Centre for Eye Research Australia

# Bionic eye fact sheet

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CERA is a key research partner in Bionic Vision Australia (BVA), a consortium of world-leading researchers from Australia, collaborating to develop an advanced bionic eye that will restore useful vision on people with advanced retinal diseases.

**What is a bionic eye?**
The retina at the back of the eye converts images into nerve signals that travel via the optic nerve to the brain. Damage to the retina causes vision loss. The bionic eye uses a retinal implant connected to a video camera that converts images into electrical impulses that activate remaining retinal cells that then carry the signal back to the brain. In this way the bionic eye mimics the function of the retina and restores sight.

**How does the bionic eye work?**
A video camera built into a pair of glasses transmits images in real time to a handheld, video-processing unit. Light patterns represented as electrical pulses are transmitted from the unit to a retinal implant containing an array of electrodes. These electrodes will activate remaining retinal cells that then send visual information along the optic nerve to the brain, where the image is interpreted.

**Who will benefit from the bionic eye?**
People with severe vision loss caused by diseases affecting the retina such as age-related Macular Degeneration and Retinitis Pigmentosa will benefit.

**Who are the Bionic Vision Australia partners?**
Bionic Vision Australia brings together a unique consortium of researchers, electrical and biomedical engineers, communication technology experts and eye specialists:

- The University of New South Wales (UNSW) School of Biomedical Engineering
- CERA ophthalmologists and researchers
- The Bionic Ear Institute's extensive experience in the stimulation of auditory nerves is being applied to research into the bionic eye
- National Information Communications Technology Australia (NICTA) engineers are involved in developing the second prototype
- The Royal Victorian Eye and Ear Hospital (RVEEH) is the clinical partner in the BVA consortium and will be the site where the first human trials are conducted
- The University of Melbourne is involved through the University's Department of Ophthalmology, the School of Engineering and in offering administrative support services.

**What are the specific aims of Bionic Vision Australia?**
By 2013, BVA intends to have the first bionic eye ready for implantation. Using 100 electrodes, it will allow people with severe vision loss to see the contrast between light and dark shapes and navigate around them.

This bionic eye will be an improvement on current technology that has been experimentally implanted in Europe and the USA.

A more advanced device that will give recipients the ability to recognise faces using 1000 electrodes will also be developed.

**How will the bionic eye benefit the wider community?**
Development of an advanced bionic eye by Australian researchers brings the additional benefits of world-wide commercialisation potential, employment and enhancement of biotechnology research in Victoria and Australia.

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