The Effect of Altering Drosophila Gut Microbiota On Mate Choice, Immunity, Memory, and Aggression

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It has become well established that the gut and the brain communicate with each other in a bidirectional manner. The objective of this experiment was to determine if altering the gut microbiota would affect the communication between the brain and gut. Knowledge gained from this project may potentially lead to novel treatments for anxiety, mood disturbances, obesity, pain and other central nervous system disorders. The gut microbiota was altered by adding probiotics or antibiotics to food, sterilizing food or changing food to a starch diet. Flies were raised in each of these food mediums as well as a normal food medium of corn, molasses and yeast. Aggression assays, memory assays, mating choice assays, and immunity tests were performed on second generation flies from each group. Results suggest that altered gut microbiota can influence aggression, memory, mating choice and immunity with flies given probiotics demonstrating the greatest effect. Out of the 57% of flies that mated with flies on different diets 65% mated to flies given probiotics and only 6% of probiotic flies mated to flies with different diets. Flies given probiotics with a CMY diet had three times the number of passes on memory testing than flies on CMY diet alone. Aggression encounters between flies given probiotics vs. flies not given probiotics had an average aggression intensity of 2.4 compared to encounters between flies in which neither were given probiotics that had an average aggression intensity of 0.75. In the immunity tests, groups given Serratia marcescens survived better than same groups without Serratia marcescens except for groups given probiotics.

Awards Won:
Fourth Award of $500
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