A Physiological Study of the Function of Crustacean AST-C and NPY-Like Peptides Using the Jonah Crab, *Cancer borealis*

Audrey Bergeron, Class of 2012

Neuropeptides, short proteins that can function both as hormones and neurotransmitters, play important roles in a wide variety of organisms. Crustaceans, such as the crab *Cancer borealis* and the American lobster, have very accessible and distinct nervous systems. As such, both types of crustaceans have been used as model systems to study the effects of neuropeptides on the heart and other organs. In this study, the effect of the disulfide bond containing C type Allostatin peptide (AST-C), as well as the NPY-Like peptide, was studied on a whole crab heart.

The whole heart was isolated and put under saline. The force of the heartbeat was measured using a force transducer that was attached to the anterior arteries of the heart. The data program Spike 2.6.9 was used to record and analyze the force and frequency of the heartbeats. The posterior artery of the heart was cannulated with a perfusion tube, through which the neuropeptide was applied directly into the heart. Different concentrations of both AST-C and NPY-Like peptides (10⁻⁶ M, 10⁻⁷ M, 10⁻⁸ M) were tested.

It was found that AST-C caused a significant decrease in amplitude about half of the time at 10⁻⁶ M concentration and had no significant effect at lower concentrations (Figure 1). Because AST-C did not consistently have an effect, it is hypothesized that varying stages of the molting cycle affect the influence of AST-C on the heart. NPY-Like peptide effects on the heart were insignificant. In the future, we plan to test the effect of the NPY-Like peptide on the digestive system of the crab.

![Whole Heart Contraction Preparation](image)

Figure 1. A graph of the average percent change in the parameters of the heartbeat after application of 10⁻⁶ M AST-C peptide. Only amplitude had a significant change.

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