New test for Obsessive Compulsive Disorder (OCD) could be on the way

January 5 2011

Researchers from the University of Sydney's Centenary Institute have identified gene mutations that impair kidney function leading to a rare kidney disorder known as dicarboxylic aminoaciduria (DA).

The same gene, which is also crucial for normal brain function, has been connected with obsessive compulsive-disorder (OCD). The findings published today in the Journal of Clinical Investigation could lead to earlier diagnosis of children who may be at risk of early onset OCD through a simple, non-invasive urine test conducted routinely on newborns.

Lead researchers, Professor John Rasko and Dr. Charles Bailey from the Centenary Institute, identified mutations in the gene SLC1A1. This gene encodes a protein pump which scavenges important amino acids from our food in the kidney. But the identical pump in the brain also governs the movement of the same amino acids which act as neurotransmitters.

Analysis of mutant pumps found in affected families in this study showed they were severely or completely impaired in their ability to transport these important amino acids in the kidney.

Centenary Institute Head of Gene and Stem Cell Therapy Professor John Rasko said: "These findings prove for the first time that SLC1A1 is the affected gene in dicarboxylic aminoaciduria and demonstrate the crucial role that SLC1A1 plays in the kidney's ability to process the essential amino acids glutamate and aspartate. Dicarboxylic aminoaciduria is a

rare kidney disorder but this discovery may provide us with a clue to understanding OCD that affects approximately 3% of Australians. Due to the crucial role of SLC1A1 in normal brain function, the findings also have major implications for a likely genetic cause of some brain disorders like obsessive-compulsive disorder."

"During the past few decades studies have revealed that OCD has a strong genetic component. Various genetic studies have linked OCD to SLC1A1 and other studies have also implicated abnormal brain glutamate activity in OCD. However, there has been no physical proof of how SLC1A1 is likely to cause OCD. Our research is a major first step towards bridging this gap as we have discovered those genetic defects that could impair the normal functioning of the neurotransmitter glutamate in the brain," said Professor Rasko.

The researchers believe the benefits of this study may not only help people with DA but also provide a simple way to identify those who may be at risk of early onset OCD, which can begin in children as young as 5 or 6 years of age. In particular, previous studies have linked this gene to mostly males with OCD.

Professor Rasko added: "People with DA can be identified through a simple urine test that detects high levels of glutamate and aspartate. This simple, non-invasive test is used regularly for screening newborns for other serious genetic disorders. If this idea is confirmed in clinical trials, a simple urine test might be used to screen young children with a family history of OCD to identify anyone who may be at risk of early onset OCD."

These findings will have a significant impact in improving the lives of people who suffer from early onset OCD, according to leading OCD expert Dr. Mairwen Jones from the University of Sydney.

Dr. Jones said: "Early onset OCD is a debilitating condition that affects about 3% of Australians. It is the most intractable and disabling of the anxiety disorders. OCD imposes a marked reduction in quality of life, an increased suicide rate and negative economic consequences to individuals and the community. It can begin as early as five years of age and it can be difficult to diagnose. Children with early onset OCD often live with the disorder undiagnosed and untreated for a number of years and often even into adulthood. The earlier we can diagnose OCD the sooner we can start treatment to manage the obsessive and compulsive behaviours. These findings are very exciting news as it will give us an easy way to identify children from families with OCD history who may have a personal risk of developing the disorder."

This research completes the molecular profiling of all five principal inherited kidney disorders, which includes cystinuria, lysinuric protein intolerance, Hartnup disorder, iminoglycinuria and now dicarboxylic aminoaciduria. This team led by Professor Rasko from the Centenary Institute comprises an international consortium of researchers from the University of Sydney, Australian National University, Université de Sherbrooke in Canada and Royal Prince Alfred Hospital. In recent years they have discovered the genetic causes of the majority of these inherited human kidney disorders.

Provided by University of Sydney