A Brief Research Proposal: *Alpheus heterochaelis*

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Variations in Snapping Shrimp Brain Transcriptomes

Analysis of model organism *Alpheus heterochaelis,* a species of snapping shrimp, will be centered around reaching the goal of complete transcriptomic analysis (barring any additional analysis request from Dr. Kingston). The *Alpheus heterochaelis* brain is where Dr. Kingston retrieved transcriptomic data. The brains of snapping shrimp are a particularly interesting body part of snapping shrimp, as snapping shrimp are known for withstanding significant blows to their heads. *Alpheus heterochaelis* have large claws and helmet-like structures on their heads, which makes them well-adapted for fighting.

The specific transcriptomic data Dr. Kingston has collected pertains to the brain transcriptome of snapping shrimp with helmets that have been snapped at, those with helmets that have not been snapped at, and those without helmets. These categories from which data has been collected leads to the primary research question: What are the differences in the brain transcriptome of snapping shrimp with helmets who have been snapped at, snapping shrimp with helmets who have not been snapped at, and snapping shrimp with no helmet that have been snapped at?

The methods behind transcriptome analysis will consist of using software such as Calypso. Software such as this will allow for a comparison of the three categories of snapped shrimp being researched. Furthermore, it will allow for a comparison of the transcriptome to the extent that differences in how their genes are working together can begin to emerge.

Overall, I believe the results will reflect that both snapping shrimps with helmet-like structures, snapped at or not, contain transcriptomes in the brain that show genes oriented toward protecting the shrimp's head. In contrast, those with no helmet-like structure will have a transcriptome showing genes that are less focused on protecting their heads (and potentially more emphasis on other features such as larger claws).