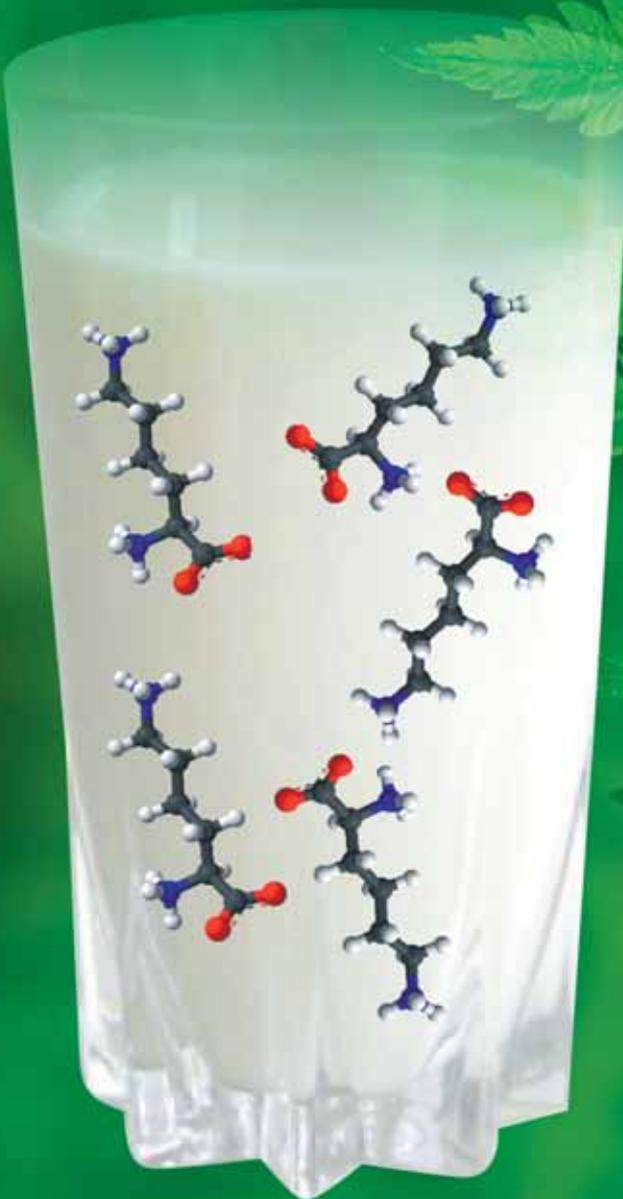

Riddet Review

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Editorial

The highlight of the year has undoubtedly been the announcement of the Primary Growth Partnership (PGP) funding by government. The Riddet Institute was selected as the primary research provider for the dairy post-farm gate programme managed by Fonterra, which is worth around \$70 million over the next seven years. The required outcomes will be new products, and scientific knowledge and capability that will bring additional benefits across the New Zealand dairy industry by 2020. The implications of the PGP funding for the institute are discussed further in this newsletter.

Another major event was the launch in October of the PROTEOS project in Wageningen, The Netherlands, by the Minister of Agriculture, the Hon. David Carter. The project is the main activity under an MoU between Massey University and Wageningen University and Research Centre. Again, more detail in the following pages. The bonds between Wageningen and the Riddet Institute were strengthened during the agri-food summit in April. The full proceedings of the summit were published in the recent edition of the New Zealand Science Review.

The institute has formed some excellent relationships in Asia over the past six months. Firstly there was a Riddet workshop in Singapore at the end of August, attracting 70

people from the leading multi-national food companies in the region; then a new research contract with Guangdong Yashili Group Co. Based in China; followed by an MoU signed with the Korea Food Research Institute covering joint projects over the next five years.

On the product development front, our probiotic technology was launched in Japan in October. This technology allows probiotics to be added to foods at ambient temperatures and circumvents the need for chilled conditions. We are seeking commercial partners for this delivery technology.

We were pleased to be major sponsors of the New Zealand Food Awards in October and also of the Food Show at the World Dairy

Summit held in Auckland in November. We continue to build our brand as New Zealand's food innovation visionary at these key events.

In all, it has been a busy six months since the last newsletter as the institute gears up for the next stage in its rapid growth as New Zealand's elite food research provider. In 2011 we expect the institute to build substantial critical mass, increasing its key capabilities and establishing new professorial positions in key areas.

It remains to wish everyone a restful festive season and all the best for the New Year.

Paula McCool
Communications Officer

RIDDET FOODLINK

Riddet Foodlink is the mechanism we use to connect to the New Zealand food industry 'at large'. It was designed for sharing information and ideas.

We reached the milestone of 100 members in September. All Riddet Foodlink members were sent the proceedings of the Riddet Institute Agri-Food Summit held in April, which were published in the New Zealand Science Review in September. Riddet Foodlink members receive priority invitations to this event and also are subsidised at other workshops during the year.

And via the new Foodlink members area on the new Riddet website we made videoed copies available of the sessions given at the three-day Singapore workshop on the Successful

Development of Healthy Foods. In November we also set up a Riddet Foodlink group on the business networking site 'LinkedIn' – so our members could talk not only to us but to each other.

In other industry events we were proud to sponsor the New Zealand Food Awards – presenting the Riddet Institute Research and Development Award, which was won by Fonterra Brands Tiptop – for the Memphis Meltdown (icecream on a stick). We were also a sponsor at the NZIFST conference in June and at the IDF World Dairy Summit in Auckland in November.

Any companies interested in joining Foodlink can do so online via our website www.riddet.ac.nz

Riddet Institute seals major Korean collaboration

The Riddet Institute and the Korea Food Research Institute (KFRI) have established a collaborative research programme on health promoting food ingredients.

The major collaborative project is FOODKONZ, which will develop ways to protect and enhance health promoting activities of ingredients such as ginseng, medicinal plant extracts, milk peptides, kiwifruit extracts and honey. Other specific research projects focus on sleep-enhancing effects of various food ingredients; modulation of gut microbiota and integrity; and investigating the beneficial effects of various Korean and New Zealand traditional plants.

This collaboration arises from the Focal Point Programme in Innovative Foods, initiated by the New Zealand (through MoRST and FRST) and Korean Governments. The Focal Point Programme provided funding to support New Zealand and Korean researchers for visits and to hold scientific meetings and workshops. Riddet co-director Professor Harjinder Singh led these initiatives in his role as the co-ordinator of food innovation for the Korea-NZ Focal Point Programme.

KFRI leads the future of the Korean food industry and to further its goals it is building co-operative networks with foreign and domestic universities, research institutes and industry.



Massey University Vice-Chancellor, Steve Maharey, President of the Korea Food Research Institute, Dr Mooha Lee and Riddet Institute co-director Professor Harjinder Singh.

Visit by Prime Minister's Fellow in Science

Earlier in the year the Riddet Institute welcomed Mr Se Yeon Kim, a Member of the National Assembly of the Republic of South Korea. Mr Kim was visiting New Zealand to promote co-operation between New Zealand and Korean scientific institutions and researchers.



From left: Riddet's Business Manager John Henley-King, Mr Kim and Mark Ward, Riddet's General Manager

New technology makes probiotics more affordable and accessible

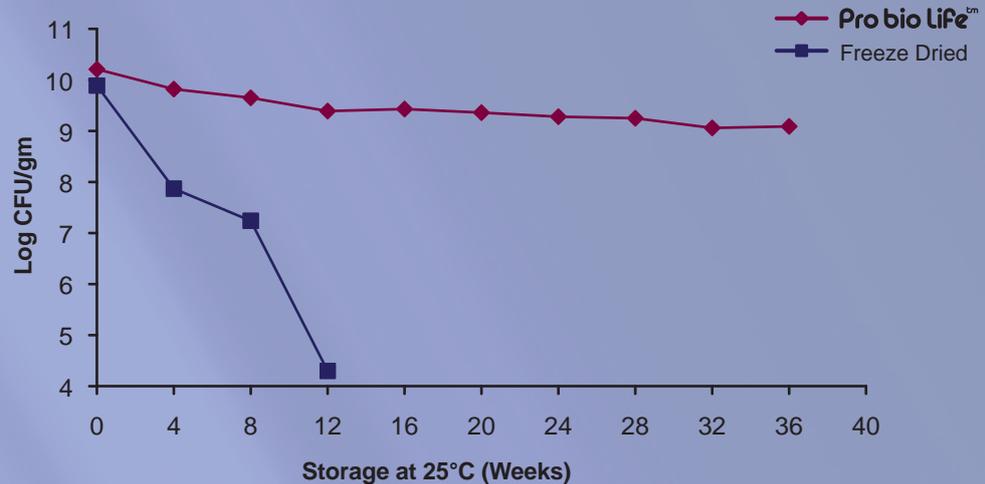
The Riddet Institute has developed a novel technology, **Pro bio LiFe™**, that allows probiotic strains to be incorporated into a range of shelf-stable foods. This will enable the food industry to make the benefits of probiotics available to millions of additional consumers particularly in developing countries, where there is often no access to a chilled supply chain. It will also give consumers a wide range of food choices beyond yoghurt, cultured milk and fruit juice for realising the benefits of probiotics. Delivery of probiotics is currently restricted to the chilled supply chain because probiotic bacteria do not survive at ambient temperature for long periods. This patented technology enables the probiotic bacteria to be stable at ambient temperatures for at least nine months.

One important feature of this technology is its compatibility with most of the probiotic strains. The initial development was carried out using *Lactobacillus casei* 431 and later validated in other probiotic strains including *L. rhamnosus* ATCC 53103, *L. plantarum* ATCC 8014, *L. casei* ATCC 393, *L. acidophilus* ATCC 4356, *L. plantarum* 299V, *B.lactis* HN019 (HOWRU) and *B.lactis* BB12. The viability of encapsulated cells was significantly higher compared with free cells in SGF and SIF and delivers at least one billion live probiotic cells per gram at the end of shelf life.

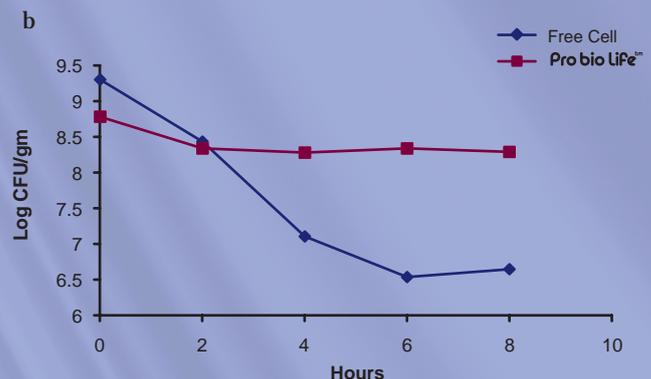
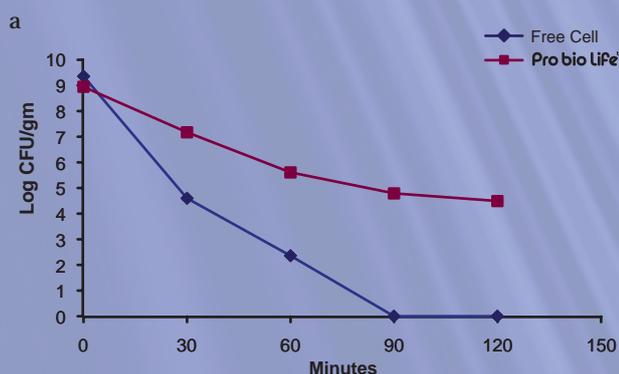
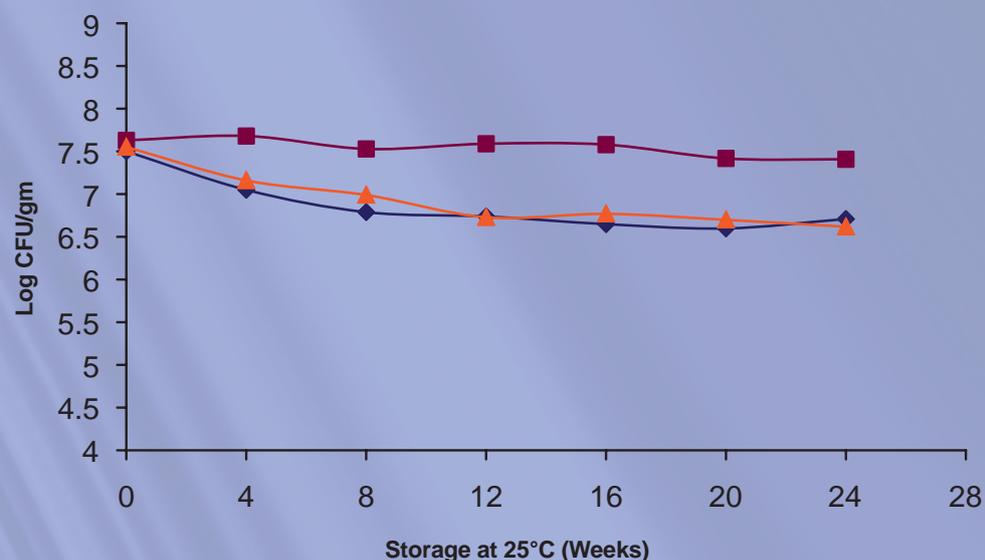
All the ingredients used are natural (GRAS).

The institute is currently looking for commercial partners for this technology.

Pro bio LiFe™ technology enables probiotic bacteria to remain viable at ambient temperatures



Potential applications for the ingredient made by **Pro bio LiFe™** technology



The viability of commercial strain of *L. casei* in simulated gastric fluid (a) and simulated intestinal fluid (b).

New Earle Fund scholarships announced

Five applications to the Earle Food Research Fund for PhD scholarships have been successful.

The projects are:

“Engineered structural disorder of the lipid-protein interfacial membrane of fat globules and the controlled release of volatile compounds in food matrices.” PhD student Haotian Zheng will be supervised by Associate Investigator Dr David Everett at the University of Otago.

“Interactions of dietary lipids with living small intestinal villi”. The selected PhD student will be supervised by Professor Harjinder Singh, Professor Roger Lentle, Massey University.

“Sticky Foods – adherence interactions between food components and the intestinal surface.” The selected PhD student will be based at AgResearch.

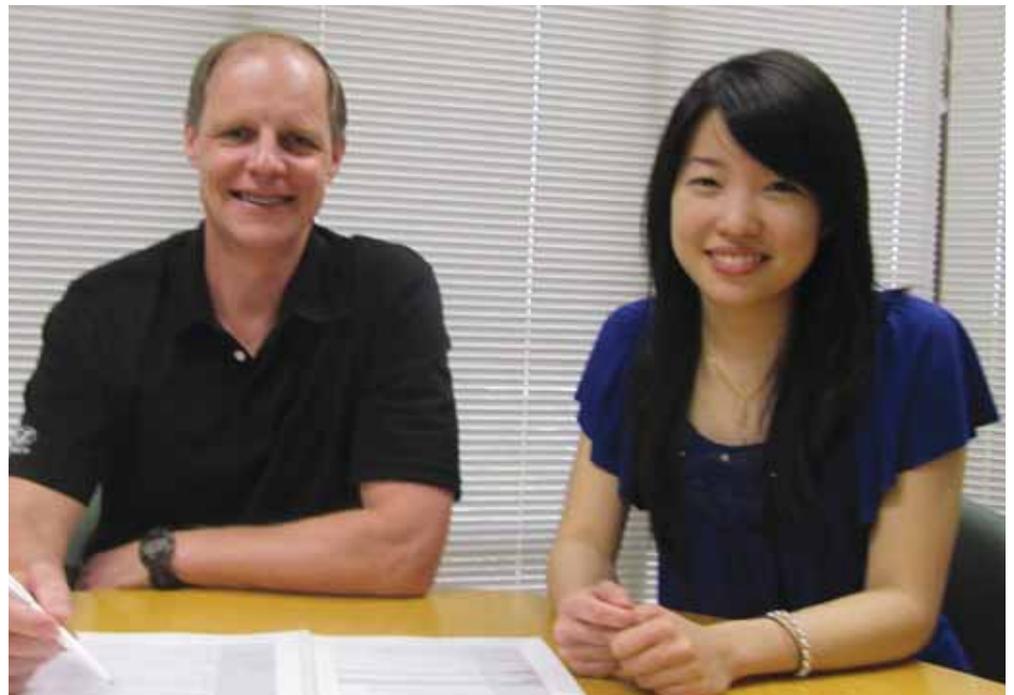
“Development of food grade microparticles from lignin.” PhD student Hayley Stewart will be supervised by Associate Professor Matt Golding and Professor Richard Archer at Massey University.

“Modelling flow in the intestine.” PhD student Jeelean Lim will be supervised by Principal Investigator Professor Andrew Pullan at the University of Auckland.

The Earle Food Research Fund is named after Professors Emeriti Richard and Mary Earle who were pioneers in food technology and engineering at Massey University.



PhD student Haotian Zheng



Professor Andrew Pullan with Jeelean Kim

The viability of a commercial strain of *Lactobacillus casei* stabilised with Pro bio Life™ technology (◆) and stored at 25°C for 9 months, compared to the freeze-dried sample of the same strain (■).

Powdered beverages

■ *Chocolate spread*

◆ *Cereal bar*

Infant food

Breakfast cereal

Candies

▲ *Milk based beverage*

Nutraceutical applications

(capsule, powder, tablet etc)



Inventors of
Pro bio Life™
Technology



Professor Harjinder Singh,
Dr Shantanu Das, and
Mr Arup Nag

Potato research looks for better processing and nutritional attributes

The Riddet Institute and Morgan Laurenson Ltd, a leading potato producer in Manawatu, are exploring relationships between the physico-chemical and nutritional properties of potatoes and new technologies for their end product use.

Under the supervision of Riddet researchers, Drs Jaspreet Singh and Lovedeep Kaur, Achinta Bordoloi is testing four commercially grown New Zealand potato cultivars, putting them through a comprehensive qualitative characterisation using sophisticated scientific techniques. Variations have been found among the cultivars in terms of their

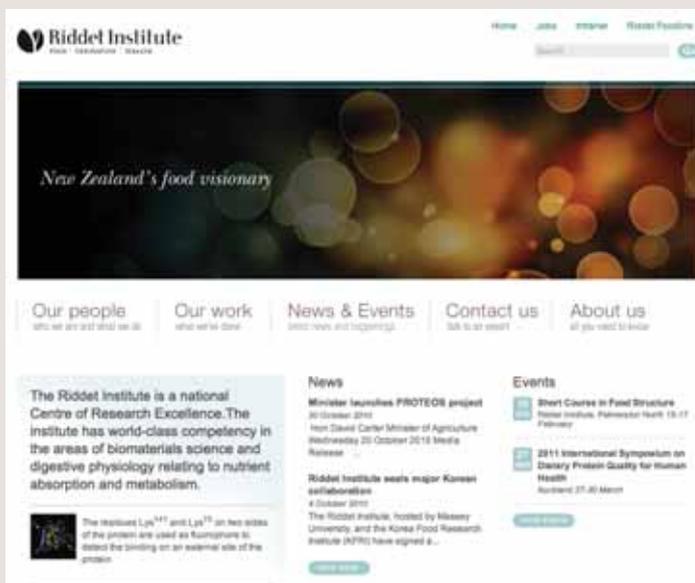
microstructure, texture and in vitro digestibility. This physico-chemical characterisation of potato tubers may affect future cultivar selection for specific end product use. Knowledge gained on digestion kinetics is a powerful tool in designing the future processing of products to maximise health benefits in a world stricken with the metabolic syndrome.



Professor Harjinder Singh, Bill Foster, Wayne Hartley, Achinta Bordoloi, Stuart Robbie, Dr Jaspreet Singh, Dr Lovedeep Kaur

New institute website launched

The new Riddet Institute website was launched on 18 November. As well as a crisp, new design and enhanced content the site now enables a sophisticated search of the institute's scientific publications. It is now possible also to register for events and join the Riddet Foodlink network on-line.





Partnership strengthened with launch of new project

The Riddet-Wageningen UR joint project on global protein supply, PROTEOS, was formally launched by the Minister of Agriculture, David Carter, in the Netherlands on 20 October.

An official agreement between Massey University and Wageningen UR, the leading agri-food university in Europe, was signed last year after many years of association between the two institutions.

PROTEOS is a three-pronged approach to producing more food with less environmental impact. As the world population will reach nine billion by 2050, the demand for animal protein will be twice what we are capable of producing now. Scientists at Riddet and Wageningen UR will work together to find substitutes and extenders for animal protein; increase agri-production efficiencies; and extend the range of animal protein products.

The Minister said, "If these ambitious goals can be achieved, we will be looking at a very different future, when new kinds of protein sources become increasingly important in human nutrition."



Professor Moughan recently returned from a trip to Europe where he contributed to a science review for the Mars Group and met with the Chairman of Wageningen UR to further the Riddet Institute's and Massey University's close ties with the Dutch university. He is pictured here with Mr George Troup at the Ambassador's residence in the Hague.

Graduation ceremony held in the Netherlands

Riddet Institute Senior Research Officer Shane Rutherford was awarded a PhD by Wageningen University at the end of September. His thesis topic was "Bioavailability of lysine in heat-treated foods and feedstuffs."

Lysine is an essential amino acid in the diet of humans..

His work was centred around the accurate evaluation of available lysine in foods. Lysine is often the first limiting amino acid in diets consumed in third world countries where nutrition is often marginal. Consequently, having accurate data about the lysine content of such foods is important. He proposed that the use of digestible reactive lysine rather than digestible total lysine was a superior measure of dietary lysine status.

Dr Rutherford is based at the institute's headquarters in Palmerston North but has been working closely with researchers at Wageningen over many years.



Dr Rutherford with his supervisors (from left) Professor Wouter Hendriks (Wageningen), Professor Paul Moughan (Riddet Institute), and Professor Martin Versteegen (Wageningen).

Recognition for our researchers



Dr Nigel Larsen, a Principal Investigator, has been appointed Adjunct Associate Professor at the Biomolecular Interactions Centre at the University of Canterbury.



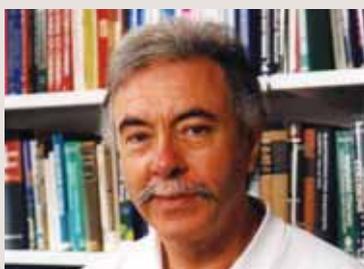
Associate Investigator Professor David Parry, was awarded the Dan Walls medal from the New Zealand Institute of Physics.



Principal Investigator R. Paul Singh, Distinguished Professor of Food Engineering, University of California, was honoured as the recipient of the 2010 Nicholas Appert Award in July, the IFT's highest honour.



Principal Investigator Professor Geoff Jameson received the Massey Research Medal in October. This is awarded to one outstanding researcher each year.



Associate Investigator Professor Peter Derrick was made a Fellow of the Royal Society of New Zealand in October.

What's on

Food structures workshop 15-17 February 2011 Palmerston North

Presenters: Professor Douglas Dalgleish, Professor Eric Dickinson, Associate Professor Kate McGrath, Dr Dmitry Sokolov, and Professor Andy Rao.
Details on www.riddet.ac.nz

International Symposium: Dietary Protein for Human Health 27-30 March 2011 SkyCity Auckland

All details on the Symposium website:
www.dietaryproteinsymposium.co.nz

PGP plans unfolding

The Primary Growth Partnership between the New Zealand Government and Fonterra in the area of post-farm gate research is being finalised. Fonterra and the Government are agreeing to co-fund significant new food research and capability development including the appointment of three new professorial chairs. These are indicated to be in the fields of food materials science, human nutrition and processing control. Around \$70 million will be invested over seven years through the Riddet Institute and its partners and collaborators. This significant investment signals the high level of commitment of Fonterra and the Government to accelerate food innovation and enhance New Zealand's competitiveness in world markets.

Food Awards

The Riddet Institute was a major sponsor of the New Zealand Food Awards hosted by Massey University in Auckland on 28 October. The Riddet Institute Research and Development Award was won by Fonterra Brands Tiptop, for the Memphis Meltdown Rocky Road ice cream. More than 300 people attended the awards dinner, which was held at the Langham Hotel.

Cover image: from Riddet Institute Senior Research Officer Shane Rutherford's thesis entitled "Bioavailability of lysine in heat-treated foods and feedstuffs."