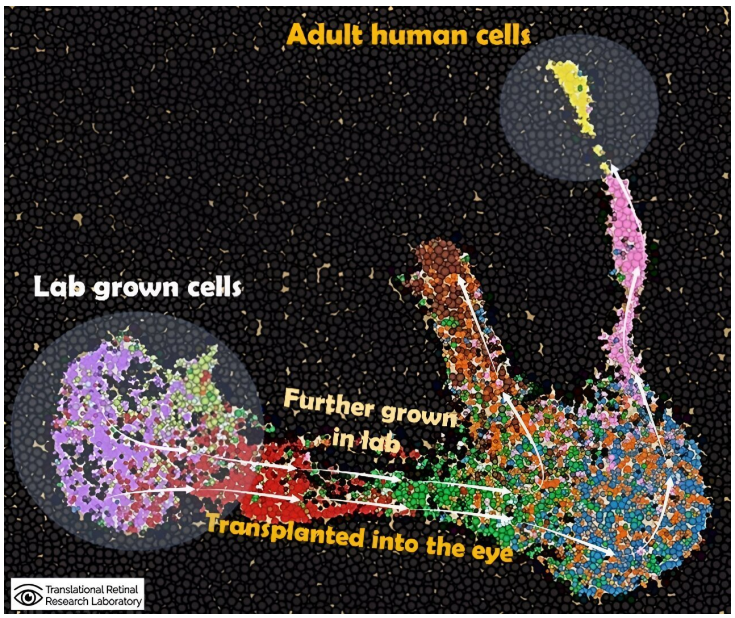
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ASIA EDITION

Singapore discovers novel insights into transplanted retinal cells to treat degenerative vision in elderly

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Discoveries can enhance outcomes of RPE cell therapy in te future



A team of scientists in Singapore has discovered new behaviour in transplanted stem cell derived retinal pigment epithelial (RPE) cells, which could help treat Age-related Macular Degeneration (AMD), one of the leading causes of irreversible blindness and visual impairment in elderly. Using preclinical models, the research team identified a special group of transplanted RPE cells that closely resembled healthy adult human RPE cells, which play a vital role in supporting vision.

The team consisted of researchers from A*STAR's Institute of Molecular and Cell Biology (IMCB), Yong Loo Lin School of Medicine, National University of Singapore (NUS Medicine), Singapore Eye Research Institute (SERI) and Lee Kong Chian School of Medicine (LKCMedicine) under Nanyang Technological University (NTU) Singapore.

Led by Dr Bhav Parikh, Scientist at A*STAR's IMCB and Dr Paul Blakeley, Senior Research Fellow at NUS Medicine, the research team used single-cell RNA sequencing technology to understand the genetic behaviour of individual cells in preclinical models, including its survival and maturation. The findings highlighted that stem cell derived RPE cells evolve posttransplantation, and a subpopulation evolved to become closely similar to mature human RPE cells. This subpopulation expressed genes that support vision and promote cell survival. This indicates that studying the transplanted retinal cells at the single-cell resolution is critical for uncovering specific cellular changes which impacts the outcome and effectiveness of retinal cell therapy. The insights could help researchers improve the survivability, functionality, and host integrability of transplanted retinal cells, as well as develop therapeutics for eye conditions in the future.

"Advancing AMD treatments via cell therapy hinges on uncovering the key elements that bolster the endurance, integration, and functionality of stem cell derived RPE cells after transplantation into the eye. Using single-cell RNA-sequencing, we discovered the precise factors that empower RPE cells to not only survive but also integrate and perform optimally in

supporting vision.” said Dr Parikh, lead author of the study and Scientist at A*STAR’s IMCB.

“This work has future implications to enhance outcomes of RPE cell therapy. For example, prior to transplantation, RPE cells in culture that display this distinct gene expression profile can be selectively chosen for RPE transplant to enhance post-transplant survival. Moving forward, we hope to develop manufacturing processes in line with cGMP regulations to culture these ‘superior’ RPE cells for AMD treatment.” said Dr Su Xinyi, corresponding author of the study, Acting Executive Director at A*STAR’s IMCB and Assistant Professor at NUS Medicine.