



Application number/Title: 43043 - The Neuropsychological Consequences of Coeliac Disease

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Keywords provided by the Applicant PI to describe the research project:
coeliac disease, brain, cognition, imaging, neurology

Application Lay Summary:

Coeliac disease is an illness where people become unwell after eating gluten. While coeliac disease is often thought of as a gut condition, it is known to affect the brain in a number of ways. People with coeliac disease often have a range of brain-based symptoms (headaches and "foggy brain" etc.), and research has also shown types of brain damage and cognitive problems to be present in patients. While this existing research is valuable there are also a number of ways which it could be improved and expanded upon. There are very few studies looking at this topic, and what studies there are often have small sample sizes which affects how confident we can be in their findings. The brain imaging studies have also been restricted to using "standard" types of MR scanning, when "advanced" sorts of imaging would help us better understand the full range and form that the brain damage takes. Also, no study has yet linked any brain damage to cognitive problems in coeliac disease; this is a particularly interesting thing to do as it gives us an idea of which types of brain damage are causing the cognitive deficits. Finally, some recent research has suggested that people with coeliac disease might have a higher risk of developing a kind of dementia driven by the brain's blood vessels deteriorating, although exactly why coeliac causes this to happen is not clear.

This study will use data from the UK Biobank to be the first to use various advanced MRI techniques in combination with cognitive testing to study the ways that coeliac disease damages the brain. It will compare "standard" / "advanced" brain imaging and cognitive scores between people with coeliac disease against matched controls. It will also associate imaging with cognition to more directly see how brain changes lead to cognitive problems, and see if people with coeliac disease show signs of damaged blood vessels. This study has the potential to

show many new findings and also raise awareness of the neurological problems seen in coeliac disease.