

Research Showcase:  
Developing personal diets tailored to  
our genes

## Using Nutrigenomics to keep us healthy and relieve disease

Current dietary guidelines provide a 'one-size fits all' approach that ignores the genetic differences between individuals.

However, we now know that your genetic make-up is partly responsible for the way in which your body will use and respond to nutrients.

Nutrigenomics New Zealand is an organisation comprising Auckland University and three Crown Research Institutes - Crop & Food Research, Ag Research Ltd, and HortResearch. Together, these experts are taking a multi-disciplinary approach in an area of cutting-edge science.

The organisation has been recognised as a world leader with its comprehensive approach to research and its strong links to other programmes.

One of the aims of the New Zealand programme is to develop recommendations about particular food extracts or foods that could:

- Help people who are currently living with a disease
- Assist people who are in remission from a disease
- Offer choices to people who are genetically predisposed to a disease

Nutrigenomics is not genetic engineering; the work focuses on existing whole foods and food extracts. The knowledge gained will be used to develop individualised foods that contain the nutrients we need to keep us healthy - depending on our genetic make-up. These foods could take the form of specifically designed food items or a whole range of 'off the shelf' products.

Nutrigenomics New Zealand has initially chosen to research the genetic differences between people with inflammatory bowel disease (IBD) and the effects of different foods on them, with a particular emphasis on Crohn's disease.

Scientists are already identifying food extracts that might help people who have genes that predispose them to the condition.

Forty common New Zealand foods, including fruit, vegetables, cereals, herbs and teas, have been tested in the search for foods that minimise inflammation caused by Crohn's.

To carry out the test, researchers induce an inflammatory response in healthy cells and then introduce one or more extracts from each food to see if it will 'block' the inflammation.

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While some food extracts are particularly beneficial, the effectiveness depends on which biochemical pathway is involved in the inflammation – and that can vary from person to person.

The long-term goal is to find foods that will benefit people with Crohn's disease as well as identify foods they should avoid. Scientists also hope to isolate foods that can prevent or slow the onset of the disease.

Later studies will focus on other diseases and could help prevent and alleviate a whole range of conditions including diabetes, obesity, cardiovascular disease and cancer. The approach may also be applied to optimising health, affecting mood, reducing depression, etc...



Nutrigenomics: Using information about human genes and their interactions with the food we eat to help optimise physical and mental performance and manage health. "In the future new foods will be developed to meet our unique needs as dictated by our genetics."



# Selecting foods for our personal needs is an important consumer trend.

## Research areas

Using nutrition interventions for prevention and treatment of diet-related diseases, including:

- Discover whether a food component will act as an anti-inflammatory
- Test whether food components can aid recovery from a specific disease
- Diagnostic testing for genetic patterns of SNPs (genetic alterations)
- Research in development of foods and / or food components suitable for particular genetic individuals / populations
- Diagnostic monitoring of biomarkers that will track genetic response to diet
- Develop a better understanding of some of the underlying causes of Crohn's disease, and in time of other diseases also

## Potential applications

- Medical foods and dietary advice for medical conditions
- Personalised functional foods
- Customised foods that optimise health and minimise disease risks
- Wellness and performance foods that enhance normal physiological processes
- Reduced risk of food allergies and intolerances
- Foods that enhance sports performance

## Nutrigenomics New Zealand

Nutrigenomics New Zealand is based in offices and laboratories around New Zealand, with the programme leader, programme administrator and associated science staff based at the University of Auckland Faculty of Medical and Health Sciences.

Launched in June 2004 and funded by the government's Foundation for Research, Science and Technology, it combines expertise primarily in medical science, food development and bioinformatics.

### The collaborating partners are:

- The University of Auckland - providing medical science and research support systems
- Crop & Food Research - providing grain and vegetable expertise, as well as data management
- AgResearch Ltd - providing dairy and livestock expertise, and bioinformatics
- HortResearch - providing fruit expertise



The 60 members, mainly scientists, have focused on gut health in the first round of work, using inflammatory bowel disease as a model, with particular emphasis on Crohn's disease. The aim is to develop a diet to alleviate the symptoms of Crohn's disease, based on an understanding of the genes of the study's participants.

Nutrigenomics New Zealand is now looking at possible research to find ways to help people with other diseases. It also has an interest in foods that 'promote health' rather than alleviating a disease, such as foods which could improve mood, memory, cognitive functions and vision.

[www.nutrigenomics.org.nz](http://www.nutrigenomics.org.nz) | [www.agresearch.co.nz](http://www.agresearch.co.nz)

[www.crop.cri.nz](http://www.crop.cri.nz) | [www.hortresearch.co.nz](http://www.hortresearch.co.nz)

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