A Quick Look at Optogenetics
by David Woodmansee

In 2004, neuroscientist and psychiatrist Karl Deisseroth and his students at Stanford University wanted to examine how brain circuits affect behavior, so as to better understand the deviations that occur in patients with schizophrenia and depression. Using mice as subjects, they discovered that they could precisely control and study the activity of nerve circuits through the insertion and stimulation of a light-sensitive protein. Since then, this new technique, optogenetics, has assisted scientists in identifying how deep brain stimulation relieves symptoms of Parkinson’s disease, and it has also provided insight into causes and potential treatments for various psychiatric disorders.

[Optogenetics](http://en.wikipedia.org/wiki/Optogenetics) allows a precise level of brain stimulation and control that is unachievable through other methods. By controlling an individual brain circuit, researchers can prove that specific neurons govern a specific behavior. For example, In a later study led by Dr. Deisseroth, mice were relieved of their anxious behavior through the optogenetic control of a specific neural pathway in the amygdala. Although the use of optogenetics on human subjects is far in the future, Dr. Deisseroth sees present-day implications for this insight: “Just understanding for us, as a society, that someone who has anxiety has a known or knowable circuitry difference is incredibly valuable.”

About the author: David Woodmansee is a postdoctoral researcher at the Ludwig Maximilian University of Munich. In 2010, he completed his Ph.D. in Organic Chemistry at the University of Basel in Switzerland. Prior to pursuing his doctoral studies, David Woodmansee served as a Senior Research Associate at the Genomics Institute of the Novartis Foundation.