Evaluating the Effects of River Water Pollution on HSP70

Michelle M. Pham
The University of Texas Rio Grande Valley, michelle.pham01@utrgv.edu

Jashandeep Bajaj
California Northstate University

Zayu Yu
California Northstate University

Recommended Citation

Pham, Michelle M.; Bajaj, Jashandeep; and Yu, Zayu, "Evaluating the Effects of River Water Pollution on HSP70" (2024). *Research Colloquium*. 18.
https://scholarworks.utrgv.edu/colloquium/2023/posters/18

Title: Evaluating the Effects of River Water Pollution on HSP70

Authors: Michelle M. Pham, B.S.[1,2], Jashandeep Bajaj[2] , Zeyu Yu[2]

Affiliations: 1- The University of Texas Rio Grande Valley School of Medicine, 2- California Northstate University College of Health Sciences

Background

Corbicula *fluminea* is an invasive clam species that disturbs the balance of the ecosystem. This study was conducted to examine the environment of the American River and the different factors that could have contributed to the success of C. *fluminea* in their established habitat, as it was hypothesized that an increased presence of contaminants would deteriorate the health of the clams.

Methods

Initially, the anatomical characteristics of the species were analyzed. The effects of both the changes in the concentration of zinc sulfate and pH level on the health of the clams and algae were respectively evaluated to simulate and study the impacts of hazardous runoffs. The biological response of the clams was examined. The stress level response of C. *fluminea* was measured by examining the presence of HSP70 protein. Increased HSP70 levels would indicate elevated levels of stress in the clam.

Results

The mass of clams experienced a proportional decrease as they were exposed to increasing concentrations of zinc sulfate. The addition of basic and acidic household products to the clams' environments caused the pH to deviate from the river's measured level of 7.92 and demonstrated a decline in algae mass, especially in acidic conditions. Since the environment of the Asian clams was altered, their stress levels could have potentially influenced their feeding rate, causing them not able to find viable food sources or display a lack of wanting to consume. The HSP70 protein was found to have larger concentrations in $CaCl_2$, indicating that clams would experience high-stress levels under the presence of daily chemical runoffs.

Conclusions

Introducing pollutants to the environment, demonstrated a substantial decline in the health of the algae and clams. The experiment should be replicated on a larger scale using a more representative clam and algae size to increase accuracy.[8] Proteins such as pGp should be correlated with the obtained levels of HSP70 to evaluate if a significant relationship exists between the levels of stress response and drug resistance capability.[9] Algae and clams are at the bottom of the food chain, allowing for biomagnification and greater detrimental effects for humans in regards to HSP70.