

FLIPPING A SWITCH ON NEURONAL ACTIVITY

Researchers in California and Germany Demonstrate Light-Activated Receptors on Nerve Cells

EMBARGOED FOR RELEASE until 8:30 a.m. on Monday, March 7, 2011.

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WASHINGTON, D.C. (March 7, 2011) -- All our daily activities, from driving to work to solving a crossword puzzle, depend on signals carried along the body's vast network of neurons. Propagation of these signals is, in turn, dependent on myriad small molecules within nerve cells -- receptors, ion channels, and transmitters -- turning on and off in complex cascades. Until recently, the study of these molecules in real time has not been possible, but researchers at the University of California at Berkeley and the University of Munich have attached light-sensing modules to neuronal molecules, resulting in molecules that can be turned on and off with simple flashes of light.

"We get millisecond accuracy," says Joshua Levitz, a graduate student at Berkeley and first author of the study. According to Levitz, the "biggest advantage is that we can probe specific receptors in living organisms." Previous methods using pharmacological agents were much less specific, affecting every receptor in every cell. Now, investigators can select individual cells for activation by focusing light. And by attaching light-sensing modules to one class of molecules at a time, they can parse the contributions of individual classes to neuronal behavior.

Levitz will be presenting a system in which G-protein-coupled receptors, molecules that play key roles in transmitting signals within cells, can be selectively activated. He is planning to use the system to study the hippocampus, a region of the brain where memories are formed, stored and maintained. There may be clinical utility to the system as well, he points out. G-protein-coupled receptors are also critical for vision in the retina, and light-sensing versions could potentially be introduced into people with damaged retinas in order to restore sight.

The presentation, "Design and Application of a Light-Activated Metabotropic Glutamate Receptor for Optical Control of Intracellular Signaling Pathways" will be presented at 8:30 a.m. on March 7, 2011 in Room 309 of the Baltimore Convention Center. ABSTRACT: http://tinyurl.com/4lf9dse

The research was funded by the Nanomedicine Development Center at the National Institutes of Health.

MORE MEETING INFORMATION

Each year, the Biophysical Society Annual Meeting brings together more than 6,000 scientists and hosts more than 4,000 poster presentations, 200 exhibits, and more than 20 symposia. The largest meeting of its type in the world, the Biophysical Society Annual Meeting retains its small-meeting flavor through its subgroup meetings, platform sessions, social activities, and committee programs.

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http://www.biophysics.org/2011meeting

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http://www.biophysics.org/GeneralInfo/Overview/tabid/2062/Default.aspx

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The Biophysical Society invites credentialed journalists, freelance reporters working on assignment, and public information officers to attend its Annual Meeting for free. For more information on registering as a member of the press, please contact Ellen Weiss at eweiss@biophysics.org or 240-290-5606. Also see:

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ABOUT THE BIOPHYSICAL SOCIETY

The Biophysical Society, founded in 1956, is a professional, scientific society established to encourage development and dissemination of knowledge in biophysics. The society promotes growth in this expanding field through its annual meeting, monthly journal, and committee and outreach activities. Its over 9,000 members are located throughout the U.S. and the world, where they teach and conduct research in colleges, universities, laboratories, government agencies, and industry. For more information on the society or the 2011 Annual Meeting, visit www.biophysics.org

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