

4th International Conference on Tissue Science and Regenerative Medicine

July 27-29, 2015 Rome, Italy

Neural progenitor cells for treating retinal degeneration

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Retinal degenerative diseases, such as age-related macular degeneration (AMD) are the major causes of irreversible blindness in industrialized countries. AMD pathogenesis involves a cascade of detrimental events beginning with RPE and Bruch's membrane changes that culminate in the death of light sensing photoreceptor cells and adjacent RPE ultimately leading to central vision loss. Currently no effective treatment options exist to slow disease progression for dry AMD.

The use of stem/progenitor cells have shown tremendous promise for treating retinal degenerative diseases and three concurrent clinical trials for dry AMD are underway in the US (ClinicalTrials.gov) and one trial for wet AMD in Japan. The clinical strategies for these trials are to use stem/progenitor cells to either replace the compromised host RPE, or to implant cells that limit ongoing RPE degeneration by undefined mechanisms. Our extensive studies demonstrated that human neural progenitor cells (NPCs) derived from induced pluripotent stem cells (iNPCs) or fetal cortex (a) have excellent survival with no evident induction of host immune rejection even in this xenogeic condition; (b) offer dramatic and prolonged preservation of both photoreceptors and visual function; (c) migrate long distance from the injection site next to photoreceptor layer; and (d) offer sustained release of multiple growth factors as well as provide other functions such as cell-cell contact and/or extracellular matrix (ECM) that enhance the survival of grafted cells and host retina. iNPCs avoid allograft immunogenicity and ethical concern, and allows for limitless production, represent a promising cell source for future personalized therapies.

Biography

Shaomei Wang completed her Ph.D. from University of Sheffield, UK and Postdoctoral studies with Professor Raymond Lund at the Institute of Ophthalmology, University of College London. She is an associate professor at Regenerative Medicine Institute at Cedars-Sinai Medical Center, USA. The laboratory has a long history of applying cell-based therapy for retinal degeneration. Currently, their preclinical studies are focused on the efficacy, long-term survival of donor cells, mechanism of action and immunological responses after transplantation of stem/progenitor cells into animal models for retinal degeneration.

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