

Changes in brain connectivity protect against developing bipolar disorder

January 5 2016



White matter fiber architecture of the brain. Credit: Human Connectome Project.

Naturally occurring changes in brain wiring can help patients at high genetic risk of developing bipolar disorder avert the onset of the illness, according to a new study led by researchers at the Icahn School of Medicine at Mount Sinai and published online today in the journal *Translational Psychiatry*. The study's findings open up new avenues for

researchers to explore ways the brain can prevent disease expression, also known as resilience, with the hope of developing better treatments.

Bipolar disorder, also known as manic-depressive illness, is a brain disorder that causes fluctuations in patients' mood, energy, activity levels and the ability to carry out day-to-day tasks. Bipolar disorder is highly heritable, meaning that people with a parent or sibling with [bipolar disorder](#) have a much greater risk of developing the illness, compared with individuals with no family history.

Researchers used [functional magnetic resonance](#) imaging (MRI) to map the connectivity patterns in the brains of three groups: patients with bipolar disorder, their siblings who did not develop the illness (resilient siblings), and unrelated healthy individuals. While having their brains scanned, each participant was asked to perform an emotional and a non-emotional task that taps into two different aspects of brain function known to be affected by bipolar disorder. The resilient siblings and the patients showed similar abnormalities in the connectivity of [brain networks](#) involved in emotional processing. However, the resilient siblings showed additional changes in brain wiring within these networks.

"The ability of the siblings to rewire their [brain](#) networks means they have adaptive neuroplasticity that may help them avoid the disease even though they still carry the genetic scar of bipolar disorder when they process emotional information," said Sophia Frangou, MD, PhD, Professor of Psychiatry at the Icahn School of Medicine at Mount Sinai and lead author of the study. Dr. Frangou's ongoing research uses neuroimaging to study how differences in [brain wiring](#) can either increase or decrease the likelihood of developing [mental health problems](#).

"A [family history](#) remains the greatest risk factor for developing bipolar

disorder and while we often focus on risk, we may forget that the majority of those who fall into this category remain well," said Dr. Frangou. "Looking for biological mechanisms that can protect against illness opens up a completely new direction for developing new treatments. Our research should give people hope that even though mental illness runs in families, it is possible to beat the odds at the genetic lottery."

Provided by The Mount Sinai Hospital

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