

Six previously blind patients detect light, motion, identify objects with artificial retina

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Researchers from the University of Southern California and the Doheny Eye Institute's Doheny Retina Institute will be presenting data on the first six patients implanted with an intraocular retinal prosthesis - more popularly referred to as an artificial retina - developed and manufactured in partnership with Second Sight Medical Products, Inc., of Sylmar, Calif.

According to Mark Humayun, professor of ophthalmology at the Keck School of Medicine and the lead investigator on the project, all six of the previously blind patients have been able to detect light, identify objects in their environment, and even perceive motion after implantation with the epiretinal device.

Data collected as of November of 2004 showed that the six patients-who had been implanted with a single prosthesis in their "worse eye" for between 5 and 33 months-were able to "localize the position of, or count the number of, high contrast objects with 74 to 99 percent accuracy," Humayun says. In addition, they could discriminate simple shapes-i.e., figure out the spatial orientation of a bar or the capital letter L-with 61 to 80 percent accuracy.

The researchers also noted that when there is no electricity running through the device, the subjects do not show any improvement in perceptual acuity, "suggesting that electrical stimulation did not improve the health or function of the retina."

Thus far, participants in the study have been people with little or no sight perception due to the degenerative eye disease retinitis pigmentosa (RP). Ultimately, however, the device is likely to be used for the millions of people suffering from age-related macular degeneration, or AMD, as well. In fact, notes Humayun, there are 25 million people across the globe, including 6 million in the United States alone, who have been blinded, or are severely visually impaired, due to disease like RP and AMD. By 2020, that figure is expected to double, creating a virtual vision-loss epidemic.

Both AMD and RP destroy vision by annihilating the retinal cells that allow light to be translated into recognizable images.

Second Sight's intraocular retinal prosthesis is taking the first step to replacing those cells with its device, a 4-by-4 grid of platinum electrodes embedded in silicone rubber. The electrodes are wirelessly stimulated through an external controller hooked up to a head-mounted video camera.

Source: University of Southern California

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