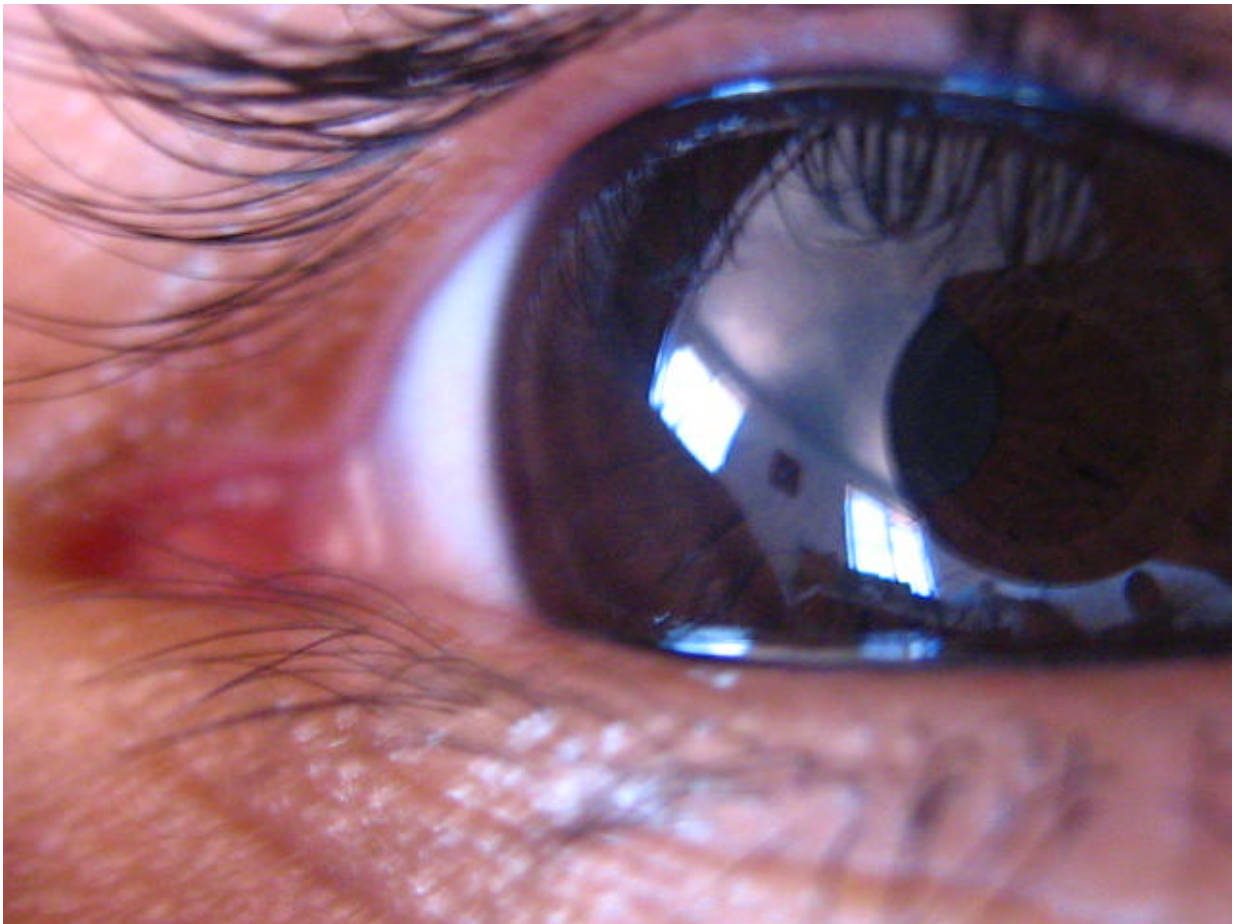


Discovery provides glimmer of hope to prevent blindness

September 27 2017



Credit: Bernardo Chaves (Flickr)

Macquarie University researchers have discovered that a naturally

occurring protein in the body protects the eye from the common eye disease glaucoma, and which is particularly sensitive to oxidation through environmental factors that may include cigarette smoke, in research published in *Scientific Reports*.

Two in 100 Australians will develop [glaucoma](#) in their lifetime, and one in eight Australians aged over 80 years will develop glaucoma.

The researchers have established that the [protein](#) 'neuroserpin' is critical to a healthy retina, regulating other enzymes and maintaining a natural protective environment in the eye.

Neuroserpin belongs to a family of proteins 'serpins' that are particularly sensitive to oxidation through [environmental factors](#).

"Over a long period of time, increased enzyme activity gradually digests the eye tissue and promotes cell death causing the adverse effects associated with glaucoma, a major blinding disorder among aged Australians," said lead author Dr Vivek Gupta from the Faculty of Medicine and Health Sciences.

Once neuroserpin is deactivated due to ageing, [disease](#) or environmental factors, it is no longer able to protect the eye, and the retina and [optic nerve](#) is compromised, leading to irreversible damage to the eye.

"Ophthalmologists and vision scientists have always wondered what damages the optic nerve in the back of the eyes, which is widely observed in glaucoma. The breakthrough findings of this study help us understand the disease mechanism and answer a key question that has eluded scientists for several years," said co-author Dr Mehdi Mirzaei.

"This long-term collaborative study has opened up a completely new line of investigation in glaucoma research that will lead to new treatment

avenues for the disease," said Dr Gupta.

Researchers will use these findings to explore [genetic engineering techniques](#) to generate 'modified neuroserpin' protein that is resistant to oxidation, and make the protein sustainably available in the eye to inhibit the damaging enzymes and protect eye sight.

Future research will also highlight if antioxidants can play an important role in protecting the eyes in glaucoma.

More information: Vivek Gupta et al. Glaucoma is associated with plasmin proteolytic activation mediated through oxidative inactivation of neuroserpin, *Scientific Reports* (2017). [DOI: 10.1038/s41598-017-08688-2](#)

Provided by Macquarie University

Citation: Discovery provides glimmer of hope to prevent blindness (2017, September 27) retrieved 4 May 2024 from <https://medicalxpress.com/news/2017-09-discovery-glimmer.html>

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