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SCIENTIFIC PROGRAMME

TUESDAY 12th APRIL 2016

16:00 - 20:30  Registration and welcome reception

WEDNESDAY 13th APRIL 2016

08:30 - 09:00  Opening session
  Prof. Paul Moughan – Co-director, Riddet Institute, New Zealand
  Dr Véronique Parmentier and Dr Juliet Ansell – Zespri Kiwifruit and Health

09:00 - 10:00  Keynote presentation 1
  Fruits and vegetables in a healthy diet
  Prof. Jaap Seidell, VU University Amsterdam, The Netherlands

10:00 - 10:30  Coffee break

10:30 - 11:30  Keynote presentation 2
  Everyday good health: The nutrient rich way
  Lynley Drummond, Director at Drummond Food Science Advisory, New Zealand

11:30 - 12:30  Lunch

12:30 - 14:30  Session 1: Kiwifruit and digestive health
  Chaired by Prof. Shin Fukudo, Tohoku University, Japan
  Co-chaired by Dr Abby Thompson, Massey University, New Zealand
  Functional gastrointestinal disorders and the role of diet
  Prof. Giovanni Barbara, University of Bologna, Italy
  A multi-center clinical trial on the effect of kiwifruit on digestive and gut health functions
  Prof. Richard Gearry, University of Otago, New Zealand
  Kiwifruit and digestive comfort: In vitro and in vivo supporting evidence
  Dr Carlene Starck, Riddet Institute, New Zealand

14:30 - 15:00  Coffee break

15:00 - 16:00  Roundtable discussion on digestive health
  Prof. Giovanni Barbara, University of Bologna, Italy
  Prof. Shin Fukudo, Tohoku University, Japan
  Prof. Richard Gearry, University of Otago, New Zealand
  Basil Mathioudakis, Former Head of Unit of the Directorate General on Health of the European Commission, Belgium
  Prof. David Richardson, Visiting Professor, University of Reading, United Kingdom

16:00 - 18:30  Free time

18:30 - 22:00  Dinner hosted by Zespri Kiwifruit
THURSDAY 14th APRIL 2016

08:30 - 10:00  **Session 2: Kiwifruit and vitamin C**  
*Chaired by Dr Chwang Leh-chii, Asian Federation of Dietetic Associations, Taiwan*  
*Co-chaired by Lynley Drummond, Director at Drummond Food Science Advisory, New Zealand*  

- **Overview of the health benefits of vitamin C**  
  *Prof. Margreet Vissers, University of Otago, New Zealand*  

- **Health and immune function benefits of kiwifruit-derived vitamin C**  
  *Dr Anitra Carr, University of Otago, New Zealand*

10:00 - 10:30  **Roundtable discussion on vitamin C**  
*Dr Anitra Carr, University of Otago, New Zealand*  
*Lynley Drummond, Director at Drummond Food Science Advisory, New Zealand*  
*Prof. Margreet Vissers, University of Otago, New Zealand*

10:30 - 11:00  **Coffee break**

11:00 - 12:30  **Session 3: Kiwifruit and metabolic health**  
*Chaired by Dr Jordi Serra, Autonomous University of Barcelona, Spain*  
*Co-chaired by Dr Rinki Murphy, University of Auckland, New Zealand*  

- **Diet, microbiota and metabolic health**  
  *Renée Wilson, University of Otago, New Zealand*  

- **Kiwifruit – A double agent for glycaemic control and nutrient enhancement**  
  *Dr John Monro, The New Zealand Institute for Plant & Food Research, New Zealand*  

- **Kiwifruit-driven microbiota, metabolites and implications for human health**  
  *Dr Paul Blatchford, The New Zealand Institute for Plant & Food Research, New Zealand*

12:30 - 13:00  **Roundtable discussion on the benefits of kiwifruit for metabolic health**  
*Dr John Monro, The New Zealand Institute for Plant & Food Research, New Zealand*  
*Dr Rinki Murphy, University of Auckland, New Zealand*  
*Prof. Jaap Seidell, VU University Amsterdam, The Netherlands*

13:00 - 13:15  **Closing session**  
*Carol Ward, General Manager Marketing & Innovation, Zespri Kiwifruit*

13:15 - 14:00  **Lunch**

14:00 - 16:30  **Plant & Food Research and orchard visit**
Fruits and Vegetables in a Healthy Diet
Professor Jaap Seidell
VU University Amsterdam, The Netherlands

An epidemic of chronic non-communicable diseases is sweeping the globe. It is afflicting especially vulnerable groups in urban settings. Upstream factors include societal problems such as loss of social cohesion, chronic stress, poverty and unhealthy food environments.

The high and increasing intake of ultra-processed foods lead to an increase in the intakes of sugar, salt and trans fatty acids. Energy dense, nutrient poor foods are the most attractive option to many consumers in terms of price, convenience, taste and availability.

This is at the expense of minimally processed or unprocessed basic foods such as fruits and vegetables. Creating healthy food environments that make the healthier choice the easiest choice is necessary. This requires regulation of the food environment by national and local governments as well as voluntary inputs by agriculture, the food industry and consumers.
Much of the global burden of disease is directly related to dietary quality and quantity. Whilst inadequate nutrition (protein, energy and micronutrients) is estimated to be responsible for more than 10% of the global disease burden, the other extreme of over-nutrition, or excess dietary consumption, is driving global epidemics of obesity and associated comorbidities such as diabetes, cardiovascular diseases, metabolic syndrome and some types of cancer. There is general consensus that for much of the world, access to low-cost, highly-processed, energy-dense, but nutrient–poor food is a key driver in the escalating rates of obesity. Food availability, safety, accessibility and education are drivers of food choice. Population nutrition policies are focused on encouraging positive changes in food consumption patterns, however a critical element in those objectives is understanding the nutrient value of foods. Improved health outcomes are associated with nutrient rich, lower energy, quality diets.

Nutrient rich foods are those that have a positive balance of beneficial nutrients and nutrients that are recommended to limit. In order to understand how to rate foods, nutrient profiling methods have been developed to provide information about the overall nutritional attributes of foods for consumers. Nutrient profiling methods are a more holistic approach to communicating the nutritional richness of foods as they take into account multiple nutrients, as opposed to focusing on single components. Fundamental to this concept is the energy value of foods. Foods that are energy dense and low in beneficial nutrients score poorly in nutrient profiling systems, whereas foods that deliver a range of beneficial nutrients score well. There are some significant challenges in designing validated ranking systems to address all food groups and typical portion or serve sizes, in order to deliver a simple to understand, yet accurate, rating.

Consistently, low energy-dense fruit and vegetables outperform other food groups in nutrient profiling systems. Within each food group there is range of nutrient profiling scores, enabling further choice for the selection of more healthy options. Whilst nutrient profiling systems typically consider only selected macro- and micro-nutrients for which there are known recommended dietary intakes, natural foods such as fruits and vegetables also contain a range of highly beneficial naturally occurring phytonutrients. Consumer research has shown the health–promoting benefits of natural foods are preferred to the added benefits of formulated functional foods. The positive promotion of diets high in nutrient-rich, low energy-dense fruit and vegetables is one aspect to improving health outcomes driven by dietary factors.

This presentation will consider the role of fruit, in particular kiwifruit, in the diet and how the nutrient-rich, and phytonutrient-rich properties can contribute to the improvement of health outcomes.
Roughly 30% of the population is affected by at least one of the several functional gastrointestinal disorders (FGIDs) with functional dyspepsia, irritable bowel syndrome (IBS) and chronic constipation (CC) being the most common. IBS is defined by the presence of abdominal pain or discomfort that is associated with altered bowel habit over a period of at least three months. IBS prevalence in Europe and USA is 10-15% with the constipation predominant IBS subgroup (IBS-C) accounting for approximately 5%. Chronic Constipation (CC) is defined by multiple bowel symptoms that include difficult or infrequent passage of stool, hardness of stool or a feeling of incomplete evaluation. It is a common problem that affects approximately 20% of the world’s population. Both conditions are associated with marked impaired quality of life and significant healthcare burden.

Although the term functional could be interpreted as a synonym of cryptogenetic or idiopathic and patients labelled as neurotic anxious, depressed, otherwise healthy subjects with an imaginary disease, the growing evidence indicating that these are in fact micro-organic diseases and that tailored dietary approaches and therapies can help to improve symptoms is considerably growing. The pathophysiology of FGID incorporates common physiological changes, including gastrointestinal motor dysfunction, visceral hypersensitivity, psychological components and abnormal central integration of sensory input, the role of diet and other luminal irritants (e.g. bile acids, toxins, etc.), increased epithelial permeability and mucosal barrier dysfunction, low grade mucosal inflammation and likely a highly probable although not yet clearly identified genetic component. A lot of the current research in the field of FGID has been directed to the potential role of diet, as this has often been recognized by patients a possible trigger of symptoms, and by experts as an opportunity to improve these syndromes with limited costs and side effects.

While restriction diets such as diets low in fermentable olygosaccharides, disaccharides, monosaccharides and polyols (FODMAPS) have been shown to be effective, at least in subgroups of patients with IBS, the described negative effects on the intestinal microbiota (reduced counts of bifidobacteria and reduction of microbiota diversity) and potential reduction in the total amount of soluble fibres, leading to reduced bulking effect, in patients with constipated bowel habit, raise some concern on the widespread prescription of these type of dietary approaches. On the other hand, dietary fibre supplements have been advocated for the management of CC and IBS-C. Fibre supplementation is effective in increasing intestinal bulk, in shortening intestinal transit times and increasing bowel habit frequency. However, abdominal bloating and distension, flatulence and abdominal pain may limit the use of fibre, particularly in those with abdominal symptoms. On the other hand, soluble fibres accelerate intestinal transit and stimulate the growth of beneficial intestinal bacteria in the colon and have been shown to be effective in IBS-C and CC.

A systematic review showed that fibre supplementation elicited beneficial effects in 5/7 studies in CC and 3/3 studies in IBS-C. Nonetheless data from good quality randomised controlled trials (RCTs) on this approach is limited and larger, more rigorous and long-term RCTs are needed. There are limited data on the supplementation of soluble fibre in the form of fruit. One study compared dried plums vs. psyllium, showing improved defecation frequency during
A Multi-center Clinical Trial on the Effect of Kiwifruit on Digestive and Gut Health Functions
Professor Richard Gearry
University of Otago, New Zealand

Digestive discomfort, including constipation is a common condition throughout the world and is reported to affect around 15% of adults in western countries. Gastrointestinal discomfort and bowel habit are two target areas for potential health claims for foods identified by EFSA. Green kiwifruit (Actinidia deliciosa var. Hayward) are often used as a natural food to assist with the relief of constipation and potential relief of gastrointestinal symptoms. The randomised, controlled cross-over clinical trial presented here was carried out in New Zealand, but is currently also in progress in two other sites around the world – Italy and Japan – using the same protocol.

Three cohorts of participants were recruited: A healthy group (H); a functionally constipated group (FC); and a group with irritable bowel syndrome constipated type (IBS-C) assigned according to Rome III criteria. The cross-over design will be completed using the kiwifruit intervention (2 green kiwifruit per day [Actinidia deliciosa var. Hayward]), compared to a positive control intervention of psyllium (7.5 g of psyllium per day providing 6 g fibre). All participants were free living and required to maintain their normal dietary and lifestyle habits for the duration of the trial.

The primary outcome measure, quantification of complete spontaneous bowel movement (CBSM), is currently being analysed and results will be presented at the 1st International Symposium on Kiwifruit and Health for the first time. The secondary outcome measures included additional stool frequency measures, validated questionnaires on digestive symptoms and comfort using the Gastrointestinal Symptom Rating Scale (GSRS). The IBS-QOL questionnaire together with objective measures of gastrointestinal transit times using smart pills are not presented here.

The goal of this study was to demonstrate the efficacy of kiwifruit as a food intervention for the relief of constipation and associated symptoms in functionally constipated adults, and those with IBS-C.

Kiwifruit and Digestive Comfort: 
*In Vitro* and *In Vivo* Supporting Evidence

Dr Carlene Starck
Riddet Institute, New Zealand

Kiwifruit (*Actinidia deliciosa*) hosts a number of beneficial properties for gut health. In addition to its high fibre content, water holding capacity and levels of the vitamins C and E, its consumption has been reported to provide relief of symptoms of gastrointestinal discomfort. This may be due to the protease actinidin, contained primarily in green Hayward kiwifruit, with reduced levels in the SunGold variety.

Protein is an essential component of a balanced diet. Dietary protein provides a number of building blocks critical for life and its efficient digestion is important for full nutritional value. However, meals high in protein can contribute to gastrointestinal discomfort, with symptoms such as stomach pain, bloating and constipation. Early work highlighted the presence of the actinidin protease in kiwifruit, an enzyme with a role in protein digestion. These findings have led the Riddet Institute to conduct a number of investigations into the detailed effects of kiwifruit on the digestion of dietary protein.

Our first experiments were carried out *in vitro*, and showed that kiwifruit actinidin enhanced the digestion of a range of food proteins, including casein, meat protein and gluten. Subsequently, elegant assays using Wide-Bore Nuclear Magnetic Resonance in rats determined that actinidin from green kiwifruit enhanced the digestion and stomach emptying of a number of dietary proteins *in vivo*. This work was extended to pigs, the best model organism for human digestion, where once again, kiwifruit actinidin proved a significant meat protein digestion aid. In humans, initial work shows that the consumption of green kiwifruit alleviates all measures of gastric discomfort when consumed with a large meal of meat.

Recently, investigations have also focused on kiwifruit fibre and its digestibility; fibre plays key roles in digestion and gastrointestinal comfort by maintaining gut function. In the growing pig, both soluble and insoluble kiwifruit fibre was highly digested in the foregut and hindgut, respectively, emphasizing the role of kiwifruit as a source of dietary fibre.

Therefore, kiwifruit consumption has the potential to contribute greatly to gastrointestinal comfort, protein digestion and gut health. This talk provides a summary of these effects, the implications of our findings and where we plan to focus our effects as we move into the future.

SESSION 1: KIWIFRUIT AND DIGESTIVE HEALTH
Overview of the Health Benefits of Vitamin C

Professor Margreet Vissers
University of Otago, New Zealand

Vitamin C is essential for life, and humans obtain this nutrient exclusively through the diet. It functions inside the cells in our bodies, where it plays an important role in supporting many essential processes. In the past decade, we have learned a great deal about the myriad of biological roles assigned to this micronutrient and this information has given us new insight and understanding of its vital importance to health maintenance and disease prevention.

The bioavailability of vitamin C to the tissues is determined by absorption through the gut, active uptake into the tissues via the circulation and clearance from the kidneys. Tissue saturation is achieved with plasma vitamin C levels of around 80 µM, which is similar to the levels maintained in animals that are able to synthesise the vitamin. Recent evidence suggests that tissue saturation best supports a number of important cell functions, including the regulation of oxidative metabolism, cell stress responses, hormone synthesis, epigenetic regulation, and life and death signalling pathways.

Higher vitamin C intake has been linked to improved wound healing, immune function and a decreased incidence of chronic diseases such as cardiovascular disease, diabetes and cancer. In addition, it has also been linked to improved mood and well-being, skin tone and to increased life expectancy. In the light of this knowledge, the recommended daily intake is being raised in a number of countries as a means of improving health and offsetting chronic diseases.

Many of the established and newly identified roles of vitamin C are associated with its ability to act as a co-factor for metal-containing enzymes that have important roles in the body.

These enzymes have functions that include: response to metabolic and oxygen stress (such as in diabetes and general illness); promoting the growth and progression of cancer; and stimulating immune function and wellbeing. Recent research has identified new members of the 2-oxoglutarate dependent dioxygenase family of enzymes that are involved in numerous biological functions including epigenetic regulation, hormone synthesis, angiogenesis and cell stress responses. The health implications of these discoveries will underpin future dietary and nutritional advice and, in particular, will improve our understanding of the need for optimal vitamin C intake on a daily basis.

Most people do not consume enough fresh fruit and vegetables to maintain saturating plasma levels of vitamin C, and available population statistics have indicated that, although acute scurvy is relatively uncommon, a significant proportion of western populations have low plasma status. In addition, vitamin C is rapidly depleted when a person is unwell, and this is an under-appreciated problem. We have investigated the effect of adding kiwifruit, an exceptional dietary source of vitamin C, to the daily diet. We have found that plasma and tissue saturation can easily be achieved and maintained by the addition of two kiwifruit per day.
Health and Immune Function Benefits of Kiwifruit-derived Vitamin C

Dr Anitra Carr
University of Otago, New Zealand

Vitamin C is an essential micronutrient. Unlike most animals, we have lost the ability to synthesise our own vitamin C and must therefore obtain it from our diet. Fresh fruit and vegetables are the best source of vitamin C, and regular and adequate daily intake of vitamin C is required to prevent marginal vitamin C status (hypovitaminosis C) and the potentially fatal deficiency disease scurvy. Kiwifruit are an outstanding source of vitamin C with one kiwifruit providing twice the Recommended Dietary Intake (RDI) of vitamin C. We believe that vitamin C levels significantly higher than the current New Zealand RDI of 40 mg/day are required for optimal health.

We have carried out several human intervention studies investigating the bioavailability of kiwifruit-derived vitamin C. We found that consumption of as little as half a gold kiwifruit per day was sufficient to significantly increase plasma vitamin C levels, and two gold kiwifruit per day (which constitutes ~200 mg/day vitamin C) provided optimal plasma levels. Few other food sources provide this benefit. We also showed an improvement in muscle, seminal fluid and white cell vitamin C status following kiwifruit intake. In addition, the intake of two kiwifruit per day was associated with improved wellbeing.

Vitamin C has a number of important functions in the body, from acting as a potent antioxidant, to its role as a cofactor for numerous biosynthetic and regulatory enzymes. We are particularly interested in its potential immune function benefits, in particular its effects on white blood cell function. White blood cells, such as neutrophils, are our first line of defence against invading microorganisms. Neutrophils migrate towards sites of infection, engulf (or phagocytose) bacteria and then produce an array of compounds, such as reactive oxidants, to kill the bacteria. We have carried out a human intervention study to investigate the effects of kiwifruit supplementation on white cell function. We found a significant increase in neutrophil vitamin C status following supplementation with two gold kiwifruit per day and an increase in the ability of neutrophils to migrate and generate oxidants. Both of these functions would likely translate into better overall immune function and health.

Combined analysis of the data from our human intervention studies has indicated that people require vitamin C intakes significantly higher than the current New Zealand RDI to achieve optimal plasma levels. Therefore, we recommend a daily intake of 200 mg/day vitamin C which can be obtained from a daily diet of 5-7 servings of fruit and vegetables, provided that at least one of those is a high vitamin C food such as kiwifruit. This will provide optimal plasma and tissue vitamin C levels and enhanced health outcomes.
This cross-sectional pilot study aims to determine whether or not there are any differences between the gut microbiota of people with normal glucose tolerance, pre-diabetes and type 2 diabetes. Specific research objectives are to:

- Define gut microbiota composition associated with normal glucose tolerance, pre-diabetes and type 2 diabetes.
- Identify dietary associations with gut microbiota composition with particular emphasis on fruit and vegetable intake.
- Establish the feasibility of an intervention study with kiwifruit to favourably alter gut microbiota composition and therefore impact on glucose tolerance.

Participant groups include individuals with normal glucose tolerance, individuals with pre-diabetes and individuals with type 2 diabetes. Information to be collected and planned analyses includes:

- Demographics: Age, gender, ethnicity and education.
- Anthropometric measures: Body mass index (BMI), waist and hip circumference.
- Completed four-day weighed food diaries to be analysed for: Amounts of macro and micronutrients and selected foods and food groups, such as fruit and vegetables.
- Fasting blood sample analysed for: Fasting glucose and HbA1c (as measures of glucose control), hormones affecting metabolism, including insulin, leptin and ghrelin, and lipid parameters including cholesterol and triglycerides. High sensitivity C-reactive protein (hs-CRP) was also measured as a marker of inflammation.
- Faecal samples: Gut microbial composition will be characterised using high throughput DNA sequencing. Analyses will allow comparison, and detection of differences between the study groups.
- Urine samples: Metabolites will be characterised using Liquid Chromatography-Mass Spectrometry (LC-MS).

Benefits and outcomes include: The relationships between glucose tolerance, dietary intake, gut microbiota characteristics and urine metabolite profiles; and an indication of whether a dietary intervention to alter gut microbiota provides a feasible prospect for type 2 diabetes therapy.
Kiwifruit – A Double Agent for Glycaemic Control and Nutrient Enhancement

Dr John Monro
The New Zealand Institute for Plant & Food Research, New Zealand

A ripe kiwifruit is a luscious, sweet, carbohydrate-rich food – the kind of food that would be expected to raise blood glucose concentrations. However, kiwifruit is also nutrient dense and capable of promoting health in numerous ways.

We therefore faced two questions:
1. What is the true glycaemic potency of whole kiwifruit – the capacity of the whole fruit to raise blood glucose?
2. What effect does the interaction of kiwifruit with other components of a meal have on the meal’s glycaemic impact?

We addressed these questions in a research sequence involving in vitro and human intervention studies, and found:
(a) The non-digested dietary fibre remnants from kiwifruit that had been digested in vitro occupied about four times their original volume in the intact fruit. They would therefore surround and extensively interact with other foods in the limited volume of the gut.
(b) Within the dispersion of pre-digested kiwifruit remnants several processes important to the glycaemic response were substantially retarded in vitro, including:
   • Digestion
   • Sugar diffusion
   • Mixing of intestinal contents
(c) In a human intervention study we found the glycaemic impact of kiwifruit to be relatively low; 100 g of kiwifruit would have about the same effect on blood glucose as only 6 g of glucose.
(d) The low in vivo glycaemic impact could be partly attributed to the carbohydrate in kiwifruit being fruit sugars, but the kiwifruit also caused changes in the blood glucose response curve that indicated improved homeostatic blood glucose control due to factors other than sugar, consistent with effects of kiwifruit remnants on intestinal processes indicated by the in vitro studies above (in c).
(e) Analysis of the effects of equal carbohydrate, partial substitution of kiwifruit for highly glycaemic foods – such as those based on cereal starch – showed that it is an effective strategy for improving intake of nutrients such as vitamin C, with the added benefit of reducing glycaemic impact.
The glycaemic benefit was greatest when kiwifruit were consumed about 30 mins before a cereal food meal, substantially lowering both the amplitude of the response (the “spike”) compared with consuming the two foods together, while inducing a lower total response (area under the curve) compared with an equal carbohydrate amount of the non-substituted food.

The study concluded that equal carbohydrate (isoenergetic) inclusion of kiwifruit in the diet by partial substitution of cereal starch-based staples, such as potatoes and rice, is an effective dietary strategy to simultaneously reduce exposure to glycaemia while improving nutrient profile of the diet.

**Kiwifruit-driven Microbiota, Metabolites and Implications for Human Health**

**Dr Paul Blatchford**

The New Zealand Institute for Plant & Food Research, New Zealand

The research presented attempts to understand how kiwifruit impacts upon microbial composition and metabolism in the human large bowel using *in vitro* fermentation systems. Kiwifruit contains non-digestible polysaccharides (2-3%) as well as other compounds including polyphenols, fatty and organic acids, proteins, vitamins and minerals that may alter microbial ecology in the large bowel. Given the evidence supporting the link between colonic microbiota function and disease, any mechanism that is able to alter the microbiota bears relevance for human health.

It is for this reason that potentially prebiotic molecules are being extensively studied and tailored to attempt to beneficially alter colonic microbiota composition. The methods used in this research were *in vitro* pH-controlled anaerobic batch fermenters in conjunction with 16S rRNA gene sequencing and metabolomics platforms. We found that green-fleshed *Actinidia deliciosa* (‘Hayward’) and gold-fleshed *Actinidia chinensis* (‘Zesy002’) kiwifruit fermentation promoted a microbiota that was significantly enriched in *Bacteroides* spp., *Parabacteroides* spp. and *Bifidobacterium* spp. These commensal genera are positively correlated with human health through various mechanisms including fortifying intestinal barrier integrity, producing antibacterial compounds and modulating the immune system. The kiwifruit-driven increase of commensal bacteria in the *in vitro* models resulted in a propionate-enriched environment. Propionate, which generally travels to the liver via portal circulation, is involved in gluconeogenesis and has been shown to play a role in regulating cholesterol synthesis. This work also showed that the kiwifruit organic acids, malic acid, quinic acid and citric acid are able to resist simulated digestion and reach the colon intact, potentially altering bacterial composition therein. The results achieved in this project contribute towards understanding how kiwifruit benefits human health via an improved microbial community composition and metabolic profile.
**BIOGRAPHIES**

**Dr Juliet Ansell**
Zespri®, New Zealand

Juliet oversees health and nutrition research with the various kiwifruit varieties in the global market. Her focus is the multi-centre clinical trial that Zespri® is conducting in New Zealand, Italy and Japan. The trial aims to provide clinical evidence that eating green kiwifruit contributes to digestive comfort and function.

Juliet is based in New Zealand and joined Zespri® in July 2015. Previously, Juliet had a part-time role on secondment from Plant & Food Research (PFR). Juliet was an academic research scientist for 20 years (including her Ph.D. thesis research) with a BSc from Kings College, London and a doctorate from Oxford University. Juliet has lived and worked in the UK, Africa, Australia and New Zealand; the last nine years being with PFR leading a group exploring the interactions between food, bacteria and the gastrointestinal tract.

Juliet has just moved to the Bay of Plenty with her husband and two sons and enjoys reading and running in her spare time.

**Professor Giovanni Barbara**
University of Bologna, Italy

Giovanni Barbara is Professor of Medicine and Gastroenterology at the University of Bologna, Italy. He qualified in internal medicine and then gastroenterology and trained in Bologna, London, and at the McMaster University in Canada. Professor Barbara’s main research interests relate to basic and clinical aspects of functional gastrointestinal disorders and neurogastroenterology, and he has authored numerous peer-reviewed articles on these topics.

He has received international awards including the Master Award in Gastroenterology from the American Gastroenterological Association. He is currently member of the Board of Directors of the Rome Foundation and President of the European Society of Neurogastroenterology and Motility.
Dr Paul Blatchford
The New Zealand Institute for Plant & Food Research, New Zealand

Dr Paul Blatchford is a Scientist in the Microbiome and Metabolism Team in the Food & Nutrition Science Group at Plant and Food Research, Palmerston North. He is specifically working on how plant polysaccharides can alter the composition of the gut microbiota using a combination of metabolic and metagenomic methods. He is interested in the interactions of microbes with their human host and the study of the functional attributes of the gut microbiota in health and disease. Some of the key tools he uses for examining the gut microbiota are *in vitro* batch and continuous culture gut models, in combination with next generation sequencing technology.

Dr Anitra Carr
University of Otago, New Zealand

Dr Anitra Carr’s research speciality is the role of micronutrients in human health and disease. She has been the co-ordinating investigator on four Zespri®-funded human intervention studies investigating the bioavailability and potential health effects of kiwifruit-derived vitamin C, particularly its effects on immune function. These studies have resulted in observations that have potential implications for public health policy, primarily the development of appropriate Australasian Nutrient Reference Values. She is currently researching the effects and biochemical mechanisms of vitamin C in the prevention and treatment of acute and chronic diseases, such as cancer and severe infection.
With over 30 years experience in the food and dairy industries, together with academia, today the key focus of Lynley’s professional services is the strategic development and commercialisation of formulated complex nutritional foods, and the strategic planning, management and execution of food and health research for commercial entities. Lynley’s expertise provides the bridge between science, commercialisation and working within an increasingly rigid regulatory environment.

Drummond Food Science Advisory provides confidential services to a number of multi-national companies – from strategic research and development planning & reviews, to product development programmes, health research and clinical trial management, science writing, through to regulatory consultancy and health claim development.

In addition to her consultancy role, Lynley is also the Senior Regulatory Advisor in the Massey Institute of Food Science and Technology, Massey University, New Zealand, where she was formerly a lecturer in food technology.

A professional member of the New Zealand Institute of Food Science and Technology, and other professional nutrition and food science organisations around the world, Lynley has patents and publications in dairy, health and nutrition, infant products and the role of kiwifruit in health.
Professor Shin Fukudo
Tohoku University Graduate School of Medicine, Japan

Professor Shin Fukudo received his MD from Tohoku University School of Medicine in 1983 and his Ph.D. in 1990. Since the 1980s, he has published a number of interesting articles on irritable bowel syndrome (IBS). He found exaggerated colonic motility in response to psychological stress in IBS patients. His achievements include earlier (1993) conceptualization of IBS as a disorder of brain-gut interactions and identifying key molecules of interoception. He first proved exaggerated response of the colonic motility and visceral perception to the exogenous administration of corticotropin-releasing hormone (CRH) in IBS patients and the effect of CRH antagonist on both IBS patients as well as the rat’s model of IBS.

He has published papers on neuroimaging of visceral perception and IBS. His articles have been published in world leading journals on the digestive system and the brain; Nature Reviews Gastroenterology and Hepatology, Nature Reviews Disease Primers, JAMA, Gastroenterology, Gut, Brain, Neuroscience, etc. Dr Fukudo is a recipient of the Early Career Award of the American Psychosomatic Society (1994), the Prize for Science and Technology of the Minister of Education, Culture, Sports, Science and Technology of Japanese Government (2006), and the Masters Award in Gastroenterology from the American Gastroenterological Association (2009). He was a member of Rome III Committee and is a member of International Liaison Committee and Rome IV Committee. He is a member of editorial board of Gut, Neurogastroenterology and Motility, Journal of Neurogastroenterology and Motility, and Biopsychosocial Medicine.
Professor Richard Gearry  
University of Otago, New Zealand

Richard Gearry is Professor of Medicine at the University of Otago, Christchurch and Consultant Gastroenterologist at Christchurch Hospital, New Zealand. He completed his medical, gastroenterology and Ph.D. studies in Christchurch before Fellowships at Box Hill (Melbourne, Australia) and St Mark’s (London, UK) Hospitals. He has a clinical and research interest in luminal gastroenterology and nutrition, having published widely in these fields. He is the Medical Director of the New Zealand Nutrition Foundation and is the Principal Investigator for the multi-center clinical trial on the effect of kiwifruit on digestive and gut health functions.

Dr Chwang Leh-chii  
Asian Federation of Dietetic Association, Taiwan

Chwang Leh-chii, DrPH, RD is the President of Asian Federation of Dietetic Association (AFDA) and Chinese Dietetic Society, Taiwan (CDS), Founding President of Taiwan Dietetic Association, a past Vice Superintendent of Taipei Municipal Gan-Dau Hospital, and Director of Food and Nutrition Department, Taipei Veterans General Hospital. She was the trailblazer for dietetic professionalization.

She served on the Board of Joint Commission on Hospital Accreditation and Quality Assurance, the Medical Research Ethics Foundation, the Dietitian Registration Examination Council, the Consumer Protection Bureau, the Child Health Alliance, and the Society of Lipids and Atherosclerosis in Taiwan.

Her academic appointments include faculty position in Department of Nutrition, Fu-Jen Catholic University, Taiwan, and external examiner of the International Medical University, Malaysia, and Visiting Scientist, USDA-Human Nutrition Research Center on Aging at Tufts, Boston, USA.

Dr. Chwang received her DrPH from University of Texas, MS from University of Hawaii, and BS from National Taiwan University.
BIOGRAPHIES

Basil Mathioudakis
Basil Mathioudakis Consulting, Belgium

Basil Mathioudakis joined the European Commission in 1982 where he worked on food legislation and nutrition covering a variety of dossiers including foods for particular nutritional uses, food supplements, food and nutrition labelling, addition of vitamins and minerals to foods and nutrition and health claims. In 2005, he became Head of the Unit responsible for these subjects in the Directorate-General for Health. He retired at the end of February 2015.

He chaired the Standing Committee on Plants, Animals, Food and Feed, Section General Food Law, which votes on all relevant implementing legal measures, including the authorisation or not of the nutrition and health claims.

As Head of the Delegation of the European Union, he was actively involved in the work at the Codex Alimentarius Committees on Nutrition and Foods for Special Dietary Uses (CCNFSDU) and on Food Labelling (CCFL) and followed the relevant work of WHO and FAO.

He has also followed closely the work of the European Food Safety Authority (EFSA) in the area of Nutrition in general and in particular on the subjects for which his unit is responsible.

Dr John Monro
The New Zealand Institute for Plant & Food Research, New Zealand

Dr John Monro is a Principal Scientist at Plant & Food Research, Palmerston North. His recent research and publications have been principally on the glycaemic impact of carbohydrate foods, its modulation by food interactions and structures in the gut, how to measure it in a physiologically valid way, and how to communicate it to consumers as a guide to healthier food choices. He has also published extensively on the properties of dietary fiber and its relationship to health outcomes. Dr Monro has served on national and international advisory groups on carbohydrates, glycaemic response, dietary fiber and health.
Dr Rinki Murphy
University of Auckland, New Zealand

Rinki is an Auckland based diabetes physician working at Auckland DHB, Counties Manukau Health, in private practice at the Mercy Specialist Centre, and as a Senior Lecturer in Medicine at the University of Auckland. She completed her endocrinology training in Auckland followed by a Ph.D. in the genetics of diabetes at the University of Plymouth, UK in 2007. She has been the Medical Advisor for Diabetes Auckland since 2009. Her research is in genetics and the physiology of diabetes and obesity.

Distinguished Professor Paul Moughan
Riddet Institute, New Zealand

Professor Paul Moughan holds the position of Distinguished Professor, Massey University, New Zealand and is Co-director of the Riddet Institute. His research has encompassed the fields of human and animal nutrition, food chemistry, functional foods, mammalian growth biology and digestive physiology. He has published in excess of 400 scientific works. In 1995, he was awarded Doctor of Science and in 1997 he was awarded a Personal Chair at Massey University and was elected a Fellow of the Royal Society of New Zealand. He is a Fellow of the Royal Society of Chemistry, Cambridge, England. In 2014, he was awarded an Honorary Doctor of Science from the University of Guelph, Canada.
BIOGRAPHIES

Dr Véronique Parmentier  
Zespri®, Belgium

As Global Marketing Manager at Zespri®, Véronique is responsible for the global implementation of the Zespri® health strategy. Her role includes coordinating scientific and innovation activities, as well as research partners and the in-market departments.

She also leads the development of global consumer insights on health and nutrition and other consumer insight tools and research projects. She is based in the European Zespri® office in Antwerp.

Véronique graduated in 1994 with a degree in Biological Engineering from the University of Leuven and has a Ph.D. in Applied Biological Sciences.

Professor David Richardson  
University of Reading, United Kingdom

David Richardson runs a specialist consultancy in nutrition and food science. He holds a Visiting Professorship at the University of Reading, School of Chemistry, Food and Pharmacy. He began his teaching and research career at the University of London as Lecturer in Nutrition and was then appointed Industrial Research Fellow in the Department of Food Science and Nutrition at the Massachusetts Institute of Technology. He subsequently worked for Nestlé UK Ltd, ultimately becoming Group Chief Scientist.

Professor Richardson chaired a section of an EU Concerted Action Programme (PASSCLAIM) to develop a process for the scientific substantiation of health claims on foods, and he was an author of the International Life Sciences Institute Europe project PROCLAIM, which developed further guidance on the science needed to underpin EU and global regulatory frameworks for health claims. Professor Richardson is a Fellow of the Royal Swedish Academy of Agriculture and Forestry. He is a member of Council of the Nutrition and Health Forum of the Royal Society of Medicine. He sits on several industrial and university scientific advisory boards and is scientific advisor to a number of European and international organisations.
Professor Jaap Seidell is Full Professor (2002-present) and Head of the Institute for Health Sciences (2003-2013) at the VU University Amsterdam. In 2013, he was appointed one of two distinguished ‘University Professors’ at the VU University and Co-director of Sarphati Amsterdam, a multidisciplinary research institute that focuses on the healthy development of children through healthier lifestyles and environments.

He obtained his MSc (1983) and PhD (1986) at the Department of Human Nutrition at the University of Wageningen, The Netherlands. He was awarded a Senior Research Fellowship by the Royal Academy of Arts and Sciences (KNAW) for the period 1988-1992. In this period, he worked as a Postdoc at Sahlgren’s Hospital, Göteborg, Sweden and at the National Institute on Aging in Baltimore, US. From 1992-2002 he was Head of the Department for Chronic Diseases Epidemiology at the National Institute for Public Health and the Environment in Bilthoven, The Netherlands.

His research focuses on the understanding of determinants of food choice and the effectiveness of (policy) interventions in the context of the prevention and management of non-communicable diseases in general and of obesity in particular. He (co)-authored well over 500 scientific papers and chapters in books on these topics (407 of these covered in ISI Web of Science; h-index: 80; h-index in Google-Scholar: 104) but he also writes columns for leading national newspapers and, together with psychologist Jutka Halberstadt, published two popular books on obesity (2011) and nutrition (2014) for the general public. He chaired numerous committees which produced dietary guidelines for the general population as well as for people with diabetes or obesity and he is a frequent consultant to the World Health Organization on these matters.

He has served as President-elect and as President (1992-2000) of the European Association for the Study of Obesity and was Editor-in-Chief of the European Journal of Clinical Nutrition (1996-2006) and Public Health Nutrition (2006-2014). He is a member of the Royal Academy of Arts and Sciences (KNAW) and the Health Council of the Netherlands.
BIOGRAPHIES

Dr Jordi Serra
Autonomous University of Barcelona, Spain

Dr Jordi Serra, born in Barcelona, Spain, in 1959, completed medical school at the Autonomous University of Barcelona in 1984. He received his medical speciality in Gastroenterology and Hepatology in 1993 from the Swedish Medical Board after training at the Uppsala University Hospital. He achieved his Ph.D. in 1998 at the Autonomous University of Barcelona, Spain.

Dr Serra was Associate Investigator at University Hospital Vall d’Hebron, Barcelona, until 2008. Since January 2009, he has been Head of the Motility and Functional Gut Disorders Unit at University Hospital Germans Trias i Pujol, Badalona, Spain. Dr Serra is also a Researcher at the Spanish Center of Research CIBERehd and a Member of the Steering Committee of the European Society of Neurogastroenterology and Motility. His main area of research is functional gut disorders, with a special focus on the role of sensory/motor disorders and intestinal gas in the development of abdominal symptoms.

Dr Carlene Starck
Riddet Institute, New Zealand

Dr Carlene Starck is a Postdoctoral Research Fellow at the Riddet Institute, Massey University, Palmerston North, New Zealand. Her research interests include the unique health benefits of specific foods, particularly fruits and vegetables, as well as the role of diet and metabolism in health and disease prevention. Her current research focuses on digestion and the uptake of nutrients from the diet, and the impact of these processes on energy metabolism as a whole.
Dr Abby Thompson is the Director of Riddet Innovation, part of the Massey University Institute of Food Science and Technology (MIFST). Her research experience ranges from food science to clinical nutrition, and she has an awareness of farming practices, marketing, consumer science and public health. This provides her with a valuable perspective on the AgriFood value chain. Part of her current role is the day-to-day oversight of large collaborative research programmes led by the Riddet Institute involving key strategic partners, including Zespri®. She is also responsible for leading the food innovation, commercialisation and business development activities within MIFST.

Professor Margreet Vissers is a Research Professor and is Associate Dean for Research at the University of Otago, Christchurch. Margreet has had a long career in medical science, specialising in the study of vitamin C, immune cell function, and oxidative stress. She is internationally respected for her research in all these areas. She has carried out fundamental studies that have led to a deeper understanding of new functions of vitamin C, including its role in the support of the immune system and in the prevention and treatment of cancer. Her work in this area has attracted much scientific and media interest.
Renée Wilson
University of Otago, New Zealand

Renée Wilson completed her undergraduate training in food science and human nutrition followed by a Master’s Degree through Fonterra’s Graduate Technical Programme. She then worked in Palmerston North doing research for Fonterra’s Cheese Foods Team before heading overseas to develop weight management programmes for a dietetics department in England. She is now a registered Dietitian working part-time at the Diabetes Centre in Christchurch. She is also working towards a Ph.D. in metabolic health and the gut microbiota. Renée enjoys research and working with people to adopt healthier lifestyles and better manage their diabetes.