Narrative
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Host Lab: Keene Lab, University of Nevada, Reno
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This past summer I had the privilege of conducting research with Dr. Alex Keene and Dr. Masato Yoshizawa at the University of Nevada, Reno. This experience allowed me to work with the emerging model organism, *Astyanax mexicanus*, which is an exceptional model for studying the evolution of behavioral and physiological traits. My interest in studying this organism stemmed from my interest in animal behavior, and my previous work using a model animal, zebrafish, to resolve the relationship between its metabolic state and sleep behavior. Dr. Keene's lab primarily studies sleep and metabolisms in fruit fly and zebrafish, and has recently extended its research field toward the evolution of these traits. Dr. Yoshizawa, a specialist in the genetics of cavefish behavior, became a part of the Keene Lab to promote the evolutionary researches, and I have been involved as a core member of this group.

Astyanax mexicanus is composed of two forms: surface-dwelling sighted morph and cove-dwelling blind morph. These two morphs can still be interbred making them a powerful tool for genetic analysis. In this system, the cave morph has known to evolve significantly reduced sleep and enhanced a foraging behavior comparing with surface morph. I spent this summer investigating the reduced sleep behavior in the F_2 hybrids generated from a cross of surface fish and cavefish, and analyzed its relation to their enhanced foraging behavior, vibration attraction behavior, that is, fish are attracted to vibrating object in the water to hunt moving prey. Because reduced sleep yield more time to seek a food, it was of interest whether cavefish evolved both sleep loss and enhanced vibration attraction behavior by mutating the same gene(s) or not. Resolving this genetic linkage was thus my research theme conducted in this summer.

The initial weeks of my internship were spent establishing the proper husbandry for *Astyanax*. Although my mentor adjusted major parts, we had to determine the configuration of our system. This learning was then reinforced throughout the remaining of my internship. At the end of the internship, I confidently mastered the way to maintain and raise my own stock of *Astyanax*. Along with this successful experience, I also optimized the adult recording system, which is capable to record 30 fish activities concurrently during 24 hours. These movies were used to extract sleep and locomotion data. Surprisingly, when we compared these data with the level of vibration attraction behavior (pre-measured), there was no significant correlation suggesting that there was no major shared genetic factor underlying vibration attraction behavior, sleep and locomotor activity. We then concluded that distinct genetic mechanisms promoted the evolution of related behaviors: reduced sleep and an enhanced foraging behavior. These behavioral data that I acquired also contributed for further genetic mapping of Quantitative Trait Loci (QTL), and above work was submitted in an international journal.

In conclusion, my internship offered me an immense amount of experience in husbandry of new animal system, and developing my own research tools as a young researcher.