Medical Xpress

Bionic eyes offering better sight to blind

February 15 2015, by Lisa M. Krieger, San Jose Mercury News

A brighter ray of hope is on the horizon for the blind, as scientists improve electronic hardware that creates sight - making it possible, they predict, to read printed text, recognize faces and lead normal, independent lives.

At the American Association for the Advancement of Science conference in San Jose, researchers on Friday described innovations in bionic vision, such as prototype prosthetics, "smart glasses" and telescopic contact lenses - all potential advances of today's artificial retinas, which produce only sketchy, high-contrast imagery.

"Retinal implants have moved from sci-fi into reality over the last few years," said Daniel Palanker, physicist and professor of ophthalmology at Stanford University. He is working on a retinal prosthesis that works like solar panels on a roof, converting light from goggles into electric current to trigger signals in the retina which then flow to the brain.

"Now we are in the race of improving resolution, improving image processing, dynamic range (of light intensity) and levels of gray - and will keep improving," he said.

For people like Palo Alto attorney Dean Lloyd, improvements are long overdue. With his 7-year-old implants, made by the Sylmar biotech company Second Sight Medical Products Inc., he can see boundaries and borders.

But he yearns to see more. And he must constantly move his head to

detect the contrast within his visual field, which is tiring.

"They offered me something, because I had nothing. I saw, basically, just darkness," said Lloyd, speaking from his law office in Palo Alto.

His implants make it possible to select white socks when he's headed to the gym and dark socks for days in court. He can even distinguish gray socks from black ones, he said.

"But it's the Model T Ford. It is a good first shot but needs refinement," said Lloyd, who also is trained as a biochemist and software engineer. He lost his vision to the retinal disease retinitis pigmentosa, which affects 100,000 Americans, including California political giant Willie Brown.

At the conference, Palanker described his technology that - in animals, at least - offers better vision than existing devices. Specifically, it is a tiny silicon chip covered with pseudo-photoreceptors - light-sensitive diodes - injected under the retina. Goggles pulse light onto the retina. The disease may rob the retina of one layer of cells, but the device can stimulate others.

Blind rats recovered about half of their normal visual acuity, and the device is being further enhanced, he said. "If everything works well, we might be able to restore acuity in human patients to 20/100 - which is pretty good vision. You can read large text, recognize faces and become very functional," he said.

It has licensed the technology to the French company Pixium Vision, and hopes to launch a human clinical trial in Paris in 2016.

While the Second Sight implant contains 60 electrodes spaced over several square millimeters, the Stanford device has 5,000 per square

millimeter. And unlike a retinal prosthesis made by the German company Retina Implant AG, which relies on a wired camera system, Stanford's device is wireless.

Switzerland's Giovanni Antonio Salvatore described research in plastic electronic systems that communicate wirelessly and are soft, deformable and implantable, offering, for instance, continuous glaucoma monitoring.

Another scientist described the first-ever telescopic contact lens, which magnifies 2.8 times. It incorporates a very thin reflective telescope - created by tiny 1-mm-thick mirrors, bouncing light - inside a lens. This could help patients with age-related macular degeneration.

Although larger and more rigid than conventional contacts, they can be custom-cut and assembled to fit comfortably, said Eric Tremblay from EPFL in Switzerland. Users would switch between normal to magnified vision using a strong wink, he said.

"It would be useful to have more definition, higher resolution," said attorney Lloyd.

"And color. I love color and remember it well."

Citation: Bionic eyes offering better sight to blind (2015, February 15) retrieved 6 May 2024 from https://medicalxpress.com/news/2015-02-bionic-eyes-sight.html