

## Scientists discover genetic cure for red-green colour blindness

Hannah Devlin

The Times

17.09.2009

Genetic scientists have discovered a cure for colour blindness, offering hope to millions of sufferers.

Scientists at the University of Washington, in Seattle, and the University of Florida restored normal vision to two colour-blind monkeys. The technique could prove to be a safe and effective cure for colour blindness and other visual disorders related to the cones in the retina.

“Although colour blindness is only moderately life-altering, we have shown we can cure a cone disease in a primate and that it can be done very safely,” said Professor William Hauswirth, an ophthalmic molecular geneticist at the University of Florida. “That is extremely encouraging for the development of therapies for human cone diseases that really are blinding.”

Those suffering from red-green colour blindness cannot distinguish between colours in the green-red-yellow part of the spectrum. This can make reading maps, using the internet and selecting a matching shirt and tie impossible. The disorder affects about 8 per cent of Caucasian males, but fewer than 0.5 per cent of females.

Normal colour vision requires three types of cone in the retina, sensitive to light in the blue, green, and red parts of the spectrum. The squirrel monkeys in the study — Dalton and Sam — lacked a gene called L opsin that codes for the red-sensitive cone. The same gene defect causes most cases of red-green colour blindness in humans. The scientists knew the monkeys were colour blind

because they were trained to perform a touchscreen test. When they identified some patterns of coloured dots they were rewarded with grape juice but they could not distinguish between the grey, green and red dots.

In the study, published today in the journal *Nature*, scientists restored normal vision to the monkeys by injecting a virus modified to contain the L opsin gene into the retina. Over 24 weeks the light sensitivity of the cones infected with the virus shifted towards the red part of the spectrum. Then the monkeys easily distinguished the patterns of grey, green and red dots.

The success of the treatment in adult animals demonstrated that the brain is able to rewire itself to take advantage of new receptors even in adulthood. The virus used to deliver the L opsin gene, called adeno-associated virus, is not known to cause disease in humans. Two years on from the study, the monkeys have shown no adverse effects from the treatment.

Scientists are now looking to obtain permission to begin trials in colour-blind humans. “People who are colour-blind feel that they are missing out,” Jay Neitz, a professor of ophthalmology at the University of Washington, said. “If we could find a way to do this with complete safety in human eyes I think there would be a lot of people who would want it.”