

## **Project Proposal**

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**Project Title:** Analyzing brain transcriptomes of snapping shrimp to investigate the possibility of up and down regulating gene expression in both shockwave exposed and healthy brains.

**Introduction:** Snapping shrimp are a group of marine (and some freshwater) crustaceans in which many have the capacity to create cavitation bubbles by snapping their claw(s). The shockwaves created by these snaps are similar in strength by scale as explosive events which cause brain damage. To compensate for this, snapping shrimp have evolved a specialized helmet like armor which covers their eyes. This specialized feature is called an orbital hood. Kingston et al. have found that the removal or alteration of these orbital hoods results in brain damage from exposure to the shockwaves they create with their snaps. Little is known about how this brain damage affects gene and protein expression the brain of these shrimp, in fact very little research into blast brain damage has been conducted at all. The vast majority of this blast induced brain damage research has been conducted in mice and with such drastically different research systems it is unknown what may be found in the brain damaged snapping shrimp brain transcriptomes.

**Research Question:** Are genes differentially expressed in shockwave exposed and control brain transcriptomes of snapping shrimp? What genes, and thus proteins, are up or down regulated due to brain damage in snapping shrimp?

**Methods:** De novo assembly of transcriptomes. Comparison of gene expression is transcriptomes from brains which were exposed to brain damaging shockwaves and brains which were not (control). Identifying what proteins these up or down regulated genes code for as well as identifying the purpose or use for said proteins/why they would be up or down regulated.

**Predictions/expected outcomes:** I expect to see genes being differentially expressed between the shockwave exposed brain transcriptomes and the control brain transcriptomes. What exact genes will be up or down regulated is not something I believe I can predict however I hope we may find a gene related to neural regeneration or any novel gene whose use is uncertain.