Brain pattern associated with genetic risk of obsessive compulsive disorder

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Cambridge researchers have discovered that individuals with obsessive compulsive disorder (OCD) and their close family members have distinctive patterns in their brain structure. This is the first time that scientists have associated an anatomical trait with familial risk for the disorder.

These new findings, reported today in the journal Brain, could help predict whether individuals are at risk of developing OCD and lead to more accurate diagnosis of the disorder.

Obsessive compulsive disorder is a prevalent illness that affects 2–3 % of the population. OCD patients suffer from obsessions (unwanted, recurrent thoughts, concerns with themes of contamination and 'germs', the need to check household items in case of fire or burglary, the symmetrical order of objects or fears of harming oneself or others) as well as compulsions (repetitive behaviours related to the obsessions such as washing and carrying out household safety checks). These symptoms can consume the patient's life, causing severe distress, alienation and anxiety.

OCD is known to run in families. However, the complex set of genes underlying this heritability and exactly how genes contribute to the illness are unknown. Such genes may pose a risk for OCD by influencing brain structure (e.g. the amount and location of grey matter in the brain) which in turn may impact upon an individual's ability to perform mental tasks.

In order to explore this idea, the researchers used cognitive and brain measures to determine whether there are biological markers of genetic risk for developing OCD. Using magnetic resonance imaging (MRI), the Cambridge researchers captured pictures of OCD patients' brains, as well as those of healthy close relatives (a sibling, parent or child) and a group of unrelated healthy people.

Participants also completed a computerised test that involved pressing a left or right button as quickly as possible when arrows appeared. When a beep noise sounded, volunteers had to attempt to stop their responses. This task objectively measured the ability to stop repetitive behaviours.

Both OCD patients and their close relatives fared worse on the computer task than the control group. This was associated with decreases of grey matter in brain regions important in suppressing responses and habits.

Lara Menzies, in the Brain Mapping Unit at the University of Cambridge, explains, "Impaired brain function in the areas of the brain associated with stopping motor responses may contribute to the compulsive and repetitive behaviours that are characteristic of OCD. These brain changes appear to run in families and may represent a genetic risk factor for developing the condition. The current diagnosis of OCD available to psychiatrists is subjective and therefore knowledge of the underlying causes may lead to better diagnosis and ultimately improved clinical treatments.

"However, we have a long way to go to identify the genes contributing to the distinctive brain structure found in OCD patients and their relatives. We also need to identify other contributing factors for OCD, to understand why close relatives that share similar brain structures don't always develop the disorder."

Source: University of Cambridge