Understanding variation in the effects of myotonic dystrophy type 1 on the brain

Dr Hamilton and his team will investigate how the genetic changes that occur in myotonic dystrophy type 1 affect the severity of the brain-related symptoms associated with the condition such as impairment of thinking and excessive sleepiness. A better understanding of how genetic factors relate to the effects of myotonic dystrophy type 1 on the brain will help to identify new strategies for the treatment of these extremely debilitating symptoms. In addition, improved understanding of the variation in symptoms between individuals will be valuable in designing future clinical trials.

What are the researchers aiming to do?

Myotonic dystrophy type 1 is an extremely variable inherited condition causing muscle weakness. It may also affect other organs such as the heart, eyes and the brain. The effects on the brain can result in slowed thinking and extreme sleepiness. These symptoms can have profound impacts on the quality of life of people affected and their families.

The condition is caused by an increase in the number of DNA repeats in the DMPK gene. A larger number of repeats is associated with more severe symptoms and an earlier age of onset. The number of repeats frequently increases from one generation to the next causing more severe symptoms and earlier age of onset in succeeding generations. The number of repeats is also seen to increase throughout the life of the person affected. Blood tests that are currently used to diagnose the condition only measure the approximate number of repeats and take no account of the changes during the person’s life.

In this study, Dr Hamilton and his team will use a more accurate method of measuring the genetic changes that occur throughout the life of a person affected by myotonic dystrophy type 1. The researchers will determine how the genetic changes relate to the severity of the brain-related symptoms using brain scans, sleep studies and tests of memory and thinking. They will then look at how changes in specific structures of the brain relate to impairment of different aspects of thinking and sleep.
How will the outcomes of the research benefit patients?

The results of this study may allow the patients and their families to be offered more specific information about how the condition is likely to affect them in the future based on their genetic results. Understanding how genetic changes and changes in brain structure relate to the symptoms of the condition will also help identify mechanisms that can be targeted by drugs in the future. In addition, this work will further improve readiness for clinical trials in myotonic dystrophy by providing new insights into why symptoms vary so considerably between individuals and by revealing better clinical tests to determine if new therapies are effective in treating the brain symptoms.

Grant information

Project leader: Dr Mark James Hamilton  
Location: University of Glasgow  
Conditions: myotonic dystrophy type 1  
Duration: three years, starting 2015  
Total project cost: £171,795  
Official title: Structural CNS changes, neuropsychological impairment and sleep disorders in type 1 myotonic dystrophy – a genotype-phenotype study

For further information

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