

New eye test detects earliest signs of glaucoma

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A simple eye test could help to solve the biggest global cause of irreversible blindness, glaucoma.

The Wellcome-funded diagnostic – developed by researchers at University College London (UCL) and the Western Eye Hospital – allows doctors to see individual nerve cell death in the back of the eye.

Early detection means doctors can start treatment before sight loss begins. The test also has potential for early diagnosis of other degenerative neurological conditions, including Parkinson's, Alzheimer's and multiple sclerosis.

The results of the first [clinical trials](#) with glaucoma patients are published today in the journal *Brain*.

Professor Francesca Cordeiro, at UCL Institute of Ophthalmology, who led the research, said: "Although detection has been improving, most patients have lost a third of vision by the time they are diagnosed.

"Now, for the first time, we have been able to show individual cell death and detect the earliest signs of glaucoma. While we cannot cure the disease, our test means treatment can start before symptoms begin."

Glaucoma affects 60 million people worldwide and one in ten go blind.

The new technique means patients could be diagnosed up to ten years

earlier than is currently possible.

Bethan Hughes, Wellcome's Strategic Development Lead for Innovation, said: "This innovation has the potential to transform lives for those who suffer loss of sight through glaucoma, and offers hope of a breakthrough in [early diagnosis](#) of other neurodegenerative diseases."

How the DARC eye test works

Loss of sight in patients with glaucoma is caused by the death of cells in the retina at the back of the eye – apoptosis.

The [new technique](#) is called DARC, which stands for detection of apoptosing retinal cells.

It uses a specially developed fluorescent marker which attaches to cell proteins when it's injected into patients. Damaged [retinal cells](#) appear as white fluorescent spots during eye examination.

Initial clinical trials were carried out on a small number of glaucoma [patients](#) and compared with tests on healthy people to establish the [test](#)'s safety.

DARC uses equipment that is already part of routine hospital eye examinations.

The researchers hope that eventually it may be possible for opticians to do the tests. This would mean even earlier detection of the disease.

Treatment for [glaucoma](#) is much more successful when it is begun in the early stages of the disease.

Further studies will now be carried out into DARC and how it could be

used to detect other neurodegenerative conditions where increasing numbers of nerve [cells](#) are lost as the disease progresses.

More information: Maria F. Cordeiro et al. Real-time imaging of single neuronal cell apoptosis in patients with glaucoma, *Brain* (2017). DOI: [10.1093/brain/awx088](https://doi.org/10.1093/brain/awx088)

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