doi: http://dx.doi.org/10.4172/2155-9570.S1.01

OMICS Group Conferences
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International Conference & Exhibition on
Clinical Research
Dermatology, Ophthalmology & Cardiology

5-6 July 2011 San Francisco, USA

Fuchs' endothelial corneal dystrophy

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Fuchs' endothelial corneal dystrophy (FECD) is a significant cause of corneal blindness and a leading cause of corneal transplantation. It affects approximately 4% of the population in the United States over 40 years of age.FECD affects corneal endothelium (CE) which is a monolayer of cells situated in the posterior portion of the cornea; by pumping and barrier functions CE keeps the cornea in a state of relative deturgescene. In FECD,corneal endothelial cells synthesize a thickened Descemet's membrane with focal excrescences that are composed of aberrant extracellular matrix components that are called guttae. As the numbers of guttae increase, the endothelial cells are lost. The mechanism of corneal endothelial cell loss in FECD is currently not known.Clinically, the disease progresses slowly over a period of 20 or more years from asymptomatic stage, manifested with isolated cornea guttae, to loss of vision due to loss of corneal endothelial cells. In such advanced disease, the cornea swells and becomes opaque because the remaining low number of endothelial cells is insufficient to keep the cornea dehydrated and clear. The only available treatment for FECD is corneal transplantation surgery. It has been shown by studies in our laboratory that there is an oxidant-antioxidant imbalance seen in FECD as compared to normal corneal endothelium (CE). The studies have shown accumulation of oxidized DNA lesions in FECD as compared to normal CE, co-localization of oxidative DNA damage and apoptosis, and down regulation of Nrf2(NF-E2-related factor 2) which is a major transcription factor responsible for activation of antioxidant genes.These findings suggest that oxidative stress is potentially a major cause of endothelial cell loss in FECD.

Biography

Dr. Alireza Ziaei received his M.D. degree with high honors from Tabriz University of Medical Sciences, Iran.Post doctoral Fellow at Harvard Medical University, he performs Basic Science Research at Schepens Eye Research Institute in Boston. Dr. Ziaei is member of Association for Research in Vision and Ophthalmology, and International Society for Eye Research. He has received numerous awards and grants including National Excellent Researchers Award and the Science Excellence Prize during his medical school. Dr. Ziaei's interest and research focus is on corneal and ocular surface diseases, mainly on the pathogenesis of Fuchs endothelial corneal dystrophy.