

Hope of stem cell cure for blindness

By Chris Riches

BRITAIN'S 600,000 sufferers of age-related blindness are being given new hope of a breakthrough in their treatment today.

Age-related macular degeneration (AMD) can start in middle age and is the leading cause of vision loss in the developed world.

But scientists have begun injecting stem cells into the eyes in trials of "regenerative medicine". Retinal support cells derived from human embryonic stem cells (HESC) were injected into the eyes of four men with macular disease.

Three of the men experienced vision improvements in their treated eyes within 12 months.

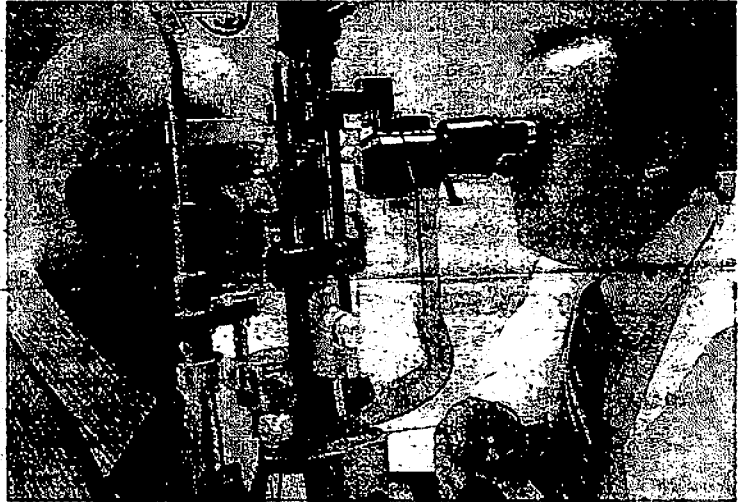
The trial adds to evidence that injecting HESC-derived cells is a workable regenerative treatment for blinding eye disorders.

Yesterday leading laser eye surgeon David Allamby, of Focus Clinics in central London, said the study could be just the breakthrough the field needs.

He said: "It is a very exciting time for regenerative ophthalmology and we are starting to realise the early promise of stem-cell therapies."

"Much work needs to be done but we may finally have treatments for the leading cause of blindness."

"The macula is part of the retina at the back of the eye. It is very small, just the size of a grain



Picture: GETTY

Examining for AMD, the leading cause of blindness in developed nations

of rice, but is responsible for all of our detailed central vision and most of our colour vision.

"AMD causes a gradual deterioration of the macula, usually over years, as the retinal cells die off and are not regenerated."

"Finding a remedy for the blinding effects of AMD is a medical priority and public health issue."

Mr Allamby explained how AMD is often linked to the destruction of darkly coloured retinal pigment epithelium (RPE) cells.

He explained: "RPE cells form a sheet directly outside the retina, supporting the overlying

light-sensitive cell 'pixels' by nourishing them and cleaning up their waste. Without functional RPEs, retinal photoreceptors will die leading to AMD."

The pioneering research in South Korea is published in the journal Stem Cell Reports.

● Eating spinach can help stave off AMD and cataracts, according to the Scripps Research Institute in the US. It has found those who ate the vegetable three times a week have a 43 per cent lower risk. Spinach is a source of carotenoids, lutein and zeaxanthin which have been strongly linked to slowing AMD.

AGE-RELATED macular degeneration (AMD) is a progressive condition that affects the central vision — and unfortunately leads eventually to significant loss of sight.

More than four million people in the UK suffer from AMD and it is the leading cause of blindness in the over-55s.

Early symptoms include dark spots in the vision, blurring that is particularly noticeable when reading, and difficulty recognising people's faces.

Vision deteriorates as AMD progresses, resulting in an inability to drive, see faces and read.

There are two types, wet and dry. Dry AMD is more common and is caused by a build-up of waste products in the membrane of the eye.

Wet AMD is caused by the formation of abnormal blood vessels underneath the macula and leads to a rapid deterioration in vision, so early diagnosis is essential.



How the world looks: Damaged central vision with macular degeneration makes it hard to see faces or to read

Picture: LONDON EYE HOSPITAL

Some evidence suggests that a diet high in vitamins A, C and E may slow any progression of dry AMD and reduce the likelihood of wet AMD.

Medication that prevents the growth of new blood vessels in the eye is often used to treat wet AMD, as is laser surgery to destroy abnormal blood vessels.

Technology has vastly improved over recent years. There are now intraocular lenses that improve the vision by projecting the image that the eyes see onto a healthy part of the retina. New advancements are also on the horizon, which could improve the sight of millions.

Consultant ophthalmic surgeon Bobby Qureshi says: "We are fortunate to live in a time in which technology is advancing at an exponential rate. This means that AMD patients are no longer having to 'get by' using visual aids such as magnifiers to enhance their vision.

"They can now have their vision restored, using telescopic AMD lenses such as the iolAMD, which gives them another chance to see the world clearly."

At last I can see my grandchild again... thanks to my new 'Hubble telescope' eyes

FOUR years ago, Irene da Silva was given the devastating news that she might never see her granddaughter's face again. The 81-year-old was told by specialists that there was no cure or effective treatment that would halt the progress of her eye disease - age-related macular degeneration (AMD).

However, in May Irene became one of the first British patients to benefit from a revolutionary new eye implant - inspired by a flaw in the Hubble space telescope - which experts say could help more than half a million people suffering from the condition.

In just a few minutes her sight was transformed. Irene, from Plymouth, says: 'When my husband David took the protective eye patch off the morning after the operation, I simply couldn't believe how much and how far I could see - all the detail in the trees, people's faces. It felt as if I had my life back.'

'My granddaughter Holly, who is 19, comes to see us every July for a fortnight which I look forward to more than any other time of the year, and I'd thought I'd never see her face again. Now that she's here I can't take my eyes off her. I keep thinking how lucky I am.'

The condition involves a part of the retina called the macula, a 5mm spot at the back of the eye that houses light-receptive cells. About 500,000 Britons suffer the most severe form of the disease, which is degenerative.

THE reason degeneration occurs is unknown, although genetics and age play a pivotal role. For sufferers, the central "spot" in the field of vision becomes distorted and blurred. About half of patients are affected so badly that they are registered blind.

Irene was treated with an AMD device. It comprises two lenses, one convex and one concave, made of a flexible yet tough plastic-like material, much like a Galilean telescope. These are injected, rolled up, into the eye via a 3mm incision at the edge of the iris.

Once in place, staggered 1mm beneath the cornea in an area known as the posterior chamber, they unfurl. This magnifies images by about 3 times, and as the lenses are offset, they direct incoming visual information away from the centre of the macula and on to healthy cells, enabling the patient to see much more.

It was the same 'fix' used to correct the central distortion which had hampered the Hubble telescope when it was sent into orbit in 1990. Scientists were not able to move or replace parts of the telescope, a device containing staggered mirrors was devised and inserted. Bobby Qureshi, an eye surgeon at the London Eye Hospital who helped

develop the device with Professor Pablo Artal, of Murcia University in Spain, says: 'Existing options for patients with AMD have not only proven inadequate, but they also involved extensive and risky open-eye surgery.'

Irene's procedure was performed with a laser, so there was no need for stitches and virtually no downtime - it meant she was free to leave the clinic just 30 minutes after surgery. But Mr Qureshi emphasises that while the new device can drastically improve eyesight, it still isn't

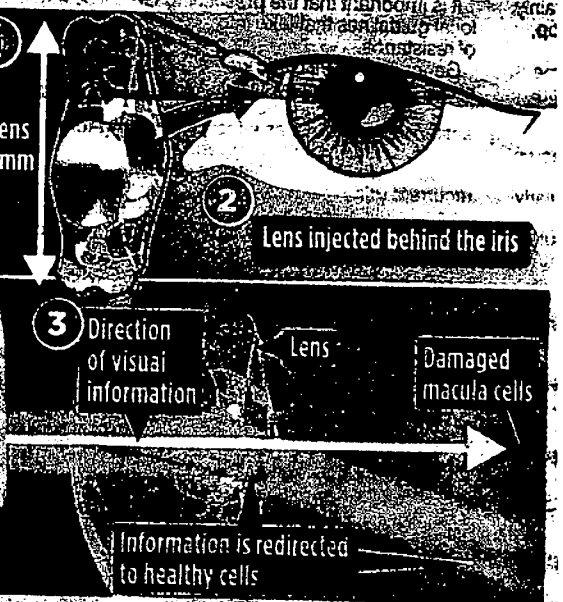
a cure. 'It won't stop the degeneration, but if it improves your eyesight by 70 per cent for ten years, during which time you can enjoy a good quality of life, then it is worth it,' he says.

'And if macular degeneration does spread, you can just adjust the lens to focus on a healthier part at a later date.'

But the new sight-saving surgery comes with a hefty price tag - Irene paid £6,000 for the implant and £4,000 to have a cataract taken out at the same time. Mr Qureshi says:

'I can foresee the price falling to about £600 in a couple of years, which would make it viable for NHS funding. The cost benefits to the overall economy of people going back to work and taking the extra strain off the NHS would be immense.'

Irene says: 'Of course it's expensive, but given the choice between not being able to see people - in particular Holly - and having money sitting in a bank account, there was no real choice. I'm delighted with the results.'



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Drug can stop ageing eyes from going blind

AN INJECTION to help severe age-related macular degeneration (AMD) is being tested at Southampton General Hospital. The disease causes the loss of central vision as light-sensitive cells at the back of the eye are damaged.

In a new two-year trial, patients with severe AMD — neovascular atrophy — will receive injections of

lampalizumab into their eye either every four or six weeks, with the results compared against a placebo group. Previous studies found the drug, which targets an enzyme implicated in AMD, can reduce the area of damage by up to 20 per cent.

Patients are still needed for the study, please email marie.nelson@uhs.nhs.uk