

Seminar

Neuroprotection and Neuroregeneration Gene Therapy for Retinal Degeneration Diseases

Dr. Wenjun Xiong

Assistant Professor

Department of Biomedical Sciences, City University of Hong Kong

Date: 7 April 2016 (Thursday)

Time: 12:00nn – 1:30pm (Reception with light sandwiches starts at 11:45am. To facilitate the order of sandwiches, please register through email shulchan2@cityu.edu.hk.)

Venue: B6605, Academic 1, City University of Hong Kong

Language: English

Abstract

Why neurons degenerate in diseases as well as during normal aging is an important question to be addressed. We use Retinitis pigmentosa (RP), an inherited retinal degeneration, as a disease model to study the common mechanisms underlying neuron degeneration and to develop novel therapies. Work from our lab and others suggest that the death of cone photoreceptors, the light-sensing neurons that provide our color and high acuity vision, is likely due to a common set of cellular stresses, including oxidation and metabolic dysregulation. We have been aiming to develop generic gene therapies to preserve cone function and survival in RP patients. To address the oxidation problem of cones, we designed two separate therapeutic strategies, one with two essential antioxidant enzymes, SOD2 and catalase, and the other with two antioxidant master transcription regulators, Nrf2 and PGC1a, and compared their efficacy. Via neonatal subretinal injection of adeno-associated virus (AAV) vectors, we can deliver these genes to the majority of cones. We found that both sets of genes can preserve cone survival and function in three different mouse models of RP, with the antioxidant transcription factor Nrf2 working the most effectively. The neuroprotective effects of Nrf2 extended to another neuronal type, retinal ganglion cells, in a model of acute axon injury, suggesting that targeted delivery of antioxidant genes has potential to ameliorate other diseases characterized by oxidative stress-induced cell degradation.

Biography



Dr Xiong received her PhD in Biomedical Sciences at the University of Chicago in 2010. Under the supervision of Prof. Ilaria Rebay, she studied how multiple signaling pathways interact in space and time to ensure the accurate developmental program of the Drosophila compound eye. In 2011, she joined the laboratory of Prof. Constance Cepko at Harvard Medical School, where she studied the disease mechanisms of inherited blindness and developed gene therapies to prolong vision in mouse models. In August 2015, she joined the Department of Biomedical Sciences at City University of Hong Kong as an Assistant Professor.

Her research interest is to unveil the molecular mechanisms that can facilitate the rescue, replacement, or regeneration of retinal neurons in the face of eye degeneration diseases, such as retinitis pigmentosa, age-related macular degeneration, and glaucoma. She hopes to translate their work into the development of novel gene therapy and regenerative medicine for retinal degeneration patients.

**** ALL ARE WELCOME ****

Enquiry: Prof. Ying Li, Department of Biomedical Sciences, City University of Hong Kong.

Tel.: 3442 2669, Fax: 3442 0549, Email: yingli@cityu.edu.hk

Prof. Stella Pang, Department of Electronic Engineering, City University of Hong Kong.

Tel.: 3442 9853, Fax: 3442 0562, Email: pang@cityu.edu.hk