

**“An overview of Regenerative Medicine Scenario in India &
Our 12-year experience of Indo-Japan bridging”**

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India, a country with diverse population, home to 1.2 billion people is now emerging not only as a medical tourism hub (1) but also its contribution to science is gradually increasing (2), with 17 patent filings per One million population in the healthcare domain (3). India being a major biotech player in Asia Pacific, coming next to Japan and South Korea (4), now ranks among the top 40 countries in terms of scientific papers published (5) whilst the stem cell therapy market in India valued at USD 15 Million in 2013; is expected to double by 2018 (6). Regarding Regenerative Medicine (RM) regulations, since 2007, the regulatory bodies such as Indian Council of Medical Research (ICMR) together with Dept. of Bio-technology (DBT) have been publishing guidelines and recently the Central Drugs Standard Control Organization (CDSCO) has published one (7) which is expected to become a law soon. The need for applications of RM in India vary from regeneration of skin in case of victims of burns (8) to corneal ulcers to trauma related regeneration as in spinal cord injury apart from birth defects as well as age related disorders covering a wide spectrum (9).

NCRM started in 2005 in Chennai, India has been working on corneal epithelial and endothelial regeneration, chondrocyte regeneration, *in vitro* cellular aging, immune cell expansion and enhanced methods for cell cryopreservation with five patents applied and two awarded (10). All our works use basic technologies by chemists, physicists and biologists from Japan which we translate to a solution in RM taking inputs from various stake holders. One significant feat we could accomplish was the transportation and preservation of highly fragile corneal endothelial precursors across varying Indian climatic conditions using scaffolds from Japan and its successful transplant (11,12) which we hope will pave way for out of the box cell culture based solutions and their delivery systems globally to institutes of RM. Our track record of transfer of Japan-origin RM solutions technology to countries like Malaysia and Vietnam is another accomplishment.

One of the key factors to develop novel solutions in RM is to create a NICHE wherein physicists, chemists and non-biology scientists would collaborate with clinicians and biologists. To promote such networking among budding scientists and clinicians we have been conducting a unique event NCRM NICHE since 2006 in India where in an exclusive

quiz program on RM has helped ignite and lure young minds and those who have completed as finalists in the Fujio Cup Quiz (FCQ) (www.fujiocupquiz.org) have landed in prestigious institutes such as Harvard, Cambridge, Kyoto University etc, making this event playing a key pivot role in shaping the future of next generation leaders in RM. This year we have planned to host the XII NCRM NICHE in National Centre for Global Health and Medicine (NCGM), Tokyo, on the 22nd of October 2017 (www.ncrmniche.org) in collaboration with Shibaura Institute, TPRM program of Univ. of Toronto and German society for stem cell research (GSZ), in partnership with Edogawa Evolutionary Lab of Science (EELS). This mission, we do hope would help us portray Japan as a hub for RM technologies, solutions and knowledge propagation to the entire world, thereby making the RM inventions from Japan reach the deserving.

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