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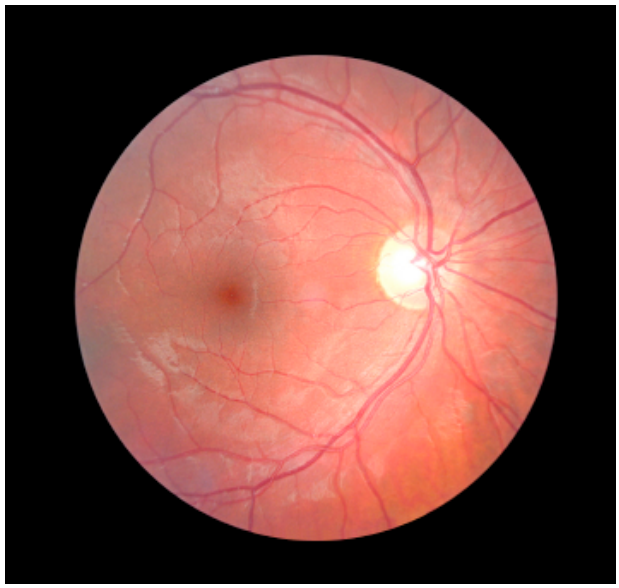
RESEARCH DIRECTIONS

Eye research part of a bigger picture

Dr Morven Cameron, from the School of Medicine, has been awarded funding to investigate how the connections between neurons in the retina are altered in response to changes in light levels over the course of the day. The project, funded by the Australian Research Council (ARC), will extend the existing understanding of retinal physiology, providing an invaluable resource for strategies aimed at restoring vision to those with retinal degeneration.

The eye isone of the most studied tissues of the human body, with research stretching back to the 18th century, the physiological function of the retina is still not entirely understood,' says Dr Cameron. 'Retinitis pigmentosa is the major cause of inherited blindness, while age-related macular degeneration accounts for almost half of all legal blindness in Australia. So if we aim to replicate retinal function to treat retinal disorders such as retinitis pigmentosa and macular degeneration, we should have a more complete understanding of how retina functions.'

Bright sunlight is about 10 billion times brighter than dim starlight, yet the human retina functions well under both these conditions. To do this, it uses cellular processes to adapt to the changing light intensity, and biological clocks to anticipate the ambient light conditions at a certain time of day. Dr Cameron's project will examine the alteration in neuronal circuits in the retina in response to changes in light over the course of the day. She will utilise cutting edge techniques to record electrical signals flowing between specific neurons of the retina. The project will provide insights that will inform future research, providing invaluable information for strategies aimed at restoring vision to vision-impaired patients by replicating normal retinal function.



The ARC also fund the high-profile Bionic Vision Australia project, a national consortium of researchers (including UWS) which is developing a bionic eye that uses electrical stimulation to activate remaining neurons in the retina following retinal degeneration. Although there are a number of projects around the world that have adopted this approach, it remains that very little is known about how to most effectively and efficiently activate the surviving retinal neurons using such electrical stimulation. Dr Cameron's project is well placed to provide data to optimise these stimulation strategies.

Project Title: Modulation of gap-junction coupling in the mammalian retina

Funding has been set at: $375,000

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