PROGRESS IN NEUROSCIENCE PINS

Seminar Series of the
Brain & Mind Research Institute
Weill Cornell Medical College (WCMC)
&
The Graduate Program in Neuroscience of
WCMC and Sloan Kettering Institute

Thursday, 11/13/14, 4 PM, coffee at 3:45 PM
Weill Auditorium

Cell-intrinsic Signaling in Neuron Growth, Regeneration, and Function

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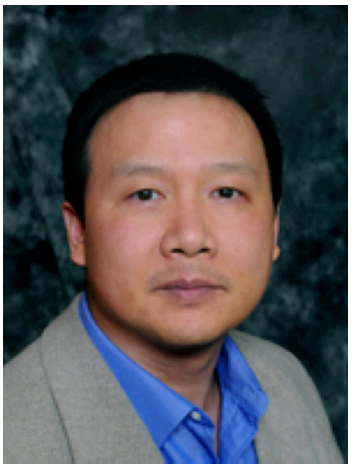

Abstract:

Axons cannot regenerate in the injured adult CNS. One of the reasons is that the intracellular mechanisms that drive axon growth in the developing organism are severely downregulated in the mature animal. My lab investigates ways to re-activate growth-promoting cell-intrinsic signalling in mature CNS neurons as a way to enable axon regeneration. We have generated genetically modified mice that conditionally express a constitutively kinase-activated B-RAF and found that activation of B-RAF kinase alone was sufficient to enable robust regenerative growth of sensory axons into the spinal cord after a dorsal root crush. Moreover, the activation of B-RAF in retinal ganglion neurons drives substantial axon regeneration in the crush-lesioned optic nerve. We are currently applying this paradigm to models of spinal cord injury and are seeking to identify the downstream effectors of RAF signaling that are relevant to axon regeneration.

Recent relevant publications:

1. O'Donovan KJ, Ma K, Guo H, Wang C, Sun F, Han SB, Kim H, Wong J, Charron J, Zou H, Son Y-J, He Z, Zhong J (2014) B-RAF kinase drives developmental axon growth and promotes axon regeneration in the injured mature CNS. ***J Exp Med*** 211:801-14.
2. Zhao Z, Huo F, Jeffry J, Hampton L, Demehri S, Kim S, Liu X, Barry DM, Wan L, Liu Z, Li H, Turkoz A, Ma K, Cornelius LA, Kopan R, Battey JF Jr, Zhong J*, Chen Z* (**co-corresponding authors*) (2013) Chronic itch development in sensory neurons requires BRAF signaling pathways. ***J Clin Invest*** *123:4769-4780*

Weill Cornell Medical College