The blind will see: bionic eyes to help restore sight

Peter Weekes
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MELBOURNE'S Eye and Ear Hospital will start implanting in two to three years bionic eyes that restore sight to the blind.

The hospital is one of three centres outside of the United States that have been chosen to implant the revolutionary device developed by Doheny Eye Institute of the University of Southern California.

While the bionic eye cannot produce the clarity of vision portrayed in *The Six Million Dollar Man*, US scientists said last week that the first six patients to try the device have learnt how to detect light, distinguish between objects and perceive direction of motion.

"We expected that all they would be able to do would be to differentiate between light and dark. But we were amazed to find that they can tell the difference between objects such as a plate, a knife and a cup, and tell which way people are moving," said Professor Mark Humayun of the University of California, who led the research.

The university is now preparing to test a more advanced version of the electronic retinal implant on up to 75 subjects.

"If the new trial hits its milestones, the second generation implant could be commercially available in two years," he said.

The tiny device offers new hope to millions of people around the world who have lost their vision to retinitis pigmentosa, a group of inherited eye diseases that cause the degeneration of the photoreceptor cells whose job it is capture and process light.

It is the most common cause of blindness among those under the age of 50.

The implant is not suitable for every form of blindness, but scientists hope in the future it may be used to restore the sight of those with degenerative eye diseases, particularly those with macular degeneration that affects those over about 75.

Professor William Campbell, head of the Royal Victorian Eye and Ear Hospital's vitreo-retinal unit, described the device as "the beginning of a very exciting development in ophthalmology".

"We have been chosen to be one of centres around the world where they want to put in their implants, but it will be two or three years before we start doing it," he said. "We will be putting some of the early models in when we find suitable candidates and after we have been trained."

Based on the advances made by Cochlear ear technology, the device comes in two parts. A tiny camera in the lens or on the bridge of a pair of lightweight glasses captures images in real time.

This information is transmitted to a radio receiver implanted behind the patient's ear that converts it to electrical signals that are sent to a grid of electrodes implanted in the retina.

These electrodes stimulate retinal nerve cells to produce electrical impulses that send signals to the brain so the patient can see spots of light occurring in different patterns. For example, a circle of dots might indicate the presence of a plate.

While the first-generation device had 16 electrodes on a four millimetre by five millimetre silicon and platinum chip attached to the retina, the new one has 60 electrodes and will cost about $32,000.

Developing the first device took 16 years of research, but the second version has taken just four years.

The more electrodes, the better the vision, said Professor Campbell, adding that 500 electrodes might allow people to read large print.

Professor Humayun said he hoped to produce an implant with 1000 electrodes, which could allow more advanced tasks such as face recognition, within seven years.

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