



Your Health

Restoring Eyesight©

by Jack Grierson

Welcome to Your Health – provided by themedicalfrontier.com, Medical News, Simplified. Coming to you this week rather fittingly, live from London at the Royal College of Physicians.

Scientists have managed to partially restore vision in blind mice, according to a recent paper published in the journal *Nature, Neuroscience*. The researchers at Stanford University managed to restore connections between the eye and brain of mice allowing them to see again. This is a significant leap forward in discovering ways to improve and restore eyesight in people with partial blindness, entire blindness, glaucoma or other eye injuries that can affect the optic nerve.

The Stanford researchers began their experiment by cutting the key nerve needed for vision in mice. Once the optic nerve is severed, this causes complete blindness. This blinding technique in mice creates a very similar situation to that seen in glaucoma patients. Glaucoma is a condition where the pressure in the eye impairs the function of the optic nerve and is one of the leading causes of blindness worldwide.

Ophthalmology (the study of the eye) has come a very long way. We can now fix cataracts (a condition where your lens becomes cloudy) very easily by replacing it with an artificial one. Nowadays you don't even have to have a general anaesthetic when having this procedure done. Having said this, there are no vision-restoring treatments available for people with sight loss through glaucoma. Worldwide, there are over 70 million people that suffer from glaucoma – so a treatment for glaucoma-induced blindness would be a huge achievement.

So how does sight actually work? When we look at something, light bounces off what you're looking at and into your eye. It is then focused by your lens onto the retina, where photoreceptor cells are located. These photoreceptor cells located at the back of the eye can detect light and convert it into signals for the brain to interpret. The signal then gets passed into a new set of cells in the brain called retinal ganglion cells. These cells stretch out with long fibres to form the optic nerve. There are over 30 different types of retinal ganglion cells and each one has a slightly different way of 'seeing' things. Some may detect general motion, some may see the up or down motions, others may see certain colours, etc. These different ganglions also transmit the signal into different areas of the brain so that when you see something it can cause a change in mood or activity.

Although a third of the whole brain is used to process vision, retinal ganglion cells are the only cells that connect the eye to the brain. Therefore cutting these cells will make you blind.

The team found out that they could regenerate these cells after they'd been cut by daily regimens of exposure to high contrast images and chemicals that excite retinal ganglion cells. The scientists then tested the mice's vision after 3 weeks of this treatment and looked at their brains to see if any of the cells had regenerated.

As it turned out, many of the cells had regrown. An interesting observation was that the cells had retraced their original locations and regrown into the correct parts of the brain.

Whilst this treatment was a big step in discovering a potential new treatment for glaucoma, the team has still some work to improve the mice's eyesight, as fine discrimination between objects still isn't working.

This week's advice: if you think you are at risk of glaucoma as it runs in your family or you are having trouble seeing, don't wait. The earlier you get your eyes tested and a diagnosis, the easier it is to save your sight.

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