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OUR RESEARCH PROJECT SUCCESSES

Dr Bob Anderson
Comprehensive gluten T-cell epitope mapping in coeliac disease

Grant from Coeliac UK: £96,000 (multiple funders)
2005 – 2007

Gluten is one of millions of proteins that the immune system recognises and decides whether to treat as a friend or foe. In coeliac disease, the immune system recognises gluten as a threat and this stimulates a reaction that tries to get rid of gluten, but instead causes damage to the lining of the gut. Once coeliac disease is established the immune system will remember gluten as a threat.

But the cells of the immune system that remember gluten as a threat detect only very specific sections of gluten proteins. In 2005, Coeliac UK provided research funding to Dr Anderson to identify these toxic parts of gluten.

With the help of over 200 volunteers with coeliac disease, this work established a major breakthrough and was successful in identifying three small fragments of gluten that cause most of the problems in people with coeliac disease.

This research has underpinned ongoing work that could potentially develop a vaccine to restore the immune system's tolerance to gluten.

Find out more online:
www.coeliac.org.uk/gluten-t-cell-epitope-mapping/
www.coeliac.org.uk/utilising-peptides/

"Coeliac UK supported research that allowed the most important gluten peptides to be identified and a mixture selected that formed the basis for further research"

Dr Bob Anderson

Professor David van Heel
The genetic basis of coeliac disease

Grant from Coeliac UK: £300k & £143k (multiple funders)
2005 – 2007 & 2010 – 2013

Coeliac disease has a strong genetic tendency and runs in families, with close family members of someone with coeliac disease having a 10% chance of developing the disease themselves against a general population risk of 1%. However the reason for this was not fully understood.

This was the first research project, part funded by Coeliac UK, to study all 30,000 human genes in DNA samples from approximately 5,000 people. The research was able to identify the genes associated with coeliac disease and genes that are associated with both coeliac disease and other autoimmune conditions – the HLA-DQ genotype.

In addition, the research identified 13 further regions containing inherited genetic variants, most of which appeared to influence the immune system. But despite these advances, around 60% of the known heritability of coeliac disease remained unexplained. Part of this may be due to rare genetic 'mutations'.

Consequently, Professor van Heel began a new project in 2010 again supported by Coeliac UK in the hopes of gaining a greater understanding of these variations and which ones may truly be associated with coeliac disease. Understanding the genetics involved in coeliac disease is important for developing new tests for the diagnosis of the condition and potential new treatments.

Over 30% of the population have the genes that predispose them to developing coeliac disease but only around 1% goes on to develop the condition – if we could understand this better maybe we could prevent people from developing coeliac disease.

Find out more online:
www.coeliac.org.uk/germline-genetic-variants/
www.coeliac.org.uk/rare-large-effect-size-genetic-variants/
www.coeliac.org.uk/geneticsandcoeliacdisease/

"Continued research is vital - we don't yet understand why people develop coeliac disease in the first place, and want to improve on the only current treatment a lifelong gluten free diet."

Professor David van Heel

Dr Elizabeth Soilleux
Development of an alternative test for coeliac disease: a pilot study

Grant from Coeliac UK: £26.5k
2014 – 2017

Diagnosis of coeliac disease may be challenging, either because insufficient gluten has been eaten for current tests to be positive, or even when there is sufficient gluten in the diet there may be a proportion of cases which are not detectable by current means.

This project aims to develop a test for coeliac disease that detects the immune cells (lymphocytes) sensitive to gluten, based on current highly successful techniques for lymphocyte detection used in lymphoma diagnosis.

The analysis is complex but the results look very promising, with significant differences between the immune cells in biopsies from people with coeliac disease and people who do not have the condition.

It is envisaged that this new test will be able to determine whether an individual has coeliac disease regardless of whether or not they have had recent gluten exposure. The test may also help clarify the "grey zone" into which some individuals fall when they have some features of coeliac disease, but not enough for a definitive diagnosis.

This is a pilot study and has successfully managed to secure further significant funding to do more research. Sometime in the future, it may be possible to undertake the test on a blood sample, reducing the need for endoscopy.

Find out more online:
www.coeliac.org.uk/develop-new-test-diagnosis/

"We are most grateful to Coeliac UK for funding this project and making these achievements possible."

Dr Elizabeth Soilleux

Professor Marios Hadjivassiliou
Cognitive dysfunction in coeliac disease

Grant from Coeliac UK: £22.3k
2015 – 2017

People with coeliac disease have an abnormal reaction to gluten which classically causes gastrointestinal symptoms such as diarrhoea, abdominal discomfort and bloating. However, symptoms can also involve organs other than the gut.

This project aimed to investigate cognitive functioning, such as memory and concentration, in a group of patients with newly diagnosed coeliac disease and a group of patients who have had coeliac disease for at least five years.

The project was able to establish that patients with newly diagnosed coeliac disease have some limited cognitive difficulties when compared to healthy controls. Such difficulties can become more pronounced and are more extensive when patients have had the diagnosis of coeliac disease for over 5 years and do not adhere to a strict gluten free diet. Those who had the diagnosis made for over 5 years but adhere strictly to the gluten free diet seem to do much better than those who do not.

Further work is required to follow newly diagnosed patients over a longer period of time, and to cognitively evaluate people who are diagnosed with coeliac disease having been referred first to a neurologist as opposed to a gastroenterologist. These patients were deliberately excluded from this study.

Find out more online:
www.coeliac.org.uk/cognitive-dysfunction/

"This work would not have been possible without the funding from Coeliac UK"

Professor Marios Hadjivassiliou

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