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Artificial retina more capable of restoring normal vision

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Researchers have developed an artificial retina that has the capacity to reproduce normal vision in mice.

While other prosthetic strategies mainly increase the number of electrodes in an eye to capture more information, this study concentrated on incorporating the eye's neural "code" that converts pictures into signals the brain can understand. The research was presented at Neuroscience 2010, the annual meeting of the Society for Neuroscience and the world's largest source of emerging news about brain science and health.

Degenerative diseases of the retina — nerve cells in the eye that send visual information to the brain — have caused more than 25 million people worldwide to become partially or totally blind. Although medicine may slow degeneration, there is no known cure. Existing retinal prosthetic devices restore partial vision; however, the sight is limited. Efforts to improve the devices have so far largely focused on increasing the number of cells that are re-activated in the damaged retina.

"But our research shows that another factor is just as critical," said Sheila Nirenberg, PhD, of Weill Cornell Medical College, lead author of the study. "Not only is it necessary to stimulate large numbers of cells, but they also have to be stimulated with the right code — the code the retina sends to the brain."

Using mice as subjects, the authors built two prosthetic systems: one with the code, one without. The researchers found the device with the code reconstructed more details. “Incorporating the code jumped the system’s performance up to normal levels — that is, there was enough information to reconstruct faces, newsprint, landscapes, essentially anything,” Nirenberg said.

Next, the authors plan to coordinate with other researchers who are already working with prosthetics on human participants.

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