

Reprogramming a patient's eye cells may herald new treatments against degenerative disease

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Scientists have overcome a key barrier to the clinical use of stem cells with a technique which transforms regular body cells into artificial stem cells without the need for introducing foreign genetic materials, which could be potentially harmful. The research, published in *Stem Cells*, suggests that cells taken from a patient's eye can be "reprogrammed" to replace or restore cells lost to degenerative diseases.

The research, led by Professor Iqbal Ahmad and co-authors from the University of Nebraska Medical Center, is the first proof in principle that somatic, or body cells, can be reprogrammed into induced pluripotent [stem cells](#) (iPSCs) simply through the influence of the microenvironment in which the sampled cells are cultured. Until now genetic materials were introduced into somatic cells to re-programme them to become pluripotent, enabling them to generate cells of all three embryonic lineages.

"Our findings provide evidence for an emerging view that somatic cells may be reprogrammed safely and simply by defined chemicals and other factors, which may facilitate their clinical use," said Ahmad. "The next step is to know how robust the reprogramming is and what existed within the microenvironment to cause it."

The team sampled progenitor eye cells, which regenerate the eye's cornea, from laboratory rats. By reprogramming them to resemble stem

cells they acquired the properties necessary to replace or restore neurons, cardiomyocytes, and hepatocytes, cell types which are degenerated in Parkinson's disease, heart disease, and [liver disease](#).

This reprogramming technique may allow 'autologous cell transplantation', where the donor of the cells is also the recipient. This is preferable to using cells from another person which may cause the patient's immune system to reject the transplanted cells.

Also, because this technique involves the use of iPSCs derived from adult [eye cells](#) and not [embryonic stem cells](#) (ES) it side steps many of the ethical dilemmas which have embroiled stem cell research.

"This research shows that it is possible to take cells from a patient's eye without affecting vision and reprogram them for use in autologous cell therapy to replace or rescue degenerating cells," concluded Ahmad, "this would allow us to circumvent ethical issues and the problems caused by the immune system rejecting foreign cells."

Source: Wiley ([news](#) : [web](#))

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