

Eye implants make vision-restoring progress

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(Medical Xpress) -- "I was blind once but now I can see." The words are no longer the sole property of religious testimony and literature. Medical progress is being made in the restoration of vision as evidenced by Second Sight's Argus II, a retinal prosthesis already on the market in Europe, and Bio-Retina from NanoRetina, which is to start clinical trials next year. Second Sight is a California company with a European office in Lausanne. Its Argus II Retinal Prosthesis System was developed to provide electrical stimulation of the retina to induce visual perception. The Argus II is an eye implant system that includes antenna, electronics case and electrode array. The \$115,000 procedure entails a four hour operation under full anesthesia.

The prosthesis provides electrical stimulation of the retina that can elicit visual perception in blind people with severe to profound retinitis pigmentosa. The system includes an antenna, an electronics case, and electrode array. External equipment includes special glasses, a video processing unit (VPU) and a cable.

The Argus II was designed to bypass damaged photoreceptors altogether. The way the system works is that a video camera in the glasses captures a scene. The video is sent to a small patient-worn computer VPU where it is processed and transformed into instructions sent back to the glasses via a cable. These instructions are transmitted wirelessly to the antenna in the implant. The signals are sent to the [electrode array](#), which emits small pulses of electricity. The pulses bypass the damaged photoreceptors and stimulate the retina's remaining cells, which transmit the visual information along the optic nerve to the brain.

The result delivers greater independence for patients. Users of the Argus II bionic [eye](#) say that they can see rough shapes and track the movement of objects; they can slowly read large writing.

Anticipation is high, meanwhile, for a bionic retina that has been designed to restore sight at less cost and with a different technique. The Bio-Retina developed by Nano Retina does not make use of an external camera; instead, a vision-restoring sensor is placed inside the eye, on top of the damaged retina. This is a 24×24-resolution (576-pixel) sensor atop the damaged retina. The device generates a grayscale image.

The implant is inserted through an incision in the eye. The procedure takes 30 minutes and requires only local anesthesia. Bio-Retina transforms naturally received light into an electrical signal that stimulates the neurons, which send the pictures received by Bio-Retina to the brain. A rechargeable, battery-powered mini-laser on a pair of eyeglasses powers the implant wirelessly. After a patient undergoes the procedure, the anticipated recover time is up to one week. Also anticipated is instantaneous restoration of vision, with patients able to distinguish faces and to be able to look from side to side with their eyes rather than needing to turn their heads.

More information: www.nano-retina.info/

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