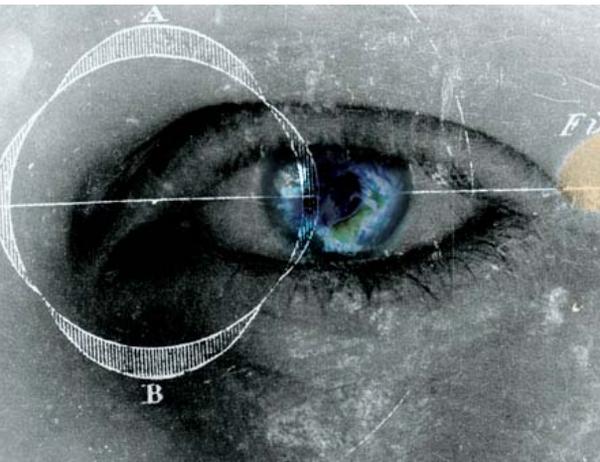


The Future of

Biotechnology



Biotechnology, like any industry has a number of key stakeholder groups, all have a unique point of view, but all are unified in their drive to achieve sustainable long term growth. We provided Chris Boalch (NZTE), Brian Ward (NZBio) and Brent Ogilvie (Pacific Channel) with some “big” questions about the industry, the future of it and the role each of their organizations play in that future. Their responses are published as Points of View within this article. I think you’ll agree they all have a passion for this growing industry and their answers to the questions posed by The Entrepreneur make interesting reading.

Chris Boalch leads NZTE’s Biotechnology sector initiative

NZTE’s Biotechnology sector engagement strategy’s 10-year vision is:

To accelerate the development and growth of an internationally integrated and acclaimed New Zealand biotechnology sector, which leads the world in niche biotechnology application and commercialisation, and attracts strong strategic relationships with investors, collaborators and markets.

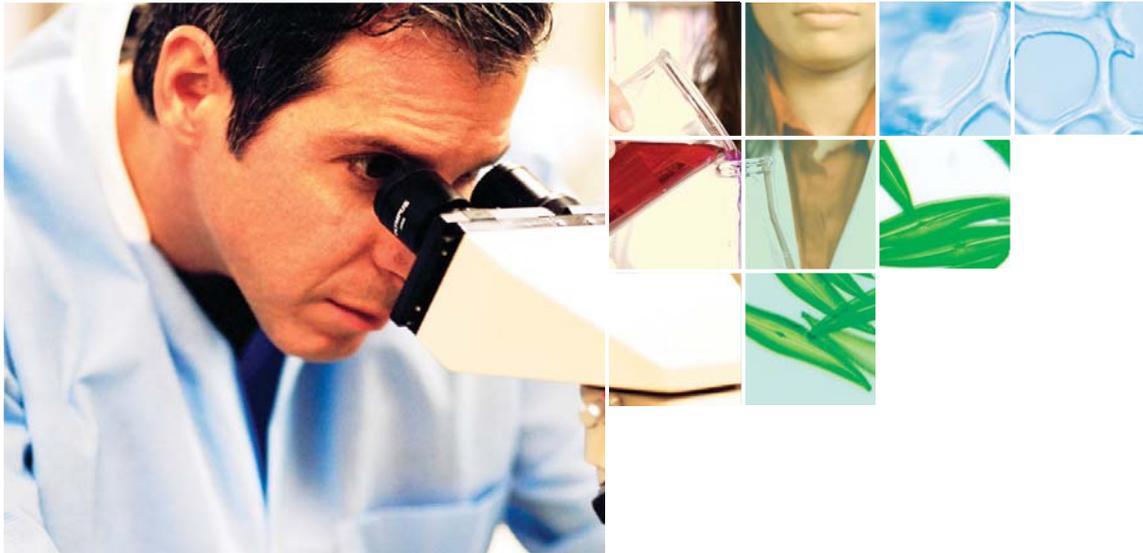
1. What are some of the trends that you are noticing in NZ Biotech?

International partnerships, rising investment and growing commercial success underpin our increasing profile as a vibrant and maturing member of the global biotechnology industry. The recently released New Zealand Biotech Industry Growth Report paints a picture of a healthy sector which continues to grow at a robust pace. Biotech export revenues increased by 30% between 2004 and 2005 alone.

2. What makes NZ an attractive investment option?

New Zealand’s biotechnology sector focuses on key industries where our country already excels, such as forestry and agriculture. That’s enabled us to develop world-class strengths in niche fields of human health research, agriculture, forestry and animal research, and in forensic and environmental sciences.

Our biotechnology industry boasts a rich pool of creative and commercially-minded scientists. It offers world-class research and development facilities, and works within a stable, cost competitive business environment that is actively supported by the New Zealand Government.



3. What challenges does NZ have as a base of operation?

Together Australia and New Zealand represent the world's fifth largest biotech hub, and both offer a competitive location for conducting clinical trials and world leading research.

4. What areas should New Zealand focus on? Where are we currently excelling on the world stage and why?

New Zealand's particular strengths lie in agriculture, animal health, forestry, industrial biotechnology, pharmaceutical research, and medical devices and diagnostics.

New Zealand has built on its historical focus on primary industries to develop wide-ranging research excellence. Its compact sector, resourcefulness and a positive growth trajectory creates a community committed to success and characterised by an ease of 'doing business'.

5. Can you elaborate on at least 2 success stories of companies NZTE has played an influential part:

New Zealand Pharmaceuticals (NZP): The company has just opened a new specialised manufacturing facility for the production of carbohydrate based synthetic pharmaceutical intermediates. They supply key biotech and pharma companies in the US and are owned 51% by BioPacific Ventures. The company's strength lies in focus on R&D and a key relationship it has established with the IRL Glycosyn carbohydrate chemistry team. NZTE has provided a suite of service support to NZP from both an onshore and offshore perspective and also provided a \$500k Growth Services Fund grant to assist with the new plant design and configuration.

Proacta: a company specialising in solid tumour cancer therapeutics which has spun out from the world leading cancer research group at Auckland University. The company uses smart technology to target cancer cells by employing a prodrug delivery mechanism activated by conditions of hypoxia (oxygen depletion being common in association with solid tumours). The company has a commercialisation arm operating in the US and R&D plus clinical trials arm operating in New Zealand. NZTE has provided a suite of support to Proacta including beachhead plus co-funding support with Tech NZ (FRST) to assist with phase I clinical trials. NZTE awarded Proacta a \$2.1m Australia New Zealand Biopartnership Fund award. The company has just raised \$35m from a group of tier 1 venture capitalists in the US to advance its drug pipeline.

If you were looking for other 'hot to trot' NZ biotech stories where NZTE has played a key role then I would include Coda Therapeutics (remarkable wound healing technology) and Lanzatech (world leading ethanol production technology feeding off carbon monoxide waste emissions - i.e. no biomass - just secured a slug of funding from US VC group Koshla Ventures).

6. What contribution - current state and future state does Biotech play in terms of the NZ economy?

Biotechnology research has critical roles in New Zealand. It is a mainstay of growth for New Zealand's predominantly, biological economic base, providing new knowledge to keep and develop our competitive advantage. It will transform our primary sector into one producing increasingly value-added and environmentally sustainable products and processes.

Biotechnology research is also fuelling the new biotechnology-based industries and enterprises of the future, including New Zealand's drug development, medical devices and ag-biotech enterprises which are linked to global research partners and markets. It underpins biodiversity and biosecurity management in New Zealand and also drives innovations within the global healthcare sector to benefit the health of New Zealanders.

7. What is the role/should be the role of government play in developing this industry?

The importance of biotechnology research to New Zealand is reflected in the proportion of government research funding spent on it. At 25% of total government R&D investment (or around \$195 million per annum), this is proportionally the highest share of government-funded biotechnology in the OECD.

Brian Ward – CEO, NZ Bio – New Zealand's Biotech industry organisation

As well as comments about the Government's recent Research & Development legislation announcement, featured in the article *Big Win for Biotechnology Industry* in this issue of *The Entrepreneur* – we asked Brian for his views on the state of play overall in biotechnology.

1. What are some of the trends that you are noticing in New Zealand Biotech?

I've seen a marked increase in private sector investment over last three years as well as an increase in offshore venture financing as evidenced by ProActa, CoDa, and Protomix from United States. Overall there is a much greater international partnering activity with such players as IRL Glycosyn & Biocryst, Kode biotech & Immucor (US) & also Medicult (Denmark), Ovita & Genetic solutions (Australia) which lead to Catapult Genetics, Pacific Edge & Signature Diagnostics (Germany), Blis & Nestle (Switzerland).

2. What makes New Zealand an attractive investment option?

New Zealand is a hot bed of great science which comes from a long history in biological science research. Also, culturally NZ companies are very easy to work with and highly productive.

3. What challenges does New Zealand have as a base of operation?

Our distance from the customers in the major markets and also the capital markets has historically limited our ability to exploit our innovations. But this is increasingly being overcome by just living with the fact that if you want to live in New Zealand and work in biotech you've got to be willing to get on planes and do long haul flights much more frequently. It was a mental rather than an actual barrier.

The exciting thing for New Zealand is that biotech is very quickly becoming a truly international business and investors and corporates are much less concerned about geography than they were even two to three years ago. We've seen a rapid increase in inward and outward activity.

4. What areas should NZ focus on? Where are we currently excelling on the world stage and why?

I'm not in favour of focusing on specific areas but rather I think it much better to focus on resourcing the best people. Each opportunity is quite different and can offer different rewards and risks, business models, capital requirements and the like. So rather than have a sector approach it's better to take a merit approach.

We are strong in biotech as it relates to pastoral farming, horticulture and forestry because we have a long legacy in agricultural research. In essence we understand animal and plants so we are very well placed in some aspects of agricultural biotechnology. This has provided great benefit to farmers in terms of reducing costs and increasing productivity but establishing new technology enterprises which marketed the products internationally has proved very challenging. We are beginning to see these types of company emerge with Livestock Improvement and Wrightson Seeds.

5. Can you elaborate on at least 2 success stories of New Zealand Bio members?

It is very early days but you could point to Auckland University was the originator of Antisoma cancer therapeutic which led to a \$1 billion deal with Novartis

IRL Glycosyn was the originator of the molecule which formed the basis of the deal between Biocryst and Mundpharma.

Neuren is in phase III with glypromate and a very full pipeline appearing. These are just some examples.

6. What is the role/should be the role of Government in developing this industry?

The role of the government to create an environment that is at least as good as the best countries in world for the development of the biotechnology industry and it may need to be even better. That means investing in more public science, providing a tax regime that works and incentivises early stage companies, and putting in place sensible regulation that is not onerous.

This industry is very capital intensive so a major success factor is investment. I can see private investment derived from local and international sources continuing to grow at a rapid pace. There is also a need for a sharp change in the public investment in biological research to fuel the pipeline. I would suggest we need to double the public spend.

Brent S Ogilvie – Director Pacific Channel

Pacific Channel, through access to expertise and financial capital, facilitates the growth of commercially viable biotechnology companies in Australia and New Zealand, both emerging centres of biomedical sciences and technology. Pacific Channel was formed as a “channel” between Australasia and the world’s largest market - the United States, acting as a conduit toward long-term global growth and success.

1. What are some of the trends that you are noticing in New Zealand Biotech?

Increasing pressure for faster returns is driving specialist activities to geographies in the world that hold competitive advantage. For example, the management of clinical development and business partnering activities of New Zealand originating biotechnology is increasingly performed in the US. Because these are significant value creation steps, and because of the greater depth and specialization of capital available in the US, some companies are migrating offshore.

Conversely, firms that rely on significant value creation activities that are best performed in New Zealand, such as ongoing discovery or specialist manufacture such as for xenocell therapy, are expanding their local operations. Similarly, New Zealand’s ongoing strength in agbiotech both generates and attracts ventures aligned with our dominant primary industries such as dairy, meat, wool and forestry.

2. What makes New Zealand an attractive investment option?

Each country developing biotechnology leverages its skills to create a unique face for the industry. New Zealand has significant assets that are playing an important role in the creation, growth, and return on investment for companies developed here. These assets are:

- The country has a long history of excellence in life sciences research in food and agriculture as a result of billions of dollars of government investment over the last 25 years.
- The Universities in Auckland, Christchurch, and Dunedin and the Crown Research Institutes are world-class and boast many researchers who have been trained in leading institutions around the globe.
- The biodiversity found in New Zealand and immediately offshore can be the source of countless numbers of targets for therapeutic and industrial development opportunities.
- New Zealand has a significant per capita population of scientists and industrial engineers and there is a significant trained workforce capable of the manufacture of many of the products resulting from life sciences research.
- Technology and company valuations are relatively low from a global perspective thereby providing good return potential for early investors.
- A significant first world advantage is enjoyed by New Zealand relative to staff research costs and early stage clinical studies.

Significant investment opportunities exist and will continue to exist in the life sciences industries in New Zealand. Life sciences technology encompasses pharmaceuticals, medical instruments and devices for diagnostic or therapeutic uses, durable medical equipment, analytic tools, supplies, services and software systems. Investment activity will naturally be technology led and will focus on applications in the life science sector. We are aware of a number of exciting innovations in this sector and specific technology investment opportunities could include:

- Development of pharmaceutical therapeutics from natural sources including from the biodiversity of New Zealand
- Cancer and Cardiology focused “theranostics,” therapeutics, and devices
- Non invasive surgical technologies

- Medical devices, particularly for the cardiology market.
- Development of more efficient, less expensive drug delivery vehicles to ferry novel payloads, such as human proteins, to targeted sites of action in the human body;
- Animal health therapeutics and delivery technologies
- Miniaturized, more biocompatible, less expensive medical devices;
- Signal-amplifying diagnostics capable of early detection of diseases, disease sites, and progression of disease;
- New biomaterials for the treatment, transplantation, and regeneration of human tissues and organs;
- Novel vaccine and immunostimulant development for treatment of infectious diseases and cancer;
- Agricultural biotechnology such as improvement in production yields, bioactive pesticides;
- Biomedical-related software;
- Applications of nanotechnologies in life sciences;
- Marine aquaculture technology such as novel aquafeeds with therapeutic payloads

3. How do you/have you measured success from an investment point of view?

From an investment point of view the key success metric is to increase shareholder wealth. The opportunity to create significant social as well as financial good is also important to investors.

4. What contribution - current state and future state does Biotech play in terms of the New Zealand economy?

There are multiple high value applications of biotech additional to drug development such as in industrial biotechnology and the food and beverage industry. Uniquely in the OECD, New Zealand is a biology based economy with biology based industries accounting for over 60% of our gross national product.

For example, the food industry has many new and innovative products from yoghurts and cheeses to breakfast cereals that have been enabled by using biotechnology processes. Fonterra can be regarded as our most successful biotechnology company.

The current contribution that biotech plays is therefore significant. The future contribution will be even more so as the growth of New Zealand industries that have a biological base can be accelerated through the use of biotechnology. The bio fuels industry is being driven by biotechnology, future large scale aquaculture will be supported by biotechnology through designer aqua feeds and finfish vaccines, new and innovative functional foods will be delivered from a biotechnology platform. These are but some examples of future contributions that will be made from biotech.

5. What is the role/should be the role of govt in developing this sector?

The New Zealand Government should continue to fund basic research in areas where the social good potential is significant but the financial good is yet to be proven. The government should move more of its funding to support private sector research as the commercial imperative of the private sector is critical in delivering the new products that will create social good and wealth. ■

