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Development of new cornea endothelial cell lines provides powerful tool for understanding corneal cell biology

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Human corneal endothelial cells (HCEnCs) form a monolayer of hexagonal cells whose main function is to maintain corneal clarity by regulating corneal hydration. Cell loss due to aging or corneal endothelial disorders, such as Fuchs dystrophy, can lead to cornea edema and blindness, resulting in the need for cornea transplants.

Studying human corneal endothelium has been difficult for cell biologists because limited cellular model systems exist and have significant drawbacks. The major drawback is that HCEnC cells do not divide and there is a limited source of these cells both for patient transplantation and for study in the laboratory. This field of study is now easier.

Scientists from the Schepens Eye Research Institute, Mass. Eye and Ear, have developed of HCENC-21 and HCEnC-21T, two novel model systems for human corneal endothelium. Their findings, Telomerase Immortalization of Human Corneal Endothelial Cells Yield Functional Hexagonal Monolayers, are online in the PLOS ONE.

A research team led by Ula Jurkunas, M.D., developed first-of their kind model systems for human corneal endothelium.

"These models mimic very well the critical characteristics and functionalities known from the tissue in the eye," Dr. Jurkunas said.

"They also fulfill essential technical requirements, e.g. indefinite number of and a high rate of cell division, to be a powerful tool. They will enable cell biologists to more reliably study human corneal endothelium in health and disease. The ability to enhance HCEnC cell self renewal and growth opens a new window of development of novel regenerative therapies for corneal swelling, hopefully reducing the need for corneal transplantation in the future."

More information: www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0051427

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