Docket #: S10-341

Opsin With Increased Potency and Speed

Researchers in Prof. Karl Deisseroth's laboratory have engineered a novel channelrhodopsin with enhanced expression, faster speed, and improved targeting. This protein was generated from mutations in VChR1 (see Stanford Docket S08-105) and can be used for temporally precise, non-invasive control of neural circuitry. Specifically, the novel opsin is a ~10x improvement in VChR1, with mutations to improve expression and speed as well as a trafficking sequence to enhance expression and targeting. This technology shows all the required properties for use as the most potent optogenetic tools know, as well as for combinatorial control with other opsins and strong redshifted action suitable for in vivo application.

Related Optogenetics Inventions
The Deisseroth Laboratory has developed a wide variety of optogenetics tools, including opsin genes, medical devices, animal models, and screens. Additional information on these technologies can be found by clicking on the “more technologies from Karl Deisseroth” link below.

Applications

- **Screening** - high-throughput cell-based screening for drugs that affect signal transduction
- **Therapeutic:**
  - neuromodulatory therapeutics for the treatment of neurological disorders
  - drug dosing management in the context of diabetes and pain control
- **Research** - basic studies for understanding neural circuitry, including interactions between two populations

Advantages

- **High expression levels**
- **Improved speed** (compared to VChR1)
- **Enhanced targeting** with a trafficking sequence

Patents

- Published Application: 20130224821
- Published Application: 20160002302
- Published Application: 20160237126
- Published Application: 20180051058
- Published Application: 20190241627
- Issued: 9,175,095 (USA)
- Issued: 9,850,290 (USA)
- Issued: 10,196,431 (USA)

Innovators

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