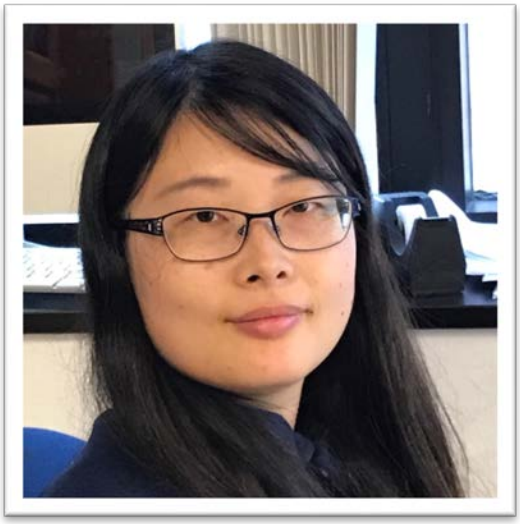
CENTER FOR RNA BIOMEDICINE



RNA Innovation Seminar
Monday, October 15th at 3:00pm
ABC Seminar rooms, Biomedical Research Science Building (BSRB), 109 Zina Pitcher

Yi Zhao, Ph.D. is a postdoctoral research fellow in the Alon Kahana Lab.
Her research focus is investigating the transcriptional regulation during cell reprogramming
• Examine the function of Twist transcription factor in muscle development and regeneration
• Examine the function of c-Myc in muscle regeneration and stem cell maintenance.

"Myc plays an important role in myocyte reprogramming and extraocular muscle regeneration"

Keywords: *muscle regeneration; c-Myc; cell reprogramming; stem cell; nuclear remodeling*

Abstract: Extraocular muscles (EOMs) are required for proper visual function. Damaged EOMs are common causes of visual dysfunction, affecting as much as 5-10% of the US population. Hence, elucidating the mechanisms that govern adult EOMs repair and regeneration carry significant promise for developing novel therapies. To study EOMs regeneration, our lab has developed a unique Zebrafish-based system, taking advantage of the robust regeneration capacity of zebrafish. After injury, zebrafish myocytes, a kind of high differentiated, post mitotic cell, dedifferentiate and reprogram to pluripotent stem cells (myoblasts) by 20 hours post injury. After proliferate and generate adequate number of cells, myoblast re-differentiate and fuse into myotubes, and eventually regenerate a functional muscle. It has been published that c-Myc, a 'Yamanaka' stem cell factor, plays a critical role in mammalian myogenesis. We hypothesized that c-Myc also promoted regeneration of EOMs. Zebrafish has 3 c-myc homologs, Myc-A, Myc-B and Myc-H. We found expression of Myc-B and Myc-H were dramatically induced after EOMs injury. Moreover, knocking down Myc expression or inhibiting its activity inhibited myoblast proliferation, suggesting myc is required for myocyte dedifferentiation. In addition, utilizing in vivo Hi-C nuclear topography analyses, we found changes of inter-chromosome interactions between Myc and loci on other chromosomes, suggesting myc might regulate genes localized in other chromosomes by nuclear remodeling during regeneration. All these data suggest that Myc may perform as a master regulator to promote myocyte reprogramming and EOMs regeneration.