

PRESS RELEASE

Japanese nanotech helps eye stem cell storage, transport

World's FIRST such feat accomplished by Indian doctors jointly with NCRM

Simple solution could help save donated corneas and patients waiting for transplant

Chennai, 24 Sep 2013: Science is moving ahead of transplantation of organs. Now, for certain organ failures, efforts are being made to replace the specific required cells. One of the commonly transplanted organs in the human body is the cornea. As a part of an ongoing, Indo-Japanese research initiative, the transport of the endothelial cells at normal temperatures without cool preservation has now been made possible. **This feat, an international FIRST of its kind of viable transportation of corneal endothelial tissue without any cool preservation** has been accomplished jointly by ophthalmologists from all over India, with Nichi-In Centre for Regenerative Medicine (NCRM), an Indo-Japan academic institute based in Chennai. The time from harvesting the corneal endothelial tissue (from cadaver donor-eye) till reaching a central stem cell lab was up to 72 Hrs, and yet due to the unique nanopolymer cocktail used for the transportation, the cells have survived. This work has been published online in the *Indian Journal of Ophthalmology* (<http://www.ijo.in/preprintarticle.asp?id=116457>).

Cornea, the transparent front portion of the eye, which transmits the images into the eye for visual perception, when damaged, may need to be transplanted with a cornea from a deceased donor. The cadaver cornea when donated should be harvested within six hours from the death of the donor and be preserved in specialized media under cool conditions to be transplanted within two weeks to a needy patient. Cornea has three main layers, the outer epithelium, central stroma and the inner endothelium. In today's practice, the eyeball is harvested and if the cornea is of usable quality, then it is preserved and transported in cool conditions to the needy patient's place where the cornea is removed and transplanted. **In the present study, from the eyes which were not suitable for such transplantation, the**

endothelium alone was separated and transported in a nanopolymer cocktail from hospitals in Dharmapuri, Mumbai, Sirsa (Haryana) etc. to the NCRM lab in Chennai and the team at NCRM could successfully isolate viable cells from these otherwise not usable endothelium, which could be further multiplied and be proven as corneal endothelial precursor (stem) cells.

In India approximately 1.5 lakhs corneas are needed for transplantation every year, whereas only a small portion of this is made available, leading to a huge backlog of patients waiting for the same and going by the statistics, the total no. of corneal blind population is expected to cross 10.6 million in the year 2020. According to the eye transplant registry of Asian countries, one-third of such patients have total corneal disease requiring full thickness corneal transplantation and in the remaining two-third, half of them have stand-alone endothelial disease, which could be treated with endothelial transplant. It was Dr. Shiro Amano of Tokyo University, Japan, who first identified that human cadaver endothelium, has precursor cells and guided the NCRM team with the culture technique. However the major hurdle was the transportation of the cadaver eye-derived corneal endothelium from the place of harvesting to the lab in Indian conditions because the corneal endothelial cells are very sensitive and fragile. **This is where the nano-polymer based cocktail prepared by NCRM in collaboration with Prof. Mori of Waseda University has proven that the corneal stem cells could be transported from even faraway places like Sirsa in Haryana from the Shah Satnamji Hospital without any cold chain preservation in the varying climatic conditions of India between 25 to even 40 degrees Celsius to the Chennai lab of NCRM.**

Now that the corneal endothelial stem cells could be transported without any damage and further could be multiplied, instead of them as a tissue be used in one eye of a patient, they could be used in more than one eye thereby making several patients waiting for corneal transplantation benefitted and see light. **This “An-eye-for-eyes” mission has taken close to eight full years to see the light and this day is very significant to us as eight years ago on the same day NCRM was inaugurated in India,** said Dr. Abraham, director NCRM, who also

shared that the eighth anniversary of NCRM is to be held on the 19th October 2019 in Chennai.

Dr. Aditya Insaan, Director and consultant ophthalmologist of the Shah Satnamji Hospital lauded the efforts of the team involving the eminent corneal surgeon **Dr Srinivas K Rao**, famous ophthalmologists **Dr S. Natarajan, Dr P. Parikumar and Dr. John Sudhakar** and added that with this technology, we can retrieve the stem cells from corneal endothelium even in the eyes which are otherwise not usable for transplant and help save the vision of patients waiting for transplantation. He recommended that similar studies be done in transporting the full thickness cornea to see if we can prolong its shelf life.

This Press release is available online at: <http://www.ncrm.org/media/pr24sep13.htm>

For further details please contact:

The Mary-Yoshio Translational Hexagon (MYTH), NCRM, PB1262, Chennai - 34

Tel: +91 44 28174743, Mob +91 94440 83551

Japanese nanotech based work by NCRM

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