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Indian researchers on way to creating vital part of human eye

Half a dozen eye hospitals in India are collaborating with a research centre in Chennai to create the inner layer of the cornea, the vital window of the human eye. It may allow 14,000 eye transplants a year.

Nichi-In Centre for Regenerative Medicine (NCRM) hopes to make corneal endothelium (inside cell layer) available on a commercial scale. NCRM eventually plans to set up a world class Corneal Endothelial Stem (CES)/Precursor Cell Bank at a cost of \$8 million.

The CES bank is expected to facilitate 14,000 eye transplants a year.

The project is based on the findings of Japanese doctor Shiro Amano of the Tokyo University School of Medicine, who in 2002 found that the endothelium of the cornea contains stem cells (cells in initial stages of development) that can be multiplied several times in the laboratory.

"The finding triggered worldwide research in creating corneal cells for therapeutic use," Samuel J.K. Abraham, lead researcher and director of the Chennai laboratory of the Nichi-In Centre, told IANS.

The eye has three main parts. The first is the cornea, which is a transparent film like structure that transmits light into the eye. The other two are the lens and retina.

During eye transplant, only the cornea is taken from the donor, not the whole eye. The black central portion of the eye has an outer layer, a middle portion and an inside layer (known as the endothelial layer).

Eye fluid keeps the cornea alive for up to six hours, allowing time for harvesting it and transplanting it.

The World Health Organisation says that in India, there are approximately 6.8 million people who are blind because their corneas are diseased. By 2010, this figure is estimated to go up to nine million.

A study done in the temple town of Madurai found 113 out of every 100,00 people had corneal ulcer. Another study in Andhra Pradesh estimated that 1,200 people per million are blind from corneal diseases.

"About 100,000 people are in need of eye transplant every year, yet only about 10,000 are able to get donated eyes. The wait for a donor can be endless for the other 90,000," eye specialists say.

"Imagine what a boon it will be if an eye stem cell bank could provide these lab generated endothelial layer of the cornea," S. Natarajan, chairman, academic research committee of the All-India Ophthalmological Society and chairman of the Aditya Jyot Eye Hospital, told IANS.

"We don't have to wait for someone to die for every eye transplant."

With the new technique, when cornea specimen from one eye donor is received, it could be used for 5-10 needy patients, he pointed out.

Nichi-In is now growing the animal and human corneal inner layer cells on a nano-scaffolding.

The research centre is hoping to begin phase I clinical trials on humans in six months.