Abnormalities in circadian rhythms linked to bipolar disorder in study

Confirming differences in the flow of a specific protein sheds light on the psychiatric disorder and may eventually lead to better treatment, scientists say.

By Stephen Feller

Scientists and doctors have had theories for decades that circadian rhythms play a role in altered chemical regulation in the brains of people with bipolar disorder, and a recent study suggests they may be right.

Scientists at McLean Hospital found in post-mortem examinations of bipolar patients' brains that chemicals dependent on the body's sleep cycle to function properly affect parts of the brain causing the psychological condition.

The scientists say there has been evidence circadian rhythms in people with bipolar disorder, as well as schizophrenia, were affecting their symptoms.

The scientists at McLean, which is affiliated with the Harvard Medical School, said somatostatin, a neurotransmitter significant to the regulation of anxiety and depression, also plays a role in both disorders.

"From studies on animals, we know we can treat the circadian rhythm of the suprachiasmatic nucleus non-pharmacologically by using light therapy," Dr. Harry Pantazopoulos, assistant neuroscientist at McLean Hospital's Translational Neuroscience Laboratory and an instructor at Harvard Medical School, said in a press release. "We could potentially correct the abnormalities in circadian rhythms in some areas -- such as the amygdala -- by resetting the circadian rhythm with bright light therapy. The goal is to not only understand the pathology of these disorders, but to develop new diagnostic methods and treatments down the line, possibly patient-specific bright light therapy."

For the study, published in the journal Biological Psychiatry, the scientists examined the brains of 15 people with bipolar disorder, 12 people with schizophrenia and 15 who were healthy.

Examinations of the people's amygdalas showed decreased somatostatin immunoreactive neurons in the schizophrenia and bipolar disorder patients. In the healthy brains, the amygdala showed a healthy circadian rhythm of somatostatin expression, while it appeared to be altered in the brains of bipolar disorder patients.

Abnormal cycles of the protein -- for people without psychiatric disorders it increases in the morning, but those with bipolar see a decrease when they wake up -- have been linked to the severity of depression and anxiety disorders, with the physical effects of this thrown-off rhythm visible in the new study.

"We're only scratching the surface of learning what the rhythmic expression of these proteins does biologically and how this goes awry in psychiatric disorders," Pantazopoulos said. "We have a long way to go, as this is just one brain region and one specific protein."