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Engineering approaches to develop biocompatible ophthalmic devices

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T issue engineering provides strategies and technologies to develop biomimetic solutions to repair and regenerate damaged or lost tissue. The engineered tissue may be either cell-based or scaffold-based without seeded cells; the latter offers advantages by minimizing challenges such as donor shortage, graft rejection and inflammatory response. While tissue engineering approaches have led to some successes in the development of artificial ocular tissues, clinically relevant tissue substitutes are still lacking. To this end, a significant effort has been dedicated to engineer scaffold-based artificial cornea and iris. These two ophthalmic devices have been designed based on engineering principles and utilize readily available materials that are shown to be biocompatible. The artificial cornea provides an alternate option for cornea replacement that minimizes post-implantation tissue melting, and thereby achieving long-term stability in the ocular environment. Moreover, an engineered artificial iris lens is shown to mimic the functionality of the natural iris by dynamically modulating light intensity entering the eye and demonstrates a promising potential for improved treatment option for patients with iris damage.

Biography

Michael Cho has received his BS degree from George Washington University and PhD from Drexel University. After completing Postdoctoral training at Harvard Medical School, he became a faculty member in the Bioengineering Department at the University of Illinois, Chicago in 2000. He recently joined the University of Texas at Arlington in 2015 as Chair of its Bioengineering Department. He is currently the Alfred R. and Janet H. Potvin Endowed Professor and Fellow in the American Institute for Medical and Biological Engineering (AIMBE). His research is focused on stem cell tissue engineering, development of ophthalmic devices, and mechanism studies of blunt force brain tissue injuries. His research endeavors have been supported by the Office of Naval Research, NIH, and DOE, and led to publishing more than 200 journal papers, book chapters, conference proceedings and abstracts.

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