opportunities, which deliver smaller margins but quicker returns on higher sales volumes.

Investors are looking for companies in which biotechnology, nanotechnology and information technology converge. "Last year, we looked at over 250 proposals," Dr Mark Bonnar of Cleantech Ventures says. "The really exciting ones are combining the traditional disciplines. There's

an opportunity for biotechnology to partner with other industries."

Cleantech Ventures has \$80 million under management to invest in energy, water and other environmental companies.

Agritechnology is a private research and development company developing industrial biotechnology products in partnership with investors. These include algae fermentation for carbon capture and storage and, long-term, fuel alternatives, nutraceuticals and food supplements.

However, one of its listed biofuels companies, Agri Energy, went into voluntary administration last September.

## INDUSTRIAL AND NON-MEDICAL BIOTECHNOLOGY COMPANIES

Company name	HQ	Product
<b>Arometrics</b>	Brisbane	Removes odours
<b>Aquatec-Maxcon</b>	Brisbane	Industrial waste-water treatment
<b>Australian Functional Foods</b>	Orange, NSW	Fruit-based sports drinks from marginal harvest fruit
<b>Biospot</b>	Sydney	Waste-water treatment
<b>CleanTeQ</b>	Melbourne	Air and water purification, metal extraction
<b>Enretech Australasia</b>	Sydney	Bioremediation of soil and grease-trap cleaner
<b>Farmacule</b>	Melbourne	Crop intensification
<b>Flinders Bioremediation</b>	Adelaide	Bioremediation
<b>Genesearch</b>	Brisbane	Grease and oil removal
<b>Hexima</b>	Melbourne	Genetically modified crops
<b>MiniFAB</b>	Melbourne	Contract development of biotechnology products
<b>Ozmotech</b>	Melbourne	Soil bioremediation
<b>Plantic Technologies</b>	Melbourne	Biodegradable plastics made from corn starch
<b>Perth Petroleum Services</b>	Perth	Bioremediation of phenol, fuels and lubricants
<b>Spartel</b>	Perth	Waste management and glass crusher
<b>Starpharma</b>	Melbourne	VivaGel, condom coating
<b>Sustainable Infrastructure Australia</b>	Sydney	Bioremediation soil, water and air
<b>Tyrian Diagnostics (Proteome)</b>	Sydney	Crop diagnostic
<b>Viva Blu</b>	Sydney	Water purification

Source: BRW, Department of Innovation, Industry, Science and Research

Research Centre hopes to deliver, its executive director, Dr David Garman, says. The centre is developing biological methods of breaking up the "films" that bacteria form to protect themselves from cleaning agents.

"That is what causes you to slip in swimming pools but it is also a problem in manufacturing, water supply and sewerage. They are everywhere." The centre has spent \$10 million and five years developing the answer, which Garman says can be applied to everything from washing salads to cleaning food-processing plants.

Consumer products companies worldwide are desperate for an alternative to petroleum-derived plastics for packaging. Biotechnology is starting to provide some of the answers. "Long term, the cost of oil is going up," says Meller, who visited Australia from Cincinnati last year to tout for partnerships with local biotechnology companies. Procter & Gamble spends billions every year on packaging and is at the mercy of the wildly fluctuating oil prices that dictate the cost of plastics. "We are working with companies involved in making packaging material from sugar cane but as yet it is too costly for consumer products. But the work is going on, and we are staying well aware."

Meller has a team of 50 people trawling the world for packaging alternatives and other innovations. In particular, medical biotechnology companies are missing industrial opportunities, he says. For example, P&G created a new skin-care product under its Olay brand after applying genomics, a technique used primarily to study the role of genes in diseases, to find the genes involved in skin ageing. The company then tested everyday products to find those that rehydrate ageing skin and had a product on the market within three years.

A three-year timeline from benchtop to market would make many biotechnology company leaders drool. A shorter, less expensive lead time to market is one advantage industrial biotechnology has over medical and agricultural biotechnology. It typically takes 15 years to take a new medicine through clinical trials to market and costs hundreds of millions of dollars.

In 2008, biotechnology companies raised \$183 million in capital – a savage fall from capital raisings of \$943 million in 2007. Biotechnology companies should consider possible industrial applications of their technology as a way to find revenue in tough times, Lavelle says. "Companies have not considered looking at industrial applications. There is no reason why it should distract them from their medical applications."

Enter the federal government. Late last year, it decided to give industrial biotechnology a push along. It launched a small Industrial Biotechnology Strategy and started it with workshops to ramp up interest and awareness in the possible use of biotechnology in manufacturing and environmental companies. About 100 people went along in Melbourne, 70 in Perth and 90 in Brisbane. Not big numbers, but the Department of Innovation, Industry, Science and Research was heartened to find that, on average, 93 per cent of participants gained ideas on how to use biotechnology.

Industrial applications of biotechnology are not a sure-fire ticket to success – as the fate of biotechnology company Apollo Life Sciences attests. Sales of its skin-care products, which went on sale last January, failed to prevent the company going into administration last November, having burned through \$25 million on its various medical biotechnology projects. **BRW.**