Docket #: S22-449

Enhanced light gated potassium selective Channelrhodopsin

Researchers at Stanford have discovered long sought after light gated potassium selective channelrhodopsins., HcKCR1 and HcKCR2. Optogenetics is a technique where genes for light-sensitive proteins are introduced into target brain cells in order to monitor and control their activity precisely using light signals. To use them as optogenetic tools and achieve complete silencing of neurons, the researchers further solved the Cryo-EM structures and made H225F mutants, both of which show a higher K+ selectivity than the corresponding wild type.

Stage of Development
In vivo

Applications

- Silencing neurons
- Potassium selectivity in cardiac cells, kidney cells, the gastrointestinal system
- Marker for cellular functions
- Ocular diseases

Advantages

- Novel discovery of potassium selective, light gated channelrhodopsins
- Increased ability of H225F mutants to silence neurons

Publications

- Tajima, S., Kim, Y. S., et al. (2022). Structural basis for ion selectivity in potassium-selective channelrhodopsins. bioRxiv, 2022-10

Patents

- Published Application: WO2024092248
- Published Application: 20260337252

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