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[Researchers Flip Brain Cells On and Off With Light Pulses](#)



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Scientists have figured out a way to switch brain cells on and off like light bulbs, but instead of using a clapper, they're using microbial proteins and [lasers](#). Ed Boyden, a neuroscientist at the Massachusetts Institute of Technology, has developed a way to shut down parts of a brain just by shining light on them. When the light is turned off, the brain switches back on [[Forbes](#)].

The research team says their technology will help neuroscientists probe the brain's circuitry by silencing certain regions and studying the effects. The technique, which was [described](#) in the journal *Nature*, could one day be used to shut down overactive regions of the brain often found in people with epilepsy, depression, Parkinson's disease, and blindness.

A bit of fancy [genetic tinkering](#) is required to prime the brain to respond to [light](#). Neurons fire when electrically charged atoms – ions – flood in and out of them, creating a tiny electric potential across their membranes [[New Scientist](#)]. Using this knowledge, the MIT researchers built upon [Boyden's 2005 discovery](#) that demonstrated that certain microbial proteins can create a stimulating effect when genetically engineered into [neurons](#) and blasted with light. Boyden has now found a similar pair of bacterial and fungi proteins that also respond to light, but respond by shutting off their neuron hosts.

What's more, one of the proteins responds to yellow light, while the other reacts to blue. A far-off hope, especially of those who study artificial intelligence, is that using a combination of [the two new proteins] to turn off certain types of neurons along with using Boyden's earlier method of activating neurons, the brain could be manipulated in complex ways. Researchers could then learn much about how the brain processes information, better copy it and, maybe, better control it [[Forbes](#)].

Obviously, using optogenetics to treat humans is years, and maybe decades, away from reality. However, even if the technology never makes its way into medical treatments for human brains, it will certainly prove useful as a research tool for basic scientific research on brain circuitry.

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January 7th, 2010 6:58 PM Tags: [Genetic Engineering](#), [lasers](#), [light](#), [neurons](#), [optogenetics](#)
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2 Responses to “Researchers Flip Brain Cells On and Off With Light Pulses”

1. 1. *Nihil* Says:

[January 8th, 2010 at 10:10 am](#)

This could be used for some kind of mind control too? You implant some light in brain and when you don't like the guy who had the bulb in his head you just turn on the light and he just switches off. This could be used in military and big brother control scenario. You imprint everybody with lights at birth an when some perfon commits a crime, you just flip his switch and he is fully immobilised (or just one of his brain functions, eg. sight), wherever he is.

2. 2. *french fries* Says:

[January 8th, 2010 at 2:47 pm](#)

Think of the hours of peace you can give to an OCD sufferer, the health benefits to those who are enslaved by compulsive behavior, the anxiety abated by hindsight. Pandoras box can have somme goodies fly out of it.

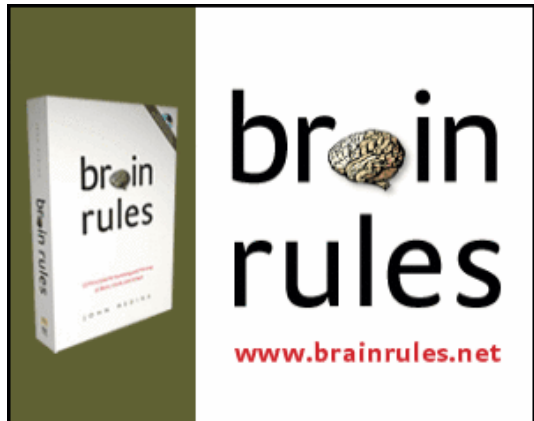
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80beats is written by Andrew Moseman and Brett Israel, and edited by Eliza Strickland. This team darts through each day's science news faster than the ruby-throated hummingbird that beats its wings 80 times per second. Send ideas, tips, suggestions, and complaints to [[estrickland at discovermagazine dot com](mailto:estrickland@discovermagazine.com)].

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