

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 archaerhodopsin-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

Brian Y. Chow, Xue Han, Allison S. Dobry, Xiaofeng Qian, Amy S. Chuong, Mingjie Li, Michael A. Henninger, Gabriel M. Belfort, Yingxi Lin, Patrick E. Monahan & Edward S. Boyden

doi:10.1038/nature08652

[First paragraph](#) | [Full Text](#) | [PDF \(420K\)](#) | [Supplementary information](#)

Nature ISSN 0028-0836 EISSN 1476-4687

[About NPG](#)

[Contact NPG](#)

[RSS web feeds](#)

[Help](#)

[Privacy policy](#)

[Legal notice](#)

[Accessibility statement](#)

[Nature News](#)

[Naturejobs](#)

[Nature Asia](#)

[Nature Education](#)

Search:

go

© 2010 Nature Publishing Group, a division of Macmillan Publishers Limited. All Rights Reserved.
partner of AGORA, HINARI, OARE, INASP, CrossRef and COUNTER