

Editor's Summary

7 January 2010

Light switch for neural circuits

The experimental use of microbial opsins — light-sensitive ion channels — has ushered in a revolution in neuroscience, as they make it possible to modulate the activity of genetically targeted neurons in response to exogenous light. Now, Ed Boyden and colleagues have screened archaeobacteria, bacteria, plants and fungi for opsins with novel properties and have found a fundamentally new mechanism for neural control: light-driven proton pumping. Although protons are not used natively as charge carriers by neural systems, light-driven proton pumping by archaeorhodopsin-3 from *Halorubrum sodomense* mediates powerful neural silencing in response to light. And a proton pump from the fungus *Leptosphaeria maculans* enables neural silencing by blue light. The use of these reagents will facilitate the shutdown of neural circuits with light as a tool for studying the role of neural circuits in behaviour and pathology.

LETTER

High-performance genetically targetable optical neural silencing by light-driven proton pumps

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