Featured Product

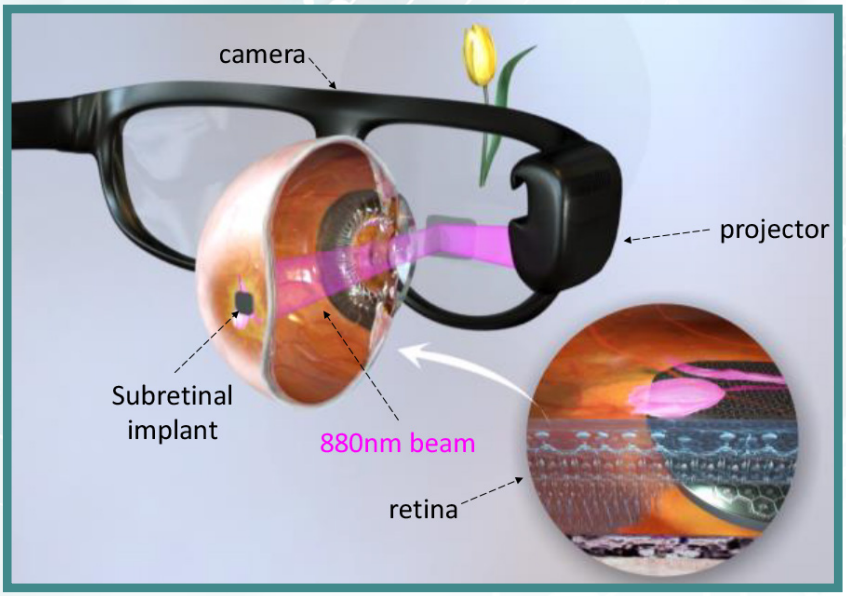
VRP Vision Research Program

Photovoltaic Subretinal Prosthesis

Functional Restoration of Vision by Electrical Stimulation

Principal Investigator: Daniel Palanker, Ph.D., Stanford University

- Head injuries, exposure to short-pulse lasers, and retinal degeneration can all result in retinal injury and/or loss of sight due to damage of the retinal pigment epithelium and loss of photoreceptors
- The Photovoltaic Subretinal Prosthesis provides photovoltaic replacement of photoreceptors using a wireless photovoltaic subretinal implant that acts as a substitute for the lost photoreceptors[1]
- Images captured by a video camera are processed and projected by the augmented-reality glasses onto the implanted subretinal photodiode array using pulsed near-IR (~880nm) light; photovoltaic pixels in the array convert this light into biphasic pulses of electric current, which stimulate the secondary retinal neurons in the inner nuclear layer
- The feasibility of the Photovoltaic Subretinal Prosthesis has been recently demonstrated in a first-in-human clinical trial[2]

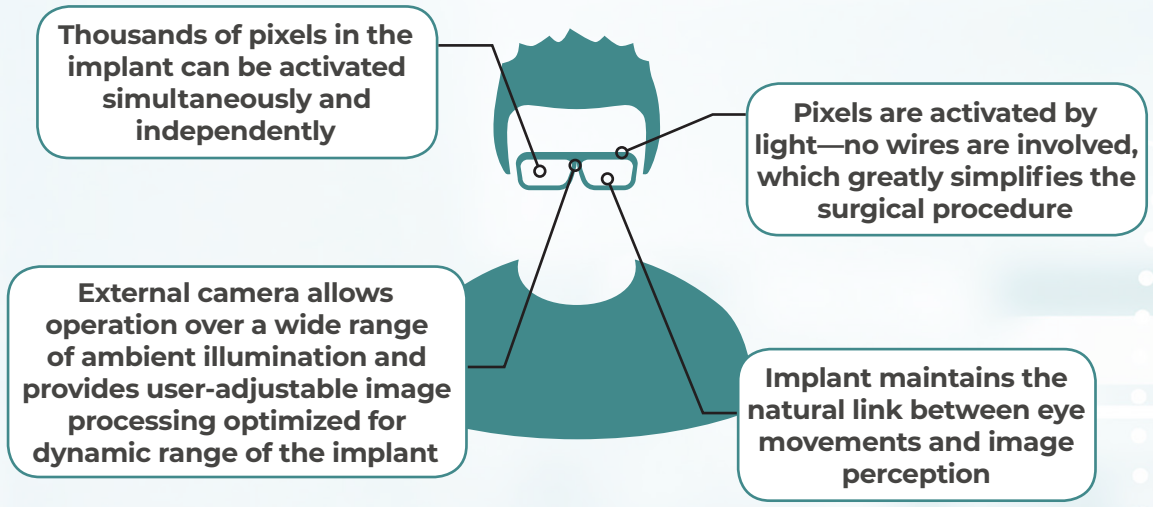


[1] https://www.nature.com/articles/nphoton.2012.104
[2] https://www.sciencedirect.com/science/article/pii/S0161642020301895

"After 15 years of development, it is very exciting to see confirmation of our assumptions in a clinical trial. It is very rewarding to observe that that prosthetic vision is close to the sampling limit of the implant, reproducible among the patients, and compatible with simultaneous use of the residual natural vision in the periphery. We are now working on higher-resolution implants to achieve visual acuity better than 20/100, which would make this technology broadly applicable to patients with atrophic AMD or retinal injury."

Dr. Daniel Palanker of Stanford University

Photovoltaic Advantages



Target polulations are patients blinded by:

- **Retinopathy as a result of trauma such as blunt trauma, blast, and laser injury; or**
- **Degenerative retinal diseases such as Age-Related Macular Degeneration (AMD) (the major cause of vision loss in people over 65 in the US)**

Congressionally Directed Medical Research Programs

CDMRP Department of Defense

https://cdmrp.army.mil/vrp/

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