TITLE: Effects of Gene Methylation on Behavior in Green Anole Lizards (*Anolis carolinensis)*

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Introduction:

Manipulating the level of methylation may alter the behavior of an organism by impacting their systems for an extended period of time. This research examines how altering the concentrations of methylation in green anole lizards change their social behavior within a dominant-subordinate relationship.

Method:

There is one aim for this research with two experiments. Experiment one determines if blocking gene methylation increase or decrease the probability of a male becoming dominant, while experiment two examined whether enhancing gene methylation at the first social encounter affects the possibility of dominance or subordinance. For experiment one, 18 male lizards were matched according to size and paired forming a total of 9 pairs. Each pair was housed in ten gallon aquariums and separated by a barrier for five days. During this time, one lizard in each pair received a 0.5 mg in 50 µl injection of Zebularine (Zeb), a methylation blocker, while the other receives a vehicle daily. On the fifth day, the barrier was removed 30 minutes after administering the injections, allowing the pairs to interact. The first 20 minutes was video recorded. The pairs remained together for four more days. On the ninth day, the pairs were separated and reintroduced on the tenth day for another 20 minute recording. For experiment two, the same procedure was used as in experiment one except 33 mmol in a 50 µl injection of L-Methionine (Met), a methylation enhancer, was given instead.

Results:

Animals treated with Zebularine displayed significantly more aggressive displays than controls ($P=0.034$) in a twenty minute session. Nine Zeb males were dominant and three were subordinate. Additionally, males injected with L-methionine performed less activity in the same period of time. Two Met males were subordinate and one dominant.

Discussion:

The data demonstrates that epigenetic changes affiliated with manipulated methylation alter aggressive social interactions leading to dominant-subordination relationships in males. This study shows that methylation levels in the brain play a vital role in social behavior.