

**Behavioral and Molecular Studies of Social Dominance in the American Lobster, Homarus
Amercanus**

Abstract

This thesis will address two related questions in the study of aggression in lobsters. The first is a behavioral study examining the effects of depletion of 5HT on fighting behavior in naïve juvenile lobsters. Experimental animals were given injections of the drug 5,7-dihydroxytryptamine (5,7-DHT) in vehicle while control animals received vehicle alone. The duration and intensities of fights between the injected animals and control opponents were then compared and statistically analyzed using the scoring scheme described by Huber et al. (1997b). The work for this project resulted from a collaborative effort that has been published recently (Doernberg et al.2001). Dr. Barbara Beltz at Wellesley College did the 5,7-DHT injections and the immunocytochemistry for this project. Drs. Stuart Cromarty and Ralf Heinrich did the electrophysiology and videotaped some of the fights. Dr. Edward Kravitz and I worked on the HPLC together. I videotaped many of the fights, dissected the combatant animals, scored all of the fights, and performed the statistical analyses. In addition, I wrote the initial paper drafts and made revisions as the writing process continued. The publication and a commentary on it are included as a chapter in this thesis.

The second study is a molecular one, involving the characterization of long-term effects of fighting. In adult lobsters that had been paired for two weeks I studied a piece of DNA generated from mRNA whose level we suspected might have been altered depending on the social status of animals. This candidate was generated by a differential display of mRNA expression produced by Dr. Geoff Ganter, a postdoctoral fellow in the lab. I first compared the sizes of this fragment in dominant, subordinate, and isolated lobsters with RT-PCR and then sequenced the variations in dominant, subordinate, and isolated animals. In an attempt to characterize the product, I used a library screening method and explored the fragment in *Drosophila melanogaster*. Though this gene fragment does not appear to be involved in aggression, other candidates from the differential display may be and could underlie the behavioral changes that occur with the establishment of a dominance hierarchy.

Back to 1999-2006 theses