The Australian Functional Foods Landscape

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1 Executive Summary

The functional food market in Australia is large and growing. Reports in 2004 suggest that Australian and New Zealand nutrition industry represented approximately A$2.9 billion of the global nutrition market. Of that, functional foods comprised AUS$1bn (35.1%), organics $0.8bn (27.8%), supplements $0.9bn (30%), and natural personal care $0.2bn (7.2%). Australia and New Zealand represent potential growth markets in this sector due to relatively low levels of per capita expenditure on nutrition products (i.e. in comparison to expenditure in the U.S., Western Europe and Japan).

The Australian government is committed to promoting innovation in the food industry to facilitate the commercialization of new products or technologies. Through a range of initiatives such as Food Innovation Grants and Centers of Excellence in Functional Foods and Food Safety, a significant investment in R&D has been demonstrated. The National Centre of Excellence in Functional Foods acts as a ‘one stop shop’ for industry and stakeholders.

As in other developed countries around the globe, the Australian functional foods market has seen rapid growth over the last decade. This trend is likely to continue as changing population demographics (e.g. an ageing population), and the effects of lifestyle diseases such as obesity create greater demand for food products targeting health and wellness.

It is clear the market is driven by taste, convenience, disease prevention, nutrition individualisation and snacking. In 2004, of the seven food categories experiencing double digit growth 6 were marketed on a health or wellness platform.

Successful nutrition platforms marketed in Australia in the past include: Omega-3 enriched foods and beverages, antioxidant containing foods, plant sterols, low glycaemic index foods and more recently whole grains.

Areas where there is evidence to support a health claim include and thus predict new marketing and R&D opportunities:

- Sodium (with or without potassium) and hypertension
- Fruit and vegetables and coronary heart disease
- Wholegrains and coronary heart disease
• Saturated and/or trans fat and elevated serum cholesterol or heart disease
• Calcium (with or without vitamin D) and osteoporosis
• Folate and neural tube defects
• Omega-3 fatty acids and coronary heart disease

It is expected that the new regulations will be in place by the end of 2006, including pre-approved high-level health claims and detailed requirements for substantiation of claims. There is a unique opportunity in Australia to be first to market with new products along with the ability to communicate the health benefits.

Large companies dominate R&D expenditure in the Australian food and beverage industry, with the largest two percent of business accounting for three quarters of expenditure. R&D funding is comes primarily from the industry itself (95%), with only 1.7% provided by the government.

Multinational companies providing a range of vitamin and mineral enriched products, plant sterol enriched spreads, omega-3 enriched products and a range of pro and pre-biotic dairy products dominate the Australian functional food market. In addition, Australia has a number of innovative SME that have produced novel products in the area of native botanicals, pro-biotic bars, wellness beverages and wheat protein isolates.

*Companies looking to Australia to invest in the functional food industry should consider:*

The emergence of foods promoted on a health and wellness platform is a significant growth market segment in Australia. With new legislation regarding health and related claims ready to be enacted at the end of 2006 companies have a unique opportunity to be first to market with novel foods and promote them in ways like no other.

Successful functional foods in Australia have included products enriched with DHA, low in GI, wholegrain and pro and pre-biotics. Although there are many factors that make a product successful or not, it appears clear that foods must firstly taste good and be convenient. In addition they must be marketed to a health need which is understood by consumers. Finally, selecting a price point where the consumer will buy the product is clearly important.

Australia has a well-developed R&D network with demonstrable Government support. The combination of these factors makes it a very attractive long-term market for functional foods.
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2 Background

The Canadian High Commission of Australia has requested market report on Australia’s functional foods/nutraceuticals industry. The report will be for the exclusive information of Canadian researchers, manufacturers and governments, and will outline the status of the functional food market in Australia and identify emerging trends/opportunities for development and collaboration.

2.1 Project Objectives

1. Provide an outline the status of the current functional food nutrition market, commercial developments and trends in the pipeline (what are the "hot" products and why?).

2. Provide a summary of Australian-based R&D and examples of current projects and major focus areas.

3. Information on selected Australian company profiles, success stories, key contacts, and examples of innovation by domestic/international firms (both large and SME).

3 Methodology

A review was conducted using publicly available literature, websites and databases. In addition industry interviews were conducted to clarify information or gather additional information. The following areas were covered with recommendations and insights provided.

1. Australian market review
   a. health and nutrition trends in Australia
   b. current food trends in Australia providing examples of products
   c. key product innovations in Australia using a case study approach

2. Australia’s R&D in relation to functional food development
   a. major R&D providers in Australia.
   b. examples of research areas and priorities

3. Company profiles

Information about company products and technology was sourced through companies known to the functional food centre (National Centre of Excellence in Functional Foods). Most of the information was that given by the companies and claims made are those expressed by the companies and does not necessarily reflect the opinions of the Functional Foods Centre. The report provides
a. examples of successful functional food companies in Australia
b. examples of emerging technologies or innovative application of technology
4 Australian Market Review

4.1 Australian Food Industry

Total retail food sales in Australia approached AU$92bn in 2004-05. Supermarket and grocery stores captured the majority of sales - accounting for approximately 62% of total food and liquor retailing. The remainder of retail food sales involved cafes and restaurants (12%), takeaway food outlets (10%) and liquor (6%) and other food retailing outlets (10%).

**Imports:** Australia's largest food import partner remains New Zealand ($1199m in 2004-05) with food imports from Canada totaling $209m (almost 70% of which were meat products).

![Australian total food imports, by selected destination](source)

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**Source:** ABS, *International Trade*, Australia, cat. no. 5465.0, Canberra.

**Exports:** In 2004-05, Australian food exports to Canada totaled $487m (almost 50% of which was Wine) but Japan remains Australia's largest food export destination ($5444m in 2004-05).

![Australian total food exports, by selected destination](source)

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**Source:** ABS, *International Trade*, Australia, cat. no. 5465.0, Canberra.
4.2 Functional Food Sector

Detailed information on the size of the Australian Functional Food market is relatively sparse; however, in 2003 the US based firm Health Strategy Consulting (HSC) estimated that the Australian and New Zealand nutrition industry represented approximately A$2.9 billion of the global nutrition market. Of that, functional foods comprised AUS$1bn (35.1%), organics $0.8bn (27.8%), supplements $0.9bn (30%), and natural personal care $0.2bn (7.2%).

At the time, HSC suggested that Australia and New Zealand represented potential growth markets in this sector due to relatively low levels of per capita expenditure on nutrition products (i.e., in comparison to expenditure in the U.S., Western Europe and Japan). As in other developed countries around the globe, the Australian Functional Foods Market has seen rapid growth over the last decade. This trend is likely to continue as changing population demographics (e.g., an ageing population), and the effects of lifestyle diseases such as obesity create greater demand for food products targeting health and wellness.

Growth of the functional foods market in Australia has proved to be strong although variable across category segments. ACNielsen's 2005 convenience store report indicates that the largest growth categories (Figure1) to year ending March 2005 were energy and sports drinks (31% and 25%), with significant growth also experienced in nutritional snacks (10.5%). ACNielsen also recently reported the Uncle Tobys 'Nutritious Snacks' category as Australia's 29th most successful brand, with Uncle Toby's estimating a 16% growth rate for the 'convenience nutritious snack' category.
4.3 Australian Food Regulation

Current Australian regulations are established by Food Standards Australia New Zealand (FSANZ). These are enforced by State agencies in Australia and prohibit the promotion of health-related claims with food products. Both State and Federal authorities are responsible for packaging statements. FSANZ also regulates product labeling.

An understanding of regulatory affairs is crucial in determining opportunities for product development as well as planning their promotion and labeling. There are three areas, which may need to be considered in the development, and marketing of functional foods:

- Whether particular novel ingredients will require special permission before use in a Functional Food. In Australia and New Zealand, food regulations require companies to apply for permission to market novel or non-traditional foods or ingredients that do not have a history of safe use.

Figure 1 Convenience Categories Value % Growth Year Ending March 2005
• Whether food regulations control the type and amount of vitamins, minerals and other bioactive (such as phytoestrogens, probiotics or antioxidants) substances, which can be added to foods. In Australia and New Zealand, the current legislation permits the addition of vitamins and minerals to specified foods only, with maximum permitted levels.

• What form of health claims are permitted on labels and in advertising and the level of evidence required to substantiate claims.

Food regulations differ significantly internationally but, with the exception of Japan, most countries do not have special food standards governing Functional Foods. What is permitted in one country may not be permitted in another. It is therefore essential to check the regulatory requirements in each country where products are to be marketed and the National Centre of Excellence in Functional Foods offers this advice.

4.3.1 Health claims

Since Functional Foods are marketed on a health platform, regulations related to health claims are of most interest. Health claims are seen by many companies as essential tools for the successful marketing of Functional Foods. There are different types of claims, including:

• **Nutrient content** and comparative claims such as “this product is a good source of X” or “this product is low in X”.

• **Structure function claims** such as “this product contains X which help maintain blood vessels” or “this product contains X which is important for healthy teeth and bones”.

• **Health claims** usually describe a relationship between diet and health. For example, “this product contains X which may reduce blood cholesterol levels”.

• **Therapeutic claims** such as “this product contains X which prevents cancer” are not permitted on foods.

At present health claims are currently not permitted on food labels or associated advertising in Australia or New Zealand, with one exception - folate and prevention of neural tube defects. However, a new standard is being considered that would permit general-level or high-level claims to be made, provided there was rigorous scientific substantiation, is being considered. General level claims include nutrient content, structure function claims, or health claims that refer only to non-serious diseases or conditions; and high-level claims refer to serious diseases or conditions or
biomarkers of such diseases (such as cholesterol). It is expected that the new regulations will be in
place by the end of 2006, including pre-approved high-level health claims and detailed
requirements for substantiation of claims. Pre-approved high-level health claims are being
considered for the following relationships:

- Sodium (with or without potassium) and hypertension
- Fruit and vegetables and coronary heart disease
- Wholegrains and coronary heart disease
- Saturated and/or trans fat and elevated serum cholesterol or heart disease
- Calcium (with or without vitamin D) and osteoporosis
- Folate and neural tube defects
- Omega-3 fatty acids and coronary heart disease

Leveraging nutrient content claims: While the health benefits of Functional Foods need to be
communicated to consumers if products are to be successfully launched, this does not always have
to be via overt high-level claims about disease or performance on pack or in advertising.

Consumers see health claims on foods as useful and when a product features a health claim, they
view it as healthier and state they are more likely to purchase it. Interestingly, consumers do not
make clear distinctions between nutrient content claims, structure-function claims and health
claims. Consumers may respond equally well to simple nutrient content claims, once they are
aware of the benefits of ingredients (e.g. “with the benefits of omega-3 fats”). A range of well
established nutrient function claims are approved for use in Australia and may be useful for
identifying nutrition marketing opportunities other than health claims.

Providing the evidence: The proposed new Australian standard on health and related claims will
impose strict requirements for documentation and scientific substantiation of health claims that
manufacturers will have to understand - even for general level claims.

Most companies will need to seek expert assistance in developing dossiers of substantiation
evidence to support claims about products. However, the Australian system might permit general-
level claims about health maintenance and wellbeing, without pre-approval by FSANZ. This should
allow greater speed to market and retention of intellectual property than in many other countries.
Policies providing new opportunities

New Wholegrain Definition: The Australia New Zealand Food Standards Code was amended on 22 September 2005 to include a new definition of wholegrain:

“Wholegrain means: the intact grain or the dehulled, ground, milled, cracked or flaked grain where the constituents – endosperm, germ and bran – are present in such proportions that represent the typical ratio of those fractions occurring in the whole cereal, and includes wholemeal” (Standard 2.11, Australia New Zealand Food Standards Code).

This new definition relates to any foods made from grains such as breads, breakfast cereals, pasta, biscuits, oats rice and grain-based snack foods. The new definition enables new opportunities for some existing foods on the market and potential new foods to be re-classified as wholegrain foods; for example, rolled oats can now be considered a wholegrain product.


According to that report, “formulated beverages are described as non-alcoholic, water-based, flavoured beverages containing claimable amounts of a range of vitamins and minerals”. Currently only three vitamins (vitamin C, folate and beta-carotene) are permitted to be added to general purpose beverages including juices and fruit drinks containing at least 25% fruit juice. Application A470 is seeking permission for the addition of 23 vitamins and minerals, a range of food additives excluding caffeine and carbon dioxide, and the use of some fruit-based ingredients and sugar” p7 (Draft Assessment Report, FSANZ, 2005).
4.4 Health and nutrition trends in Australia

4.4.1 Population Demographics

Australia, like many developed countries has an ageing population due to reduced birth rates and greater life expectancy. The Australian Bureau of Statistics\(^5\,^6\) reports that the proportion of the Australian population aged over 50 will increase over the next 15 years - particularly the over 65 age group (see Figure 2).

The proportion of Australians aged 65 or over rose from 10.3% in 1985 to 13.1% in 2005 and is projected to reach 19% by 2021. By 2016, Australia will have more people aged over 65 than children under 15.

Although the proportion of Australians over 50 is expected to increase over the next 15 years, the largest demographic in Australia at present is comprised of those aged between 10 and 40 – a demographic, which encompasses the so-called X and Y generations.

4.4.2 Health

Australia is currently faced with a number of major health challenges arising from an ageing population and an increase in lifestyle diseases. Current research suggests that functional foods can make a positive contribution to addressing those challenges.

**Ageing Adults:** The concerns of older consumers about long-term health and beauty are reflected by their willingness to spend on food and beverage products, which address those concerns due to a growing awareness that while ageing is inevitable, quality of life is affected by lifestyle factors such as diet.

As the proportion of Australia's older population increases so will the market for functional foods amongst this group - especially for those products formulated to meet their specific “ageing” needs. This will offer functional food manufacturers a range of opportunities to market products which target conditions of ageing such as decrease in bone density; arthritis; cognitive deterioration; loss of muscle bulk and strength; deterioration in vision; decreased immune system effectiveness and reduction in metabolic rate, bearing in mind the requirements of the regulatory framework.
**Overweight/Obesity:** As in many countries around the globe, the prevalence of overweight and obesity are increasing in the Australian population affecting a sizeable proportion of both children and adults. Obesity is associated with increased risk of developing high blood pressure, heart disease, diabetes, osteoarthritis, back pain, low self-esteem and depression in later life. Growing awareness of health costs associated with obesity has contributed to the growth in weight-loss products (e.g., low-fat, low-carb, low-glycaemic index (GI) etc).

**Overweight/Obese Children:** In 1995, over 20% of children aged 7–15 years were overweight or obese with obesity among 7–15 year olds tripling between 1985 and 1995. More recent regional data indicates that those trends have continued. A Victorian study in 2003 reported that 7.9% of children aged 7–11 years were obese, and 26.7% were overweight while a survey of NSW children aged 7–11 years in 2000, reported an obesity prevalence of 9.9% in boys, 7.1% in girls and an overweight prevalence as high as 26.2% in boys and 28.4% in girls.

**Overweight/Obese adults:** Results of the latest national health survey conducted by the Australian Bureau of statistics indicate that 62% of males (Figure 3) and 45% of females (Figure 4) were overweight or obese (based on BMI), with the highest percentages occurring in the older age groups e.g. for people aged 55–64 years 72% of males and 58% of females were classified as overweight or obese.


### 4.5 Current food trends in Australia

As in many developed countries around the world, the megatrends of health and convenience, coupled with an increasing trend towards products which target specific age, sex or nutritional need...
demographics, is driving growth in the Australian Functional Food market. There is increasing interest in ‘healthy living’, especially amongst the ageing population and the overweight/obese. This interest is being driven by increased understanding of the link between nutrition and health and is being fostered by the marketing of food companies and health-care agencies in their attempts to control escalating health care costs\(^\text{10}\).

In their recent summary of Food trends in Australia, the USDA Foreign Agricultural Service\(^\text{11}\) reported that trends driving Australian consumers included:

- **Health** – the momentum of the trend towards health cannot be doubted and health (or wellness) is becoming the new standard for the food industry (Food companies should consider Intrinsic Health – which strategy has the least risk associated with it and little to no new product development cost - marketing the intrinsic healthfulness of foods.)
- **Daily-dose and the power of packaging innovation.**
- **Bars & Beverages** – over the past few years the largest growth in nutritional products has been in bars and single-serve beverages – products consumed by individuals who are on-the-go, in a hurry, & most often eating alone.
- **Out of the supplement aisle** – increasingly ingredients traditionally found in the supplement aisle are finding their way into beverages. For example, calcium has just been approved as an additive for beverages, soups and biscuits.
- **Personalized nutrition is here to stay** – products that allow customers to choose a snack that meets particular health needs.
- **Kids’ nutrition crisis** – just like in the U.S. this issue is at the forefront of parents’ minds. Pressure is on to produce healthier options for children’s snacks.

### 4.6 Omega-3 enriched foods – An Australian success story

*[The following case study on omega-3 enriched products is based on discussions with food industry representatives who wish to remain anonymous.]*

Australian consumers are well known for their knowledge and interest in the beneficial effects of Docosahexaenoic acid (DHA). DHA is a long-chain polyunsaturated fatty acid in the omega-3 family of fatty acids and found predominantly in fatty fish. While there is no recommended dietary intake for DHA, it is an essential component of all cells in the body, especially brain and neural tissue and has direct effects on heart health. As a result, products enriched with fish oil have been very successful for a number of years in Australia; however, despite high consumer awareness their position in the market place remains largely at a niche level.
Peters Brownes is well known for its innovation with Heart Plus being a perfect example. They were leaders in producing functional milk with added multi-functional ingredients such as omega-3 fats and vitamins. In addition, they packaged them in a low fat milk with the aim of appealing to heart and health conscious older adults. Heart Plus won the inaugural Australian Grand Dairy Awards Innovation Award in 2003. Peters Brownes Heart Plus was the first milk product formulated targeted at those who wish to maintain a healthy heart and cardiovascular system. It is low fat milk, containing 60mg/100ml of DHA and EPA with added vitamin B6, B12, E, C and folate. Peters Brownes is based in Western Australia and distribute nation wide via the major supermarket chains. We were advised that Western Australia was the largest market although they do distribute to most states” in Australia

On the East coast of Australia, Dairy Farmers formulated their traditional Farmers Best product (with saturated fat substituted with monounsaturated oil) to include DHA and EPA. It is slightly lower in marine oils (13.2mg/100g) with; 250ml of Farmers Best only provides 6% of what is needed per day to be beneficial for heart health compared to Heart Plus, which provides 30% of daily requirements.

Omega-3 enriched milks are higher-priced, higher-margin milks. Brownes Heart Plus is slightly more expensive than regular milk – AU$2.36 per litre compared to AU$1.68 per litre (approximately 30% more expensive). Similarly, Farmers Best is approximately 15% more expensive per litre than regular milk and retails for about AU$1.67 per litre compared to AU$1.99 per litre. Omega milks are priced comparable to other low fat milks.

Despite the high consumer awareness about the health effects of omega-3 oils, product sales for omega-3 milk remains low as a percent of the overall fresh milk market. We were advised that the Omega-3 milk market is still very much a niche market. The market size in the 2003/04 year was reported as being 1,974.3 million litres or worth $1,568 Million in dollar terms. Whereas, the combined market of reduced fat milks is 22% of the Australian liquid fresh milk market with omega-3 enriched milks only a fraction of this market with some reporting this to be less than 2%.

Although the health benefits of omega-3 oils extend beyond heart health both products are targeted at the consumer concerned with heart health. We were advised that the company focused on
functional benefits with respect to cardiovascular disease and although they were aware of the real and perceived benefits of omega-3, this would remain their focus in the near future.

The Farmers Best product has been around since 1992 and has always been formulated using monounsaturated fat to replace butterfat and marketed as a heart health proposition with endorsement by the National Heart Foundation. We were advised that the message ‘you can drink it to your heart's content’ has been part of the advertising for many years. In addition, marketing has variously used print media or TV with the latter in the past including advertisements featuring a well-known heart transplant recipient. The omega-3 variant was launched in 2003 and conveys the message of added benefit of omega-3 as one of the most important nutrients for maintaining a healthy cardiovascular system and general wellbeing.

Australia is also known for a range of high DHA breads, muffins and yoghurts. These have had relative success due to the initial launch by George Weston foods with their signature ‘UP’ bread. We were advised that this product enriched with 36mg/100g of DHA, was launched at a comparable price point to regular bread and this was attributed to the success of the product. Providing a tasty, nutritional product at a competitive price point is very important for the market success of functional foods.
5 Australia’s R&D in relation to functional food development

Recognising that functional foods were at the centre of food innovation, the National Food Industry Strategy established the National Centre of Excellence in Functional Foods in July 2003. The National Food Industry Strategy (or NFIS) Ltd is an industry-led public company funded by the Australian Government to be 'change agents' in the Australian food industry by assisting Australian food businesses to be profitable and sustainable in the global food industry. Formed in 2002, NFIS was given the task of coordinating the implementation of the Government's 5-year blueprint (2002-2007) for increased investment in innovation, increased export growth and improved productivity, efficiency and skills in the Australian food industry. NFIS supports food innovation and funds the National Centre of Excellence in Functional Foods. The purpose of the Centre is to consolidate R&D in the area to support an effective functional food market, and act as a 'one stop shop' for investors and collaborators. The Centre, delivers advice, researches opportunity and promotes a leadership position for the Australian food industry in the global functional food market.

5.1 R&D investment in food

Research and development in the food, beverage and tobacco industry had risen from $202 million in 2000-2001 to $260 million in 2003-04, an increase of over 40 per cent (Table 1). The increase in R&D expenditure was particular strong in the other foods (up 127 per cent), beverages and malt (up 106 per cent), fruit and vegetable processing (up 46 per cent), bakery products (up 46 per cent) and meat and meat products sectors (up 22 per cent). In contrast, R&D expenditure declined by more than 24% over the same time period for the dairy sector\(^1\).
Table 1: R&D expenditure by food, beverage and tobacco management units

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b Capital expenditure is defined as expenditure on the acquisition of fixed tangible assets such as land, buildings, vehicles, plant, machinery and equipment attributable to R&D activity.
c Current expenditure is defined as expenditure on direct labour costs, materials, fuels, rent and hiring, repairs and maintenance, data processing, etc., and the proportion of expenditure on general services and overheads that is attributable to R&D activity.
np Not published.

Source: Australian Food Statistics 2005

Large companies dominate R&D expenditure in the Australian food and beverage industry, with the largest two percent of business accounting for three quarters of expenditure. R&D funding is comes primarily from the industry itself (95%), with only 1.7% provided by the government. A recent survey of food and beverage manufacturers conducted by National Food Industry Strategy Limited examined reasons for lack of R&D investment and found that the most common reason was lack of capital1.

On an international basis, Australia out ranks the Canada, Japan, US and the UK (Figure 4) for public expenditure on R&D as a percentage of gross expenditure on research and development (GERD)12. The Australian Government’s has committed A$8.3 billion to 2010 to fund innovation as part of its Backing Australia’s Ability program and offers R&D tax concessions and other incentives.
support programs to enhance commercialisation. In terms of Business expenditure on R&D (Table 2), Australia falls below the OECD average.

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Table 2: BERD/GDP ratios for OECD Countries

BERD = business expenditure on R&D. na Not available.
Source: Australian Food Statistics 2005

Australia has been ranked in the top seven countries in the world in providing a supportive legal environment for scientific research, and in the top two countries in the Asia-Pacific region in terms of its patent and copyright enforcement.


The NCEFF is an integrated, world class centre of functional food research, promoting the development, substantiation, and commercialisation of effective functional foods whose benefits are recognized by consumers and regulatory bodies.

The strategic science program utilises a science driven approach and is funded via co-investment by the partner organisations and NFIS. The Centre has invested in projects that contribute to the evidence that substantiates the benefits of functional foods for healthy ageing and for appetite control and examine opportunities in functional foods for kids.
Foods for healthy aging: research into two functional ingredients that have the potential to protect against the effects of aging and the development of pathology: anti-oxidants and selenium. Foods for Appetite Control: focusing on macronutrients and their effects on appetite and energy balance. Kids Nutrition: market opportunities for kids nutrition. Services to industry: The Centre provides newsletters and conferences, undertakes consultancies, and builds industry syndicated projects to obtain leveraged funds for pre-competitive research. Partners in the Centre are:

- CSIRO; Human Nutrition (a merger between part of the Division of Health Sciences and Nutrition and part of Food Science Australia)
- Food Science Australia (a joint venture between CSIRO and DPI-Victoria)
- Department of Primary Industries – Victoria (DPI-V).
- ARC Key Centre for Smart Foods Centre of the University of Wollongong

The operational hub of the Centre is located at the University of Wollongong.

Centre capabilities in functional foods delivered by partner organisations

5.2.1 CSIRO - Diet & Nutrition

Areas of focus in functional food R&D

- Bioactive screening and in vivo testing
- polyphenol R&D (physiology and pharmacology)
- biological assays (biochemical, cellular, tissue and whole animal models)
- long term feeding studies (safety, ageing, diet-drug interactions).

Gastrointestinal health

- development of foods and food-related health products with proven nutritional qualities and enhanced gut functionality.
  - role that nutrient and non-nutrient phytochemicals, including polyphenols, play in influencing gastrointestinal physiology and health and wellbeing.
  - gastrointestinal simulation systems for investigating nutrient bioavailability.
- intervention trials for assessing antioxidant capacity in vitro and in vivo
- small and large animal models as well as clinical trials in humans to investigate physiological functionality of foods and food components.

Human clinical trials
• CSIRO conducts human clinical trials for the substantiation of health claims of foods, functional foods, ingredients, to establish the health potential of diets, complementary medicines, dietary supplements and drugs for cardiovascular, diabetes and obesity therapies.
• clinical trial design, planning, and coordination, recruitment of volunteers from a broad base, management and analysis of data. laboratory analysis
• communication of results to the scientific community, the media and the general public.

Consumer and cognitive research
• cognition and mood studies examining the effects of both acute and chronic polyphenol consumption accessing a broad range of population bases. Key capabilities include:
  • Knowledge of relevant and up-to-date psychosocial theory and practice
  • Understanding the relationship between diet, cognition and mood
  • Expertise in assessing behaviour, cognition and mood across the lifespan
  • Expertise in development of psychosocial measurement instruments including questionnaires
  • Assessment of consumer attitudes to food, dietary change and nutritional intervention programmes
  • Expertise in focus group facilitation
  • Expertise in cross-cultural measurement of behaviour Facilities include: Fully equipped 10-booth sensory laboratory with capability for delivery of computer-based cognitive assessment and web-based questionnaires

Key research facilities

Biochemical assays Ex-vivo models In-vivo studies (acute/chronic)
• ACE inhibition
• Angiotensin receptor binding
• Cyclooxygenase -1 & -2
• 5-Lipoxygenase
• NADPH oxidase
• Endothelin receptor binding
• Cholesterol absorption/uptake
• Aortic ring (Large blood vessels)

• Perfused mesentery (small blood vessels)
• Myograph (micro blood vessels)
• Gut contractility
• Blood pressure
• Vascular flow
• Cardiac arrhythmia
• Gut transit

Analytical laboratories
• chromatography, atomic absorption spectroscopy, spectrophotometry, carbohydrate analysis, clinical chemistry and immunoassays
• classical and molecular microbiology
• assessment of genome stability
• state-of-the-art biochemical assays

Clinical assessments

• Evaluation of a suite of non-invasive biomarkers of blood vessel health and metabolic function, (flow-mediated dilatation, pulse wave velocity analysis, augmentation index, arterial compliance and ambulatory blood pressure monitoring).
• equipment includes an Acuson ultrasound, a SphygmoCor™ blood pressure analysis system and a HDI/Pulsewave™ Cardiovascular Profiling instrument (together with full-time technical staff).
• Fully equipped kitchen designed for sensory food.

Examples of current and recent projects

• Defining the functional properties of different types of proteins
• Defining the effects of combined whey protein and different forms of carbohydrate in overweight men
• Safety and health potential of wheat bio-fortified with selenium
• Understanding consumers’ perceptions of selenium and motivations to increase selenium intakes
• Consumer understanding of the attributes and functions of protein
• Influence of selenised dairy protein on colon cancer risk biomarkers

5.2.2 Food Science Australia

Areas of focus in functional food R&D

• Literature reviews, patent searches and opportunity analysis
• Identification and characterisation of bioactive components and functional food ingredients (also includes flavour work)
  • Sensory-consumer interface, Physico-sensory interface
  • Chemical analysis and structural characterisation (including LC-MS)
• Cell based assays
• Extraction or fractionation of functional food ingredients and bioactive components from agribusiness raw materials or waste streams
  • Aqueous high power ultrasound as an alternative to organic solvent systems
  • Scalable continuous chromatographic processes
  • Enzymic hydrolysis and peptide fractionation

• Incorporation of bioactive components, with demonstrated retained efficacy, into ingredients and processed food products. A wide range of pilot scale manufacturing technologies are available, e.g.:
  • Beverages
  • Meat, Dairy products as carriers
  • Extruded products snacks, cereals bars etc. products
  • Pastes, spreads etc.
  • Microencapsulated products, powders, emulsions etc.

• Emerging processing technologies (low temperature pasteurisation etc.) that enhance shelf-life and safety of functional food ingredients and products, e.g.:
  • Pulsed Electric Fields
  • High Pressure Processing
  • High Power Ultrasonics

Examples of current and recent projects
• Opportunity analysis studies
• Polyphenols for healthy aging (identification of plant bioactives that improve cognition)
• Microencapsulation of omega-3 long chain fat acids at 60% w/w concentration in powders with a two year shelf life.
• Site specific delivery in the colon of functional food bioactives incorporated in food products.
• Development of microencapsulation technologies for the delivery of water-soluble bioactive components through food matrices.
• Solvent free extraction of bioactive components from carrots.
• Optimisation of the operation of a low temperature drier for the production of functional food ingredients.
• Processing technologies to retain the resistant starch content of grains in process cereals and food products.
• Production of cooked chicken breast meat analogues from soy protein.
• Development and technology transfer of fat mimetics and methods for their incorporation into low fat meat products.
• Incorporation of bioactives into a range of processed functional foods function
• Separation and purification of dairy bioactives
• Separation and purification of anti-inflammatory glycosaminoglycans from meat industry by-products bioactives
• Identification and substantiation of bioactive components in fruits and vegetables

www.foodscience.afisc.csiro.au

5.2.3 Dept. of Primary Industries Victoria

Areas of focus in functional food R&D
• Metabolic health (obesity, diabetes, cardiovascular health)
• Gut health (colon cancer, inflammation, gut microbiology, probiotics and prebiotics, gut pathogens)
• Immune Health (immunomodulation, immunoregulation including anti-inflammation, resistance to infectious diseases)
• Bone health
• Genome health

Examples of current and recent projects
• Healthy hamburger (human dietary intervention trial)
• Health benefits of selenium-enriched milk products (includes studies in patients with colon cancer)
• Anti-flu and immune enhancing effects of Se-milk in the elderly (human dietary intervention trial)
• Vital vegetables (phytochemical- and carbohydrate- products their bioavailability, efficacy and toxicology)
• Health effects of chickpeas in a diabetes type-II model (using systems biology approach: metabolomic, proteomic and transcriptomic analysis)
• Health-enhancing pork products
• Development and standardisation of analytical methods for bioactive compounds in physiological samples and plants
• Milk Bioactives

www.dpi.vic.gov.au
5.2.4 Smart Foods Centre, University of Wollongong

Areas of focus in functional food R&D

Marketing and product development support for functional food

- Facilitation of substantiation dossiers for functional foods
  - Literature reviews
  - Systematic evidence evaluation
  - Support for FSANZ applications
  - Facilitation of research projects

- Product development support
  - Nutrition profiling
  - Nutrition criteria for functional food development
  - Nutrition communications
  - Facilitation of new product ideation

- Facilitation of policy development
  - Food standards
  - Substantiation guidelines
  - Expert commentary
  - Scientific publications

Clinical trials

- Dietary modelling to test food/macronutrient effects
  - Positioning of test foods in whole of diet framework

- Substantiation of clinical benefits
  - Cognition assessment
  - Lipids, glucose, insulin, appetite hormones measurement
  - Exercise and biomechanical assessment

- Translation to practice (dietary advice/marketing messages)

- Consumer acceptance and food choice behaviour

Human calorimetry

- Assessment of 24hr energy expenditure

- Assessment of fat oxidation

- Animal model studies
- Effects of macronutrients and selected bioactive compounds on biomarkers of metabolic, cardiovascular and mental health

**Consumer research**
- Surveys
- Focus group methodology
- Experimental methodology

**Ethnographic research**

**Examples of current and recent projects**

(*indicate NCEFF funded)

- **Human studies**
  - Effects of protein intake on energy expenditure and fat oxidation (Calorimeter study)
  - Effectiveness of anti-oxidant supplements on oxidative status under conditions of stress (exercise) (Human experiment)
  - Walnuts as a significant delivery agent in the dietary management of diabetes (Clinical trial), and in weight management (Clinical trial)
  - Dietary polyunsaturated fat and weight management (Clinical trial/Calorimeter study)
  - Evaluation of omega-3 enriched functional foods on cardiovascular risk biomarkers and consumer food choices (Clinical trial)
  - Evaluation of omega-3 supplementation on indices of depression (Clinical trial)
  - Studies of soy supplementation on cardiovascular risk biomarkers (Clinical trial) and cognition (experimental study)

**Animal model studies**

- Effects of dietary protein on bodyweight and metabolism (Mouse)
- Influence of diet and exercise on biomarkers of oxidative status (Rat)
- Effect of resistant starch on metabolic health (Rat)

**Consumer research**

- Studies of the message and the messenger in nutrition marketing (survey and experimental)
- Consumer attitudes, beliefs and intention to use functional foods (focus groups and surveys)
- Consumer understanding of health and related claims on food product labels (focus groups)
- Use of web technology for health claims (content analysis)
- Prevalence of health claims on food labels (survey)
- Consumer reactions to different formats for health claims on labels (experimental)
Key research facilities utilised by NCEFF

Clinical trial facilities; clinical laboratory

Whole Room Calorimeter

Small animal whole body respirometry

CT Scanner

Bioelectric impedance analyser

Biomechanics laboratory

Underwater weighing facility

Dietetic studies unit (with meal testing and kitchen facilities)

Human performance laboratory

General biochemistry and laboratory facilities (HPLC, gas chromatograph; Shimadzu GC; gel electrophoresis; spectrophotometer;

Cobas; mass spectrometer etc)
5.3 Overview of the major food R&D providers in Australia

Food production plays an important role in Australia’s economy and is supported by a sophisticated blend of industry, government and university research organisations and backed by a wide range of government R&D initiatives. The focus of food-related R&D infrastructure in Australia ranges from the early phases of R&D to late-stage commercialisation. Linkages between the various major R&D providers are illustrated in Figure 513.

Figure 5  Research & Development linkages within Australia

5.3.1 University of Wollongong

The Smart Foods Centre (SFC) comprises collaborating scientists principally within the Faculty of Health and Behavioural Sciences and associated departments working in conjunction with the food
industry on a range of research projects funded by contract and collaborative grants with industry and related bodies.

SFC research strengths lie in application of nutrition to the functional areas of energy balance and weight control, and the related syndromes of obesity, diabetes (insulin resistance, gestational diabetes), heart disease and hypertension, oxidation processes in cell damage and fatigue using expertise in dietary analysis and prescription, clinical intervention trials, human and animal physiology and biochemistry, plant, food and clinical chemistry. Most importantly, these research strengths extend to nutrition in healthy heart function, muscle physiology, exercise conditioning and energy balance for daily living and healthy aging. Coupled with research into consumer issues, food labeling and marketing, understanding nutrients as components of whole foods underpins the ability to apply research outcomes to functional foods and free living achievable, whole of diet conditions. Food Sector Research Areas include:

- Proteins and Protein rich foods as fuels, cellular building blocks and bioactives
- Fats and oils as fuels, biomembrane constituents and bioactives,
- Fish & fish oils with particular expertise in omega-3 research in obesity, heart and muscle function, insulin sensitivity, blood pressure and clinical lipids;
- Cereals and grains as fuels, fibre, protein and resistant starch and as sources of bioactives and prebiotics;
- Fruits, vegetables, nuts as fuels, fibre, antioxidants and bioactives;
- Antioxidant phytochemicals.

Key Facilities and Skills include;

- Dietetic Studies Unit
- Consumer Research Unit
- Clinical Trials Unit
- Nutrient Analysis Unit
- Metabolic Biochemistry and Physiology Unit
- Human Whole Room Calorimeter

www.uow.edu.au/health/smartfoods/

5.3.2 Queensland University - Centre for Nutrition and Food Sciences

The Centre for Nutrition and Food Sciences (CNAFS) is a virtual centre established in 2003 at the University of Queensland in collaboration with the Queensland Department of Primary Industries and Fisheries. Support from within the University comes from faculties representing...
physical/engineering, biological/chemical, health/nutrition, and agriculture/food disciplines. The Centre aims to develop projects and collaborations that exploit post-genomic biology and modern physico-chemical sciences and take a whole-of-chain approach starting from consumer drivers ("fork to farm"). Example areas where research themes are being developed include:

- **'Nutrient metabolomics'.** Characterisation of the molecular basis for nutritional benefits from selected foods through a combination of chemical and gene-level analysis of raw materials coupled with in vitro assays for bioactivity. The initial focus will be on tropical fruits.

- **'Natural structuring of foods'.** Building 'molecules to materials' understanding of relevant physical properties for foods based on plant or animal structures. Aims include the extension of applications for natural materials in formulated foods, and a predictive capability for energy delivery and micronutrient bioavailability.

- **'Clean and Green Foods'.** Addressing the validation of 'clean and green' positions associated with Australian foods. A risk assessment framework built on analytical data from molecular to environmental scales is envisaged as a means of defining potential markers for 'clean and green', and providing a proactive approach to identifying current / future threats and opportunities.


5.3.3 Curtin University of Technology - School of Public Health

The Curtin University of Technology School of Public Health coordinates one of the biggest and comprehensive centres of multi-disciplinary health research and training in Australia and the Asia Pacific region.

The School is committed to excellence in research and evaluation in many health related areas such as heart health, bone health, eating disorders, weight management and nutrition.

The School of Public Health has a strong history of working collaboratively with numerous government and non government organisations in research and evaluation programs, consultancy, continuing education, advocacy and community service and it has consulted for the World Health Organisation, UNICEF, UNAIDS, AusAID and the National Health and Medical Research Council.

www.publichealth.curtin.edu.au/html/about.htm

5.3.4 Deakin University - Centre for Physical Activity and Nutrition Research (C-PAN)

The Centre’s mission is to understand the role of nutrition and physical activity in common health conditions, and to develop strategies to enhance population health by improving nutrition and
increasing physical activity to optimal levels. The Centre's research programs bring together expertise from a wide variety of disciplines including the exercise and nutrition sciences, social and behavioural sciences, epidemiology, and health policy, which cover the full spectrum of research, from basic metabolism and physiology, through clinical and behavioural studies, to community and population-based research. The Centre's five programs address:

- Exercise, muscle and metabolism
- Exercise and nutrition physiology
- Behavioural epidemiology
- Obesity Prevention
- Public Health Nutrition

The Public Health Nutrition program is devoted to the analysis of international and Australian food policy options whether within the local community (e.g. in schools) or at national and international levels including issues related to food regulation. Food policy topics currently being investigated by the program include: functional foods, food fortification and food labeling. The major underpinnings of food policy are food consumers needs and demands so a considerable research effort is being undertaken to examine the ways consumers think about and act on food issues. In particular ways in which communication between government, industry and consumers can be fostered for the betterment of population health are being investigated. The program also undertakes research into community and individual food security and the development, implementation and evaluation of public health nutrition interventions directed at meeting the needs of vulnerable populations. Current programs include:

- Examination of the implementation of the folate claim on food labels in Australia
- Prediction of consumers trust in sources of nutrition information.
- Prediction of consumers' concerns about the Australian food supply.
- Consumers' perceptions of three milk products.
- The adoption of plant based foods by consumers and industry.
- Consumers' confidence in the Australian food system.
- Analysis of using food legislation and regulation in the fight against obesity.
- Analysis of functional foods and health claims policy.

5.3.5  RMIT University - Food Science Research Group (FSRG)

The Food Science Research Group at RMIT focuses on Lipid Biotechnology and Product Development in collaboration with Industry to support new product development. The FSRG has expertise in omega-3 fatty acid research and nutrition research on meat as well as texture research (physical measurements and sensory evaluation). The groups’ members have a wide range of research skills including Lipid Biotechnology, Nutrition, Dairy Science, Soy & Fish Product Development, Food Microbiology & Food Safety, Physical & Chemical Analysis of Foods, and Sensory Evaluation. The FSRG maintains strong multi-disciplinary interactions with external groups from other RMIT Departments, other Universities, the CSIRO and the Food Industry.

The outcomes of the FSRG research have application in modifying the formulation of traditional food products, achieving specific nutrient profiles in foods to improve the health of Australians, improving product control, reducing production costs, enhancing food acceptability and increasing the competitiveness of the Industry partners with whom we work. In the past three years, the FSRG has contributed to the production of high quality tuna oil for inclusion in food products, the development and release of a functional bread, a marketing campaign for margarines by the largest food company in Australia, and research at the FSRG is underpinning the production of a novel anti-inflammatory functional foods.

www.rmit.edu.au/FOODSCI

5.3.6  University of Western Sydney, Probiotics Research Unit

This unit is concerned with the design, development and production of value-added, health-based, safe and nutritious food products. The practical outcomes of this program are supported by fundamental research into the functionality, interaction and performance of intestinal bacteria and bioactive substances and the role of intestinal bacteria and bioactive substances in enhancing immune responses.

Main areas of research

- Biochemical and molecular biology studies of the mechanisms of oxygen tolerance in probiotic bacteria with the aim of developing superior probiotic strains and incorporating them into new foods products;
- Developing new packaging materials which scavenge oxygen in dairy products to extend the viability of probiotic bacteria and thus the shelf-life of products;
- Conducting fundamental studies of the immuno-modulating mechanisms of the strains of probiotic bacteria found suitable to date;
- Developing a new pilot scale microencapsulation and nanoencapsulation device in conjunction
with industry partners;

- Investigating combinations of probiotic and prebiotic entities for incorporation into new functional foods using molecular biology and fermentation techniques;
- Studying the incorporation of probiotic bacteria into cook-chill and other fresh foods including cut vegetables and fruits; and
- Encapsulation of bioactives and nutrients to develop novel functional foods

www.uws.edu.au/about/acadorg/cste/research/links/cafr/probiotics

5.3.7 Cooperative Research Centres (CRC) (www.crc.gov.au)
The Cooperative Research Centre program fosters collaboration between industry, government and research organisations in innovation with concrete commercial outcomes. CRCs are joint ventures bringing together public and private institutions to conduct long term R&D in areas of significant economic, social and environmental benefit to Australia. CRCs link researchers with industry to focus R&D efforts on utilisation and commercialisation. Since the program commenced 12 years ago, participants have committed more than A$7 billion (cash and in-kind) to CRCs. This includes A$1.8 billion by the Australian Government, A$1.8 billion by universities, A$1.3 billion by industry and almost A$1 billion by CSIRO. There are 31 CRCs, which undertake R&D spanning diverse areas in health, agriculture and the environment. CRCs involved in functional foods related R&D include;

The centre manages a wide range of development projects with leading Australian research and manufacturing organisations. Priority is given to healthy grain food products as well as sources of industrial and pharmaceutical compounds. The Grain Foods CRC develops and commercialises high value grains and grain food product; new ingredients and nutraceutical products and innovative processing and manufacturing technologies

- **CRC for Innovative Dairy Products (www.dairycrc.com)**
Established in 2001 by the Australian Federal Government and the dairy industry, the Dairy CRC is a seven-year $90 million research consortium involving a number of Australia’s leading research institutes and commercial companies. It is applying cutting-edge biotechnology research to develop new milk products and aims to provide dairy farmers, processors and manufacturers with access to advanced technologies and products; expand the choice of health-giving milk products and, improve the globally competitive position of milk products
5.3.8 The Commonwealth Scientific and Industrial Research Organisation (http://www.csiro.gov.au)
CSIRO is Australia’s largest research organisation, and spends approximately A$110 million each year representing 29 per cent of publicly-funded biotechnology research. CSIRO has over 60 sites across Australia with approximately 3300 staff involved in biotechnology and related areas. The CSIRO has strong partnerships with leading firms in the US, Europe and Japan and is Australia’s leading patenting enterprise with 3500 patents granted or pending to date.

- **CSIRO's "Food Futures" research flagship** is one of the largest research endeavours serving Australia’s agriculture and food sector. Food Futures Flagship is a A$28 million per annum partnership of leading Australian scientists, research institutions and commercial enterprises and has extensive Food R&D capability.

5.3.9 Food Science Australia (http://foodscience.afisc.csiro.au/)
Food Science Australia is Australia's largest and most diversified food research organisation and a joint venture of CSIRO and the Department of Primary Industries, Victoria. Food Science Australia states their purpose as being to provide:

- Food science for health and vitality
- Quality products through processing innovation
- Science for a safe and secure food supply

5.3.10 Rural research and development corporations
Rural research and development corporations are joint government and industry initiative to promote competitive primary industries in Australia through innovative R&D. There are a number of Rural Research & Development Corporations active in the food industry including:

- Dairy Research & Development Corporation (Dairy Australia http://www.drdc.aust.com/)
- Grains Research & Development Corporation (http://www.grdc.com.au/)
- Horticulture Australia Ltd (http://www.horticulture.com.au/)
- Meat & Livestock Australia Ltd (http://www.mla.com.au/)
- SA Research & Development Institute (http://www.sardi.sa.gov.au/)
- Sugar Research & Development Corporation (http://www.srdc.gov.au/)
5.3.11 Dept. of Primary Industry Victoria (http://www.dpi.vic.gov.au/DPI/)

The Department of Primary Industries (DPI), Victoria is made up of 4 divisions including: Agriculture, Fisheries, Minerals and Petroleum, and Regional Services. The Agriculture Division is concerned with improving the profitability and market competitiveness of agricultural industries whilst ensuring that such operations remain sustainable and environmentally responsible. The Department aims to achieve this through its research, industry development and extension activities. The Division of Agriculture within DPI, employs approximately 2000 staff statewide, spread over 30 office locations around Victoria. The Division has an active R&D interest in the Functional Foods area and is one of the founding partners of the National Centre of Excellence in Functional Food.

5.3.12 Queensland Department of State Development and Innovation - Centre for New Foods

The State government has recognized the importance of this sector and has set aside funds to invest in a new centre. This proposed centre, the Queensland Centre for New Foods will draw together Queensland's key players in the research, development and commercialisation of tropical and sub-tropical future foods. The Centre's objectives include development of new and improved foods, biofortified and functional foods based on Queensland's food production systems; facilitation of interaction between researchers and industry, and identification of market opportunities to build on Queensland's R&D strengths in this area.

The Centre will network food biotechnology and health agencies including the Queensland Department of Primary Industries and Fisheries, CSIRO, the Queensland University of Technology, the University of Queensland, Griffith University and Queensland Health with local and international food companies. It will also consist of marketing expertise, both to scan emerging trends for opportunities in Queensland and to promote the effectiveness of new foods as part of healthy eating. The Centre's functions will include:

- Consolidating Queensland interests – gathering players within Queensland to address specific projects
- Brokerage – networking across R&D and industry players to bring together knowledge bases to drive collaborative projects
- Commercialisation – early stage product development
- Communications – promoting the uptake of new foods as part of healthy eating

5.3.13 South Australian Research and Development Institute (SARDI)

SARDI is a South Australian Government agency and has extensive research capabilities across a wide range of food, fibre and bioscience related sectors, including livestock, dairy, horticulture and grains. The organization seeks collaborative research opportunities globally. SARDI pursues excellence through highly skilled scientists, post-graduates students and technicians supported by state-of-the-art advanced research facilities at 14 locations throughout the State.

Core Research Capabilities

- **Aquatic Sciences**: SARDI Aquatic Sciences is a research provider to the fishing, aquaculture and environment industries. The application of the research outcomes helps to ensure that the resource base remains healthy and the information provides a basis for sound management decisions.

- **Crops**: The focus of the program in SARDI is the development of improved crop varieties which have the capacity to meet increasingly stringent grain market product specifications, and technologies to enable high and sustainable on-farm productivity. The programs are structured within three main functional areas:
  - Genetically improving the crop varieties;
  - Understanding and developing new farming systems for improved sustainable production of crops; and
  - Developing new diagnostic tests and biotechnologies to detect yield-limiting diseases, and to improve both the capability of breeding programs and the effectiveness of farming system practices.

- **Horticulture**: The horticulture strategic research area develops and applies innovative technology to enhance the sustainable production and marketing of high quality, competitively priced fruit, vegetables and ornamentals for local and international markets. SARDI's horticulture research programs include viticulture, tree crops, vegetables, citrus, ornamentals, entomology, pathology, sustainable production and post harvest handling.

- **Livestock Systems**: Livestock Systems strategic research assists the animal industries in the economic and sustainable production of high quality, competitively priced produce. The development and marketing of livestock industries and products, and the provision of policy advice to Government on animal issues, are two key objectives of livestock programs. Livestock Systems programs include dairy, beef/sheep meat and wool, pigs and poultry.

- **Sustainable Systems**: Sustainable Systems strategic research develops and applies
innovative technology to develop Lucerne improvement, pasture management systems and identifying and refining farming systems for sustainable resources management in southern Australia. Sustainable Systems programs include pastures and sustainable farming systems.
6 Company profiles

6.1 Examples of successful SME functional food companies in Australia

*Results based on personal communication*

*Product overviews provided by individual companies and claims do not necessarily reflect the opinions of NCEFF.*

<table>
<thead>
<tr>
<th>Company</th>
<th>Products</th>
<th>Selling proposition</th>
<th>Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Megaburn</td>
<td>Bars</td>
<td>These functional food products are raw, unprocessed food and beverage products</td>
<td>$800K</td>
</tr>
<tr>
<td>Aussie bodies</td>
<td>Bars/Drinks</td>
<td>Specialise in high protein foods and drinks</td>
<td>$15 Million</td>
</tr>
<tr>
<td>Australian Harvest</td>
<td>Pastes, Jus and jellies</td>
<td>Bio-grape (extract of grape skin) high in antioxidants and is organic</td>
<td>$500K</td>
</tr>
<tr>
<td>Vitality brands</td>
<td>Bars</td>
<td>Wellness bars based on fruit and vegetables</td>
<td>$4 Million</td>
</tr>
<tr>
<td>Vic Cherikoff</td>
<td>Spice &amp; seasoning</td>
<td>Australian native botanicals which have high antioxidants and anti-fungal properties</td>
<td>-</td>
</tr>
<tr>
<td>Australian food innovators</td>
<td>Indigenous juices</td>
<td>Native botanicals such as desert lime, rivermint, muntries etc</td>
<td>$4-5 Million</td>
</tr>
<tr>
<td>Tarac technologies</td>
<td>Ingredients</td>
<td>Antioxidant extracts from grapes</td>
<td>-</td>
</tr>
</tbody>
</table>

*The following information has been provided by companies and has not been vetted in any way by NCEFF.*
6.1.1 Megaburn Natural Nutrition

Company overview

MEGABURN is an Australian owned and operated manufacturer of natural nutrition, energy, health, sport and wellness products. They are a leader in developing products that deliver a more natural approach to health and wellbeing, based on our expertise in combining raw ingredients, vitamins, minerals, herbs and energy nutrients. They have two (2) product and supplement divisions:

- Energy (health and fitness product range)
- Wellbeing (Wellness and energy product range)

Both product divisions deliver natural nutrition with the essential factors of training, performance and wellbeing in mind: physical training, adequate recovery and rest. The wellness and energy range claims to deliver the long term benefits of soy, low fat, low sugar and the combinations of fresh, high quality raw ingredients that are essential when it comes to building strength, increasing endurance as well as speeding up the recovery process after exercise.

Products & Unique selling points – Company promotions

The Megaburn bars are best suited for the proposed Australian wellness/health category.

- Apricot Choc, gluten free, dairy free - An afternoon real fruit and chocolate pick me up.
- Strawberry - Gluten Free - Beat the afternoon blues.
- Apricot, gluten free, dairy free - A yummy blast of real apricots and nuts.
- Green Bar, gluten free, contains whey and soy - How can anything this healthy taste so good?
- Choc Ginger, gluten free with Glucosamine and MSM - Help your joints to run jump and play.
- Choc Peppermint, gluten free - Relax with peppermint and chamomile. Great after dinner mint.
- Banana Choc, gluten free - Get you going with a combination of banana and guarana.
- Banana, gluten free, dairy free - All natural dried banana. A healthy snack that kids love.
Dairy, Soy and Gluten Free - All your greens and fibre in a taste sensation.

Choc Cherry, low gluten, contain whey and soy - A healthy snack voted number 1 for taste.

These functional food products are raw, unprocessed food. They claim to contain therapeutic doses of multi-strain lactobacillus and fructo-oligosacchrides which is a unique selling proposition. Bars include:

**Turnover**
Megaburn formed as a commercial company for their products on 01 October 2004. The current turnover is on track for a first year turn of $800K

**Contact**
e: info@megaburn.com
t: 07 5531 4064
w: [http://www.megaburn.com](http://www.megaburn.com);

**6.1.2 Aussie Bodies Ltd**

**Company overview**
Aussie Bodies is a rapidly growing, progressive Australian company dedicated to nourishing both body and mind. Aussie Bodies is committed to helping men and women gain a better understanding and appreciation of their own bodies. Aussie bodies claim to select only the purest ingredients chosen for their scientifically proven quality and potency. Manufacturing methods ensure that these ingredients remain pure so that they deliver all the benefits promised.

They have a portfolio of close to 20 premium products, along with a free expert advisory service. Aussie bodies product range has been formulated to deliver a variety of health benefits including enhanced **immunity, weight management, sports performance and overall wellbeing**. The range consists of convenient, great tasting, ready-to-eat protein-based foods and snacks, along with a core capability in protein powders formulated with the world's leading quality proteins.

**Products & unique selling points – Company promotions**
Aussie bodies specialise in high protein and protein boosted foods. They have unique capabilities in protein manufacturing. Foods are nutritionally sound, taste great and are convenient.
Protein Revival - Aussie Bodies, the taste leaders in protein snacks, have made Australia's no.1 ready-to-drink protein even better.

Lo-Carb Protein Revival - Less carbohydrate = more opportunity to fuel up on protein! Aussie Bodies Protein Revival, the ultimate post-training formula, now has the ultimate partner. Lo-Carb Protein Revival.

Protein Delite - Good things really do come in small packages. Aussie Bodies Protein Delite is the pocketful of protein that's perfect for your busy, active lifestyle. Easy to eat at just 50g, Protein...

HPLC Bar - Still with an unbeatable 45 grams of protein - the highest amount of protein in any Australian bar - HPLC Bar is the ultimate in high protein, low carb indulgence. You can build lean...

Protein FX - Protein FX is the ultimate protein snack for energy, recovery and muscle maintenance. Ideal for those who exercise or simply enjoy a busy, active lifestyle, Protein FX contains a balance of...

Start The Day - Breakfast drinks can save time, but often at the expense of balanced nutrition. With Aussie Bodies Start The Day in a ready-to-drink pack you can enjoy all the convenience without…

Trim Anytime Protein - Aussie Bodies puts the taste back into protein nutrition! Anytime Protein delivers all the goodness of Whey Protein Concentrate and Solae® Soy Protein with the flavour you love.


Trim Start The Day breakfast-in-a-shake - First thing every morning, your body needs the nutritional balance of protein and carbohydrates with plenty of essential vitamins and minerals for optimum health.

Turnover
A reported turnover of $15M 2004/05.

Contact
e: info@aussiebodies.com.au
6.1.3 Australian harvest fine foods PTY LTD

Company overview
Australian Harvest is based at Coldstream in Victoria's Yarra Valley and produces a wide range of Gourmet Fine Foods, including the recently released BIO-GRAPE range of delicious functional foods, which compliments the existing range of Liquored Fruits and Panforte, Nougat, rich Jellies, Pastes, Jams, Sauces, Mustards and Olives.

Products & unique selling points – Company promotions
Bio-grape product is a unique formulation from the extract of the skin and seeds of the red wine grape. There is a range of pastes and sauces as well as red wine Jus. These products are high in antioxidants with a reported ORAC rating (measure of antioxidant content) of up to 3000 units per 100g. In addition these products are pass organic specifications and utilise unique Australian botanicals such as the pepperberry which is indigenous to Tasmania.

Turnover
$500K for the 2004/05.

Contact
e: australian-harvest@bigpond.com
t: 0419 393 864
6.1.4 Vitality Brands Worldwide

Company overview

Vitality Brands Worldwide is an Australian owned company dedicated to developing "wellness" products that help people feel healthier and happier, thereby influencing their lives in a positive way. Vitality Brands' products can be found in a wide variety of retail outlets including pharmacies, supermarkets, health food stores, gyms, health practitioner clinics and cafes. Products are exported into Asia and will soon be available in the UK.

Products & unique selling points – Company promotions

Vitality brands have range of innovative snack products. These innovative snack products claim to help you feel healthier and happier, thereby influencing your lives in a positive way. Products are aimed at sports enthusiast, looking for foods that will help you loose weight, or people looking for nutritious snack products as part of a moderate health conscious diet and lifestyle.

**Freggie Nutri-bars** - A world first! The goodness of whole grains and one serve of fresh fruit & veggies in every bar!

**Sugar free/Low sugar Chocolate Blocks** - A smooth, rich and creamy indulgent snack - without the guilt!

**Cereal-style Protein Snack Bars** - Gluten free low carb snack bars that are also low in fat!

**Choc-coated Protein Snack Bars** - An energizing protein hit without the carbs!

Turnover

$4 Million for the 2004/05 which is expected to double next year.

Contact

e: wb@vitalitybrands.com
	t: 03 9861 7012
6.1.5 Vic Cherikoff Food Services Pty Ltd

Company overview
Cherikoff spices, herbs, fruits, seeds, nuts and other flavours claim to be a defining Australian cuisine. Most products and seasonings have encapsulated oils which have various antifungal properties and high antioxidant contents. They claim to have products that can assist people in the management of diabetes, arthritis and help stimulate the immune and endocrine system.

Products & unique selling points – Company promotions

6 pack of Australian Herbs and Spices Seasonings - Australian herbs and spices flavour pack. The pack includes one each of Alpine Pepper, Oz Lemon, Fruit Spice, Wildfire Spice, Red Desert Dust & Rainforest Rub.

Australian Alpine Pepper - Alpine pepper is a formulation of the peppery leaves and fruits of mountain pepper, a high country native Australian shrub. Use Alpine pepper instead of ordinary pepper and even over fruits.

Australian Fruit Spice - Fruit Spice is a really unique seasoning for enhancing fruit flavors of soft or stone fruits such as berries, apricots, peaches or tropical fruits like mango. We also use it to make ordinary jams fruitier.

Australian Glace Ribberries - These Australian rainforest fruits have an amazingly aromatic, cinnamon and clove flavour and are great as a garnish for desserts. Sugar preserved, use them in sweet or savoury dishes or even cocktails.

Turnover
Undisclosed.

Contact
e: vic@cherikoff.net
6.1.6 Australian Food Innovators

Company overview

Australian Food Innovators is an Australian company with a maxim "live life to the full". Consequently product development will be based on the needs of contemporary lifestyles. An emphasis will be placed on 'value adding' through natural ingredients, ensuring quality and integrity. Australian Food Innovators is located in Berri, South Australia in a state of the art manufacturing facility offering efficient and up to date processing tools and techniques. The facilities enable them to produce fruit in a convenient package ensuring the maximum health benefits. Many of the products are unique to the market and stand out from the competition by being pure, natural and full of flavour.

Products & unique selling points – Company promotions

All products are free from preservatives and sugar sweeteners.

Turnover

$4-5 million for the 2004/05.

Contact

e: info@austfoodinnovators.com.au

t: 0428 236 849
w: http://www.austfoodinnovators.com.au;
6.1.7 Tarac technologies

Company overview

Tarac Technologies was established in 1929 by ex-CSIRO scientist Alfred Allen at his home in the Barossa Valley, South Australia. Initially focus was directed at the development processes used to recover grape alcohol, grape seed oil and tartrates from winery by-products. The Tarac of today has successfully built on these solid foundations and is now a marketer and manufacturer of branded food & beverage ingredients for the food, beverage and wine industries. They have specific capabilities in antioxidant ingredients.

Products & unique selling points – Company promotions

Vinlife® grape skin and seed extracts, made from 100% Australian wine grapes, provide one of nature's richest sources of polyphenol antioxidants. Human trials in conjunction with CSIRO have shown that positive blood vessel health can be achieved from regular consumption with this seed extract. Vinlife® products are approved for use as a food by Food Standards Australia New Zealand (FSANZ) and UK/EU Food standards Agency (FSA). Two forms of Vinlife® are available - grape seed extract and grape skin extract. They are 100% pure and do not contain any preservatives or additives.

Turnover

Undisclosed
info@tarac.com.au
T: +61 [08] 8562 1522
F: +61 [08] 85622031
W: http://www.taractechnologies.com
6.2 Examples of emerging technologies or innovative application of technology

Many food and beverage companies are offering novel foods, ingredients and bioactives responding to both consumer demand and government policies and recommendations aimed at improving public health. The following Companies provide unique capabilities in the functional food area.

6.2.1 NutraDry

NutraDry utilizes a novel Refractance Window technology providing unique ingredients to the world market. The unique features of the technology is the low temperature, gentle drying with good continuous throughput with the ability to produce and develop functional food ingredients. The unique opportunity is that NutraDry technology retains high concentrations of certain vitamins, minerals and phytochemicals in the component ingredients and final products. Much of this evidence is held in commercial-in-confidence; however a paper comparing RWT with freeze dry technology showed significant differences between the bioavailability of water soluble vitamins.

Although the Company is actively pursuing research to determine the superior bioavailability or their ingredients, few studies of this kind are known to have been completed previously and limit the immediate potential marketing opportunities.

Contact:
NutraDry Limited
21 Navigator Place, Hendra
Brisbane 4011 Queensland Australia
Ph: 617 3268 5818 Fax: 617 3268 6181
email: info@nutradry.com.au

6.2.2 Olive Leaf Australia

Olive Leaf Australia Pty Ltd is a Queensland-based global exporter specialising in the scientific development of systems to grow, harvest, extract and package bio-active ingredients from olive leaves. As the world's largest specialist olive leaf grower the company has an opportunity to be the international market leader for a range of new functional food/drink ingredients with proven health benefits. The company's products are used as bio-active ingredients in a range of products including functional foods, functional drinks, and skin care and natural health products.
Research has shown that Olive Leaf Australia’s EnvirOléa™ extracts have substantially higher antioxidant capacity than globally accepted functional ingredients such as Vitamin C, green tea extract and grape seed extract. This has led to significant enquiries from food and beverage manufacturing companies in Europe, the USA and Asia. As such, the company has taken steps to fast-track expansion of the functional food/drink ingredient aspects of its business but would need novel food approval in Australia.

Contact:
Olive Leaf Australia
789 Teviot Road
Jimboomba. 4280 Queensland Australia
Ph: 617 3297 6262 Fax: 617 3297 6330

6.2.3 Manildra

First established in 1952 with the purchase of a single flour mill, the Manildra Group of companies has since undergone steady growth. The company is now the largest user of wheat for industrial purposes in Australia processing some 1 million tonnes of wheat per annum. Manildra produces a wide range of functional wheat proteins suitable for use in snack, beverage, meat and poultry applications. Gemtec™ - functional wheat proteins respond to the ever increasing world demand for a nutritional, cost effective source of protein. Through an ongoing commitment to innovation and development the Gemtec™ range encompasses proteins with exceptional emulsification, water binding, solubility and texture enhancement. Gemtec™ is available globally through our worldwide network of distributors, brokers and company operated offices.

Manildra are also recipients of a food innovation grant to investigate novel protein extraction techniques and have recently provided preliminary results of a trial on Romanian Olympians that demonstration significant performance improvements using novel glutamine enriched bars and beverages.

Contact:
Manildra Ltd
PO Box 123
Nowra. 2541 New South Wales Australia
6.2.4 Speciality Cereals

Specialty Cereals uses the latest research and technology in extrusion & packaging to produce innovative top-quality, cereals and snacks. The focus is on developing tasty cereal-based foods, that are also healthy, to meet the consumer demand for "better-for-you" products. Segments of the food industry targeted include Ready to Eat (RTE) breakfast cereals, confectionery, convenience foods, extruded coatings and toppings and the recently evolving health orientated functional food arena. Specialty Cereals was responsible for launching the first Soy breakfast cereals into the Australian market and is keen to continue to expand the health food category with valuable, tasty and innovative products. Their "Food that works" slogan highlights a commitment to develop superior functional food products that meet the ever-changing needs of the consumer.

Their brands include a range of vitamin & protein enriched soy cereals including VOGEL’S Ultra Bran™ Soy and Linseed crunchy bran; VOGEL’S Oven Crisp Muesli; VOGEL’S Vita Pro™, and VOGEL’S Soytana (gluten-free).

Contact:
Specialty Cereals Pty Limited
P.O. Box 42
Mt Kuring-Gai
NSW 2080 AUSTRALIA
P: +61 (02) 9457 9966
F: +61 (02) 9457 8681
http://www.specialitycereals.com.au
7 Summary

The emergence of foods promoted on a health and wellness platform is a significant market segment in Australia. With new legislation regarding health and related claims to be gazetted at the end of 2006, companies have a unique opportunity to be first to market with novel foods and promote them in ways like no never before. In the past, successful functional foods in Australia have included products enriched with DHA, low in GI, wholegrain and pro and pre-biotics. From analyzing successful products in the past there appears to be many factors, which make a product a market success. What is clear however is that foods must firstly taste good and be convenient? In addition, they must be marketed to a health need that is well understood by consumers. Finally, selecting a price point where the consumer will buy the product is clearly important.

Innovation in the Australian food industry is gaining momentum. The Australian government is committed to promoting innovation in the food industry to facilitate the commercialization of new products or technologies. Through a range of initiatives such as food innovation grants (FIG) and centres of excellence in functional foods and food safety a significant investment in R&D has been demonstrated. Key research organisations in the area of functional food include CSIRO, Food Science Australia, DPI Victoria and the Smart Foods Centre (University of Wollongong). These four-leader organisations comprise of the National Centre of Excellence in Functional Foods and between them contribute the largest amount of R&D in food research in Australia - not including company in-house research.

Like most modern food markets, multinational companies providing a range of vitamin and mineral enriched products plant sterol enriched spreads, omega-3 enriched products and a range of pro and pre-biotic dairy products dominate the Australian functional food market. In addition, there are a number of innovative SME that are delivering novel products in Australia (e.g. foods with indigenous herbs and spices, probiotic bars, antioxidants and wheat protein isolates). There are opportunities currently in Australia for both multinational food companies and SME to develop market and distribute novel functional foods in Australia.

The success of high DHA products in Australia provides us with an important example of how functional foods can work in this market. Starting with a clear consumer health need combined with a high consumer understanding about the ingredient helped prime the market for this novel food. Technology developed in Australia helped overcome the problem with fishy taste opening the way
for consumer acceptable products to enter the market. Finally, the price point of these offerings was not set at a high premium, which ultimately led to immediate traction in the market and ongoing success.

The functional food market in Australia is growing. Regulatory changes are likely to open the way for more novel foods and provide new marketing opportunities to communicate the health benefits. Australia has a well-developed R&D network with demonstrable Government support. The combination of these factors makes it a very attractive long-term market for functional foods.
8 References


9 Appendices

9.1 Contacts

AusIndustry
AusIndustry is the Australian Government's business unit within the Department of Industry, Tourism and Resources. AusIndustry provides a range of incentives for Australian businesses to invest, innovate and be internationally competitive. AusIndustry products cover a range of industry sectors and business needs. They are delivered in the form of grants, tax and duty concessions, business services and access to venture capital. This link does not mean that AusIndustry endorses this site or its content.

Ph: 13 28 46 (Australia Only)  
Fax: +61 2 9023 8822  
E-mail: hotline@ausindustry.gov.au  
Web: www.ausindustry.gov.au

Austrade
The Australian Trade Commission (Austrade) is the Australian Government agency that helps Australian companies win overseas business for their products and services. Its' mission is to contribute to community wealth by helping more Australians succeed in export and international business. Austrade is represented in 109 locations in 57 countries including an extensive domestic network throughout Australia.

Ph: 13 28 78 (Australia Only)  
E-mail: info@austrade.gov.au  
Web: www.austrade.gov.au

Australian Bureau of Agricultural and Resource Economics
ABARE, the Australian Bureau of Agricultural and Resource Economics, is located in Canberra, Australia. ABARE is an Australian government economic research agency noted for its professionally independent research and analysis.

Ph: +61 2 6272 2000  
Fax: +61 2 6272 2001  
Web: www.abareconomics.com

Australian Pesticides and Veterinary Medicines Authority
The Australian Pesticides and Veterinary Medicines Authority (APVMA) is the national agency responsible for the evaluation and registration of pesticides and veterinary chemical products prior to sale, and regulation of their supply up to and including the point of sale. The APVMA is part of the National Registration Scheme for Agricultural and Veterinary Chemicals in partnership with the States and Territories and with the active involvement of other Australian government agencies. The States and Territories are responsible for control of use of the products.

Ph: +61 2 6272 5852  
Fax: +61 2 6272 4753  
Web: www.apvma.gov.au

Biotechnology Australia
Biotechnology Australia is an agency comprising five Australian Government partner departments (Agriculture, Fisheries and Forestry; Environment and Heritage; Health and Ageing; Industry, Tourism and Resources; and Science Education and Training). It was created to assist in coordinating the Government's approach to biotechnology, and reports to the Australian Government's Biotechnology Ministerial Council on its progress and achievements.

Ph: +61 2 6213 6000  
Fax: +61 2 6213 6952
Dairy Australia
Dairy Australia invests in and manages R&D projects for the benefit of the Australian Dairy Industry (using taxpayer funds and levy payments obtained from dairy farmers).
Ph: + 61 3 9694 3777  Address  Level 5, IBM Centre, 60 City Road
Fax: + 61 3 9694 3733  Southbank Victoria 3006
E-mail: enquiries@dairyaustralia.com.au
Web: www.dairyaustralia.com.au

Department of Agriculture, Fisheries and Forestry (DAFF)
The Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) is responsible for Australia's agricultural, fisheries, forestry and food industries. Their role is to increase the competitiveness, profitability and sustainability of these.
Ph: +61 2 6272 3933  Address  Dept. Agriculture, Fisheries and Forestry Edmund Barton Building Blackall Street Barton ACT 2601
Web: www.daff.gov.au

Food Standards Australia New Zealand (FSANZ)
Food Standards Australia New Zealand (FSANZ) sets food standards for Australia and New Zealand and is part of the Australian Government’s health portfolio. FSANZ carries out rigorous safety assessments of genetically modified (GM) commodities, based on internationally accepted principles, to ensure that they are as safe as conventional food.
Ph: +61 2 6271 2222  Address  Boeing House 55 Blackall Street BARTON ACT 2600
Fax: +61 2 6271 2278
E-mail: info@foodstandards.gov.au
Web: www.foodstandards.gov.au

Import Conditions Database (ICON)
This site will take you to AQIS’s (Australian Quarantine and Inspection Services) import conditions database. It is a simple and convenient way to enable you to access information about Australian import conditions for more than 18,000 foreign plant, animal, mineral and human commodities. It can be used to determine if a commodity intended for import to Australia needs a quarantine permit and/or treatment or if there are any other quarantine prerequisites.

Invest Australia
As the Australian Government's inward investment agency, Invest Australia helps potential investors with their business needs, saving them valuable time and money. Since 1997, Invest Australia has helped a wide range of international companies invest an estimated US$9 billion, and is currently working with companies on projects with potential investment in Australia of more than US$60 billion. Through a range of services, programs and initiatives, Invest Australia works in partnership with business and government to provide comprehensive, free and totally confidential assistance. Key contact offices in main states.
Ph: + 61 2 6213 6711  Address  Invest Australia Head Office - Canberra
Fax: + 61 2 6213 7843  Level 4, 40 Allara Street
Web: www.investaustralia.gov.au  Canberra ACT 2601
IP Australia
IP Australia is responsible for administering Australia’s patent, trade mark and designs legislation and systems. IP Australia is a division of the Department of Industry, Tourism and Resources. Recent information on legislative developments and application procedures can be accessed via www.ipaustralia.gov.au. IP Australia is one of the oldest Australian Government organisations, having started operations in 1904. Since this time, IP Australia and IP legislation has developed so that Australian IP rights are recognised as being robust and of high quality throughout the world.

Ph: +61 2 6283 2999 Address Ground Floor, Discovery House
Fax: +61 2 6283 7999 47 Bowes Street
Email: assist@ipaustralia.gov.au Phillip ACT, 2606
Web: www.ipaustralia.gov.au

Office of the Gene Technology Regulator
The Office of the Gene Technology Regulator has been established within the Australian Government Department of Health and Ageing to provide administrative support to the Gene Technology Regulator in the performance of her functions under the Gene Technology Act 2000.

Ph: 1800 181 030 Address Office of the Gene Technology Regulator (MDP 54)
Fax: +61 2 6271 4202 PO Box 100
Email: ogtr@health.gov.au Woden ACT 2606
Web: www.ogtr.gov.au

The Therapeutic Goods Administration (TGA)
The Therapeutic Goods Administration (TGA) is a unit of the Australian Government Department of Health and Ageing. The TGA carries out a range of assessment and monitoring activities to ensure therapeutic goods available in Australia are of an acceptable standard with the aim of ensuring that the Australian community has access, within a reasonable time, to therapeutic advances.

Ph: +61 2 6232 8444 Address PO Box 100
Fax: +61 2 6232 8605 Woden ACT 2606
Email: tga-information-officer@health.gov.au Australia
Web: www.tga.gov.au