

**FOR IMMEDIATE RELEASE:**  
February 27, 2004

Contact:  
Cindy Lepore  
617-855-2110

## **McLean Researchers Suggest Cause of Bipolar Disorder**

Belmont, MA— Is bipolar disorder related to an energy deficiency in the brain? Can researchers find ways to stabilize this deficiency in order to help patients suffering from the disease? These questions and more are being addressed in a revolutionary new study from McLean Hospital published in the *Archives of General Psychiatry*.

The research paper “Molecular Evidence of Mitochondrial Dysfunction in Bipolar Disorder” reveals that the mitochondria, cell organelles in the brain important for energy conversion, might not function as effectively in the brains of patients with bipolar disorder as they do in the brains of controls or those with schizophrenia. The discovery of this dysfunction could have significant implications for the diagnosis and treatment of bipolar disorder, a debilitating psychiatric illness that involves recurrent episodes of depression and mania.

According to the study's lead investigator, Christine Konradi, PhD, mitochondria are the body's "power plants," helping to convert the energy we get from food (glucose) into a form our bodies can use. Much like the way an oil refinery processes crude oil, mitochondria take the raw materials from our nutrients and "refine" them so that our cells can use the energy. However, in patients with bipolar disorder, something in this energy conversion appears to go awry.

When Konradi and her colleagues compared gene levels in the brains of subjects with bipolar disorder to those with schizophrenia and to controls, they discovered that the genes that make the proteins involved in energy transfer were significantly "down-regulated" in the brains of subjects with bipolar disorder.

"The reduction of these genes indicates that either there are not enough of these 'power plants' in the cells or that these plants are not efficient," Konradi said. "Our study therefore suggests a causal relationship between bipolar disorder and decreased energy transfer. If this is the case, it could completely refocus our approach to the treatment of bipolar disorder."

Konradi's research concentrated primarily on the hippocampus, one of the brain areas indicated in bipolar disorder. Energy deficits were also evident in the brain's cortex.

“It appears that the mitochondria of people with bipolar disorder do not function as effectively as they do in the average person,” Konradi said.

While bipolar disorder affects nearly 2.3 million adult Americans, little is known about the disease’s etiology or function. Studies indicate a hereditary component, but no gene or gene expression has been linked conclusively to the illness. Because it indicates decreased levels of mitochondrial genes, the McLean study provides further evidence that the abnormal expression of the genes involved in energy metabolism is closely related to bipolar disorder.

“Our hope is that this research will attract the pharmaceutical industry to explore new approaches for treatment,” Konradi said. “While there are many diseases related to mitochondrial dysfunction, they are so rare that drug companies have little incentive to fund research. But bipolar disorder affects a huge population. If drug companies can support our efforts to stabilize energy conversion in patients with bipolar disorder, we could help millions of people.”

McLean Hospital maintains the largest research program of any private psychiatric hospital in the nation. It is a teaching facility of Harvard Medical School, an affiliate of Massachusetts General Hospital and a member of Partners HealthCare System, Inc.