

Docket #: S06-068

Inductive Light Generator (ILG)

This invention is a practical extension of Stanford docket S05-170 ([photosensitive proteins Channelrhodopsins](#)) and describes an implantable, light-generating device for the optical stimulation of neural cells. Essentially an optical electrode, this is intended to be a next-generation method providing deep brain stimulation (DBS). Importantly, this neural interface is designed to permit neuron-type-specific modulation. For example, motor fibers might be recruited while leaving immediately adjacent pain fibers undisturbed or excitatory neurons might be harnessed without affecting inhibitory neurons in a region. Targeted, temporally-precise control of neuronal subtypes may enable neuromodulation with fewer side effects and more robust therapeutic efficacy.

Applications

- Neurostimulation of photosensitive cells

Advantages

- Once implanted, selective activation of the photo-sensitive cells can be achieved non-invasively.

Publications

- US Patent Application: [11/651,422](#)
- Sohal VS, Zhang F, Yizhar O, Deisseroth K. [Parvalbumin neurons and gamma rhythms enhance cortical circuit performance](#). Nature. 2009 Jun 4;459(7247):698-702. Epub 2009 Apr 26.
- Cardin JA, Carlén M, Meletis K, Knoblich U, Zhang F, Deisseroth K, Tsai LH, Moore CI. [Driving fast-spiking cells induces gamma rhythm and controls](#)

- [sensory responses](#). Nature. 2009 Jun 4;459(7247):663-7. Epub 2009 Apr 26.
- Tsai HC, Zhang F, Adamantidis A, Stuber GD, Bonci A, de Lecea L, Deisseroth K. [Phasic Firing in Dopaminergic Neurons Is Sufficient for Behavioral Conditioning](#). Science. 2009 May 22;324(5930):1080-4. Epub 2009 Apr 23.
 - Gradinaru V, Mogri M, Thompson KR, Henderson JM, Deisseroth K. [Optical Deconstruction of Parkinsonian Neural Circuitry](#). Science. 2009 Apr 17;324(5925):354-9. Epub 2009 Mar 19.
 - Airan RD, Thompson KR, Fenno LE, Bernstein H, Deisseroth K. [Temporally precise in vivo control of intracellular signalling.](#) Nature. 2009 Apr 23;458(7241):1025-9. Epub 2009 Mar 18.

Patents

- Published Application: [20080085265](#)
- Published Application: [WO2008089003](#)
- Published Application: [20100190229](#)
- Published Application: [20150217128](#)
- Published Application: [20180326221](#)
- Published Application: [20190321651](#)
- Issued: [8,926,959 \(USA\)](#)
- Issued: [10,052,497 \(USA\)](#)
- Issued: [10,569,099 \(USA\)](#)

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