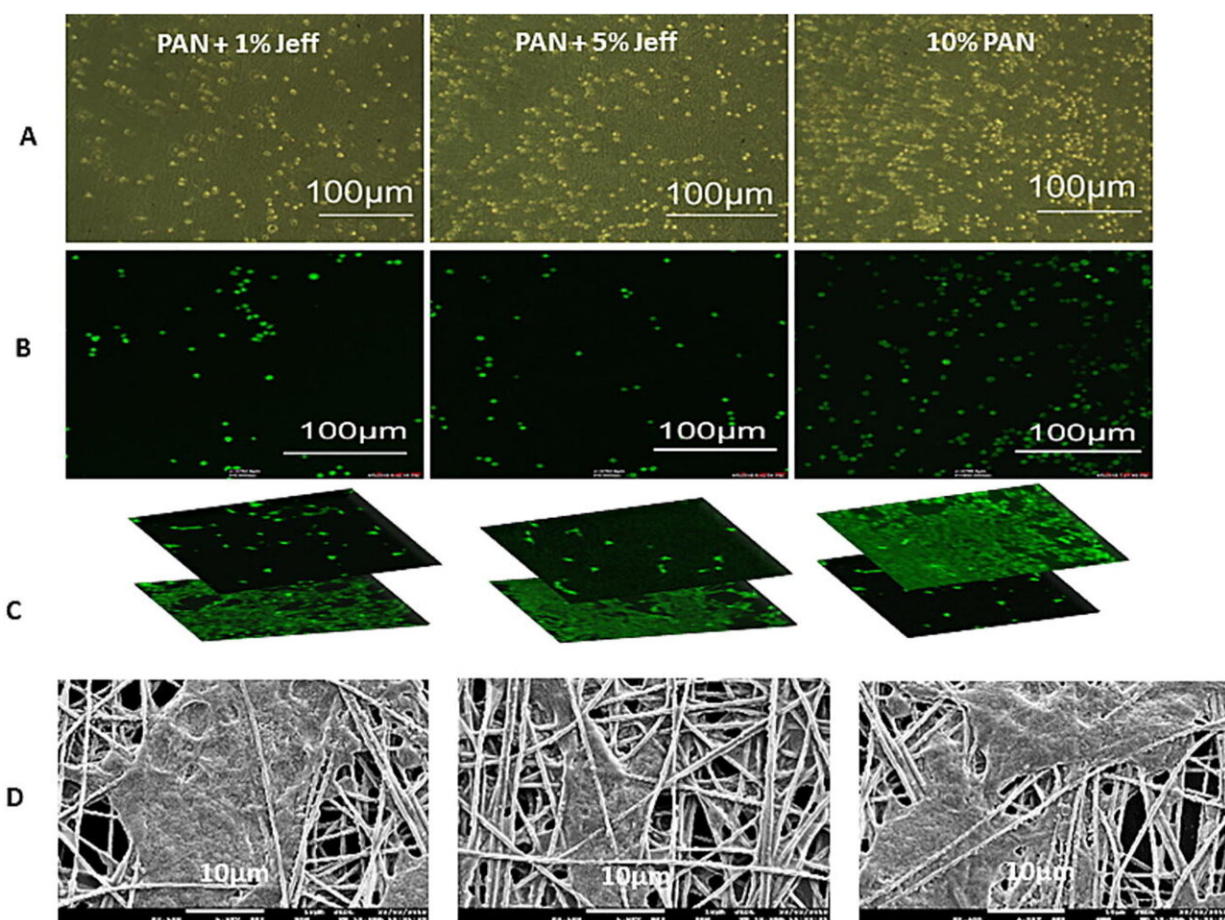


Retina cells cultured on nanofiber scaffolds could help treat blindness

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Representative images of unstained and fluorescently stained live ARPE-19 cells in culture with FA- treated ENS. Shown are unlabeled cells observed 5 minutes after seeding (A), labeled cells observed 30 minutes after seeding (B). Using confocal microscopy, cells infiltrated the PAN/Jeff series, while cells on PAN remained on the surface (C). Panel (D) shows SEM images of ARPE-19 cells cultured 24 h on FA- treated ENS. Credit: *Materials & Design* (2023). DOI:

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Scientists have found a way to use nanotechnology to create a 3D "scaffold" to grow cells from the retina—paving the way for potential new ways of treating a common cause of blindness.

Researchers, led by Professor Barbara Pierscionek from Anglia Ruskin University (ARU), have been working on a way to successfully grow [retinal pigment](#) epithelial (RPE) cells that stay healthy and viable for up to 150 days. RPE cells sit just outside the neural part of the retina, and when damaged, can cause vision to deteriorate. Their work is published in *Materials & Design*.

It is the first time this technology, called "electrospinning," has been used to create a scaffold on which the RPE cells could grow, and could revolutionize treatment for one of age-related macular degeneration, one of the world's most common vision complaints.

When the scaffold is treated with a steroid called fluocinolone acetonide, which protects against inflammation, the resilience of the cells appears to increase, promoting growth of eye cells. These findings are important in the future development of ocular tissue for transplantation into the patient's eye.

Age-related macular degeneration (AMD) is a leading cause of blindness in the developed world and is expected to increase in the coming years due to an [aging population](#). [Recent research](#) has predicted that 77 million people in Europe alone will have some form of AMD by 2050.

AMD can be caused by changes in the Bruch's membrane, which supports the RPE cells, and breakdown of the choriocapillaris, the rich

vascular bed that is adjacent to the other side of the Bruch's membrane.

In Western populations, the most common way sight deteriorates is due to an accumulation of lipid deposits called drusen, and the subsequent degeneration of parts of the RPE, the choriocapillaris and outer retina. In the developing world, AMD tends to be caused by abnormal blood vessel growth in the choroid and their subsequent movement into the RPE cells, leading to hemorrhaging, RPE or retinal detachment and scar formation.

The replacement of the RPE cells is among several promising therapeutic options for effective treatment of sight conditions like AMD, and researchers have been working on efficient ways to transplant these cells into the eye.

Study author Professor Barbara Pierscionek, Deputy Dean (Research and Innovation) at Anglia Ruskin University (ARU), said, "This research has demonstrated, for the first time, that nanofiber scaffolds treated with the anti-inflammatory substance such as fluocinolone acetonide can enhance the growth, differentiation, and functionality of RPE cells.

"In the past, scientists would grow cells on a flat surface, which is not biologically relevant. Using these new techniques, the cell line has been shown to thrive in the 3D environment provided by the scaffolds.

"This system shows great potential for development as a substitute Bruch's membrane, providing a synthetic, non-toxic, biostable support for transplantation of the retinal pigment [epithelial cells](#). Pathological changes in this membrane have been identified as a cause of eye diseases such as AMD, making this an exciting breakthrough that could potentially help millions of people worldwide."

More information: Biola F. Egbowon et al, Retinal pigment epithelial cells can be cultured on fluocinolone acetonide treated nanofibrous

scaffold, *Materials & Design* (2023). DOI:
[10.1016/j.matdes.2023.112152](https://doi.org/10.1016/j.matdes.2023.112152)

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