



Improving the eye's 'transport system'

Professor Keith Martin's team is working to improve the 'transport system' within the nerve fibres of the eye. They've discovered that a molecule called protrudin may hold the answer.

"We've found that if we increase the amount of protrudin or change the way it's working, we can improve transportation along the nerve fibres," says Professor

Martin. "And getting the right molecules to the right place at the right time can improve the ability of that nerve to repair.

"We are still at a relatively early stage, looking at the fundamental mechanisms of how protrudin is working. But what we've seen is the strongest regeneration of any technique we've used before."

Repairing the optic nerve

Professor Keith Martin is investigating using gene therapy to protect and repair the optic nerve and restore sight for patients who have lost their vision to glaucoma.

The optic nerve is the connection between the eye and the brain – a bit like a cable that connects a camera to a computer. It plays an essential role in our vision, allowing the brain to receive electrical signals from the back of the eye, so it can interpret them as images.

Glaucoma interrupts this transfer of visual information. As the disease develops, the optic nerve becomes progressively damaged, leading to gradual loss of peripheral vision. If left untreated, it can lead to blindness.

Currently, glaucoma treatment is largely aimed at lowering eye pressure to protect the optic nerve and prevent further damage. This can slow or even stop the progression of vision loss. But for about 15 per cent of patients, vision continues to deteriorate, despite the best available treatments.

Professor Keith Martin, CERA's Managing Director and one of the world's leading experts in glaucoma, believes gene therapy could change this.

New potential

“Gene therapy is offering new potential and hope for patients whose glaucoma does not respond to conventional treatments,” says Professor Martin.

“Gene therapy to treat eye disease is advancing at a faster pace than arguably in any other branch of medicine.”

In a ground-breaking and ambitious new project, Professor Martin and Professor James Fawcett from the University of Cambridge are striving to develop new treatments, including gene therapy, that could strengthen and repair the optic nerve, potentially restoring lost vision.

Professor Martin, who joined CERA in February 2019 from University of Cambridge, is currently building his Melbourne team as the research moves into its next phase.

“Essentially what we're trying to do is protect the optic nerve from damage but also increase its ability to regenerate after injury,” Professor Martin explains.

Restoring vision may be some way off – but these early days are showing it is a realistic possibility for the future.

“In the past it seemed impossible that we'd be able to regenerate the optic nerve. We can potentially do this now, but it remains to be seen how much vision can be restored,” says Professor Martin.

“There is still much work to do and we will continue to work hard on this with the help of our supporters.”

This research is supported by funding from UK charity Fight for Sight.

← **New potential: Professor Keith Martin says gene therapy could regenerate the optic nerve.**