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Differential gene expression profiling and mechanism of VEGF-B in photoreceptors degeneration

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Despite its early discovery and high sequence homology to the other VEGF family members, the molecular mechanism of VEGF-B in retinal degeneration in a disease model of retinitis pigmentosa has not been delineated yet. Thus, we aimed to test our hypothesis that either VEGF-B functions as a potent photoreceptors survival or rescue factor in retinal degenerative disease. We used different animal models and cultured cells to show that VEGF-B is a potent neuro protective and survival factor. Retinal thickness was measured by IF and H&E staining in VEGF-B, treated rd1 and VEGF-B-/- mice retinae compared with their respective controls. VEGF-B regulated genes related to neurotrophic/survival, angiogenic, apoptotic, antioxidants & oxidative stress were tested using microarray, pathway focused PCR-array, qPCR and western. Role of VEGF-B mediated survival of photoreceptors were examined after VEGF-B and H_2O_2 treatment. Increased retinal thickness was observed in VEGF-B treatment whereas reduced in VEGFB-/- mice. VEGF-B activates the expression of the protein and antioxidant defense, cell survival related genes whereas inhibits oxidative damage, cell death related genes in rd1 mic retinae. Western and IF confirms VEGF-B specificity and increased rho-4D2 positivity, respectively, in VEGF-B treated rd1 mice retina. Our finding shows that VEGF-B treatment up-regulates the array of survival & antioxidant related genes, which activates the glutathione defense system and rescues and protect the retinal photoreceptor cells in rd1 mice. Thus, our data demonstrates VEGF-B play a pivotal role in conserving/survival under pathological condition and may be of therapeutic value in treating retinal degenerative disease.

Biography

Pachiappan Arjunan has completed his PhD from National University of Singapore (NUS) and postdoctoral training from National Eye Institute/NIH. He is a Junior Faculty in the Dept. of Periodontics at GRU. He has published more than 20 papers in reputed journals and has been serving as an honorable consulting editor of *Eye and Brain*, permanent reviewer of *JoVE*, and volunteer reviewer for more than 10 journals etc.

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