OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference on
Clinical Research
Cardiology, Ophthalmology & Dermatology

5-7 March 2012 Omaha Marriott, USA

Moderate light induced degeneration of rod photoreceptors with delayed transducin translocation in shaker1 mice

You-Wei Peng, Marisa Zallocchi, Weimin Wang, Duane Delimont, and Dominic Cosgrove

Boys Town National Research Hospital, USA

Usher syndrome is the leading genetic disorder of combined blindness and deafness. The main clinical symptoms of the disease are retinitis pigmentosa (RP) and hearing loss. Vestibular dysfunction and mental disturbances are also, in some cases, features of the syndrome. Usher syndrome is clinically and genetically heterogeneous, and can be divided into 3 major types. They can be further divided into different genetic sub-types. Mutations in the myosin VIIa gene (*MYO7A*) cause a major subtype (USH1B) of Usher syndrome. The shaker1 mouse has mutations in *MYO7A* and is a widely accepted animal model for USH1B. This mouse model is deaf and shows vestibular dysfunction but does not develop appreciable photoreceptor degeneration. We provide evidence showing that shaker1 mice have delayed rod transducin translocation with a shift of its activation threshold. Furthermore, shaker1 is much more sensitive than strain-matched wild type mice to light-induced photoreceptor damage. Even moderate light exposure can induce oxidative damage and significant rod degeneration in *shaker1* mice. When shaker1 are reared under moderate light/dark cycle, severe retinal degeneration develops in less than 6 months. More importantly, subretinal delivery of EIAV-based lentiviral vectors expressing human *MYO7A* in the Shaker1 is able to rescue these phenotypes, demonstrating that they result from lack of myosin VIIa function. These findings demonstrate that, contrary to earlier studies, shaker-1 mice possess a light-induced retinal phenotype which is closely related to these defective protein translocations. Importantly USH1B patients are thus likely vulnerable to light induced photoreceptor damage even under moderate room light.

Biography

You-Wei Peng has completed his PhD from Baylor College of Medicine and postdoctoral training from Howard Hughes Medical Institute in Johns Hopkins University. He later joins the faculty of Johns Hopkins University and Duke University. He has published peer-reviewed publications in various well-known journals including *Nature*, *Neuron* and *PNAS*. He is now the director of Retinal Neurobiology Lab in Boys Town National Research Hospital.