

# MEDICAL MIRACLE IN SIGHT

## True grit puts bionic eye a blink closer

THE holy grail of bionic eyes, which would allow those with the most common and incurable causes of blindness to recognise facial expression and read large print, is about to begin preclinical testing in Melbourne.

The University of Melbourne's development of the 256-electrode diamond device has been boosted by a \$1 million federal grant to fast-track testing, which could mean the device is trialled in humans in 4-5 years. The unique design is man-made diamond electrodes inside a diamond case, to stimulate the retina at the back of the eye so messages can be sent to the brain and perceived as light.

Lead researcher Dr David Garrett, from the department of physics, said what set his team's device apart in a global race to restore vision to 50 million blind people was that it is fully wireless and the diamond casing would never erode in the body.

A version already on the market overseas has a lead coming out of the eyeball.

"In some diseases, the light-sensing part of the eye — the rods and cones — are damaged, but all of the other nerves are basically intact," Dr Garret said.

"In a healthy person those nerves carry the signal from the rods and cones to the brain. We hijack it at that point with the electrode, tricking those nerves into firing and thinking they've perceived light."

Those to benefit will be people with age-related macular degeneration, the major cause of blindness and

**EXCLUSIVE**  
**BRIGID O'CONNELL**

vision impairment in people over 50, and retinitis pigmentosa, the most common cause of blindness in the young.

While the initial proof-of-concept device had 256 electrodes on a 5mm-by-5mm microchip, Dr Garrett said they planned to insert four tiles into the back of the eye — for the squeamish, there are no pain receptors in the eye — to make the 1024 electrodes needed for resolution high enough to see faces and read.

But the device almost slipped, along with many other promising medical prototypes into the "valley of death" last year, when it went dangerously close to running out of funding.

But through a partnership established by lead inventor and physics professor, Steven Praver, the Victorian group of engineers, mathematicians, physicists and neuroscientists from the university and National Vision Research Institute joined with Canadian eye surgeons and engineers to launch start-up company iBionics to move into clinical trials.

The National Health and Medical Research Council grant will allow preclinical testing to determine the stimulation patterns needed to achieve the best vision.

It is the first major grant since an initial \$50 million investment by the government in Bionic Vision Australia, a consortium of Melbourne research institutes, to develop two bionic eyes.

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Dr David Garrett (centre) with Prof Michael Ibbotson and Dr Hamish Meffin.  
Picture: DAVID CAIRD



**HOW THE DIAMOND BIONIC EYE PROTOTYPE WORKS**

A tiny camera sits in the middle of a pair of glasses worn by the patient.



These images are transmitted wirelessly, via a laser, to the diamond electrode device implanted at the back of the eye.



This 5mm-by-5mm microchip, with 256 diamond electrodes encased in a diamond box, sits against the back of the eye and stimulates the optic nerves from a control box attached to the glasses.



These electrical pulses carry the signal to the brain where it's perceived as an image.