BIOLOGY SAMPLE THESIS PROPOSAL

Honors Thesis Proposal
Fall 2013
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I. Thesis Project Summary

Social interaction is crucial for the development of social experience in an organism and can impact their psychological and biological systems for short or long periods of time. Associations like dominant-subordinate relationships can form during social interactions causing aggressive behavior and changes in the physiology of the organism. The focus of this research is to analyze how social experience impacts the social status of an organism by testing the hypothesis that epigenetic changes affiliated with methylation are stimulated by aggressive social interactions leading to dominant-subordination relationships in males.

The model organism for this experiment will be the male green anole lizard (Anolis carolinensis) because they exhibit documented and specified behaviors within thirty to ninety minutes of introduction. These behaviors lead to dominant-subordinate relationships which affect the lizard’s social status for mating and living area. The dominant male will exhibit certain characteristics like appearing a greenish color and occupying a high perched position, while the subordinate male will occupy a lower perched position, appear a brownish color, and display a low profile compared to the dominant male. There will be one aim for this research with two experiments. Experiment one will be to examine whether amplifying gene methylation at the first social encounter affects the possibility of dominance or subordination and experiment two will be to determine if blocking gene methylation increase or decrease the probability of a male becoming dominant.

II. Method of Study

Aim 1: Male lizards will be matched by size and paired forming a total of ten pairs. Each pair will be housed in ten gallon aquariums separated by a barrier for seven days. For experiment one, the barrier will be removed on the eighth day and each pair will be placed in a test cage containing a single diagonal perch and a female. An hour before removal one randomly selected male from each pair will be injected with L-methionin which causes increased methylation, while the other male will be injected with vehicle. For experiment two, one of the paired male lizards will be randomly selected an hour before removal on the eighth day and injected with Zebularine which is a methylation blocker. The other male will be injected with
vehicle. All male lizards in both experiments will be marked with nontoxic acrylic paint to facilitate identification. The test cage environment will spark males to participate in agonistic and chasing behaviors until a dominant-subordinate relationship is achieved. The time allotted for this social interaction will be thirty to ninety minutes; however, lizards that continue to fight longer than two hours or do not form a dominant-subordinate relationship will not be used. The males will remain together for a total of seven days and observed every day to be sure relationships are maintained.

III. Bibliography


IV. Method of Faculty Assessment

The research advisors for this experiment will be Dr. Wilczynski and Dr. Carruth from GSU’s Biology department. The method of assessment will be based on my attendance and
presentations at weekly lab meetings, participation in the project, quality of lab notebook, and satisfying given duties. The written thesis document will be evaluated based on the formation of an outline, a rough draft, and the overall quality of the final thesis document.

V. How Study Fits into Major and Degree Requirements

This Honors Thesis will fulfill three credit hours in my Honors Thesis concentration area as well as three hours in area I for my Biology degree. The skills and concepts learned through this research with Dr. Carruth and Dr. Wilczynski will not only strengthen my applications for graduate or medical schools, but also enrich me with knowledge of social interactions in neuroscience.