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Broad-band opsin for effective stimulation of cells by white light SUBRATA BATABYAL, GREGORY CERVENKA, YOUNG-TAE KIM, SAMARENDRA MOHANTY, University of Texas System — Currently, use of optogenetic sensitization of retinal cells combined with activation/inhibition has potential as alternative to retinal implants that would have required electrodes inside every single neuron for high visual resolution. However, clinical translation of optogenetic activation for restoration of vision suffers from the drawback that narrow spectral sensitivity of opsin requires active stimulation by blue laser or LED having intensity much higher than ambient light. In order to allow ambient-light based stimulation paradigm, here we report development of broad-band opsin that has broad spectral excitability in the entire visible spectrum. The cells sensitized with the broad-band opsin showed order of magnitude higher excitability with white light as compared to that using only the narrow-band light components. The use of broad-band opsin construct will allow higher sensitivity of the opsin-sensitized neurons in degenerated retina to ambient white light, and therefore, significantly lower activation-threshold in contrast to conventional approach of intense, narrow-band light based active-stimulation.

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