RETINA australia

RETINAL IMPLANT TECHNOLOGY

Retina implant technology aims to restore vision by surgically implanting microelectronics and microchip electrodes into the back of the eye. Normally, photoreceptor cells in the retina convert images into electrical signals which ultimately reach the brain, where they are perceived as vision.

Scientists have found that, even when photoreceptor cells in patients with retinitis pigmentosa and age-related macular degeneration have been damaged, nearby nerve cells can stay intact for many years. Therefore, it is possible to stimulate the nerve cells in the eye and produce signals that will be perceived as vision by the brain. Scientists have looked at several different ways of stimulating retinal nerve cells, but most are looking into electrical stimulation. In Australia, there are two separate projects underway to develop a retinal implant or “bionic eye”. There are also several overseas projects.

Bionic Vision Technologies

Based in Melbourne, Victoria, this company plans to commercialise a bionic eye that would comprise a camera mounted on glasses that would transmit visual images to an implanted retinal prosthesis which would in turn transmit the information to the brain. An early prototype was implanted in three patients in 2012 for use in the laboratory and to establish safety. Another four patients were implanted in 2018 with a device for everyday use. Results already show that a sense of vision has been restored to these patients.

Retina Australia is proud to have been an early financial supporter of the bionic eye project.

Monash Vision Group

Also based in Melbourne, the Monash Vision Group is developing the Gennaris bionic vision system. The Monash approach is different from the Bionic Vision Technologies approach, in that visual images detected by a camera are transmitted directly to tiles implanted in the brain. The first implantations into patients are planned to take place shortly.

An international project – The Argus II implant

This implant was developed by a study group spread across Europe, the United States and Mexico. It is now approved for use in North America and Canada for approved patients with late stage retinitis pigmentosa. It is also approved for use in parts of Europe.

The Argus II Retinal Prosthesis System works by transmitting images from a video camera housed in the patient's glasses to a prosthesis located inside the eye. The vision provided by the device is not the same as normal vision. It provides a small visual field in which the patients can perceive spots of light, to assist them to perform some tasks visually instead of by touch.

Germany – Retina Implant AG

Retina Implant AG in Germany has its own retinal implant for patients with retinal degenerations. A chip is implanted under the retina. Unlike other prostheses, no camera is used. Visual images are transmitted to the brain via the optic nerve. A separate device powers the chip, and another is a control unit to adjust brightness and contrast.

Pixium-Vision – IRIS Retinal Implant System

In 2017, Pixium-Vision, a spinout of the Vision Institute at the National Eye Hospital in Paris and Universite Pierre et Marie Curie, announced that it had successfully implanted retinal implants into 10 patients as part of its clinical trial of its Iris II retinal implant.

The IRIS system works in the following way. A camera chip in glasses wirelessly transmits visual images to a retinal implant. After processing, these images are re-transmitted to the eye. In a rehabilitation process, the brain learns to interpret the images.