Combating Malnutrition: The Effect of Eggs on the Development, Learning, and Memory of Drosophila melanogaster

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This project's purpose was to determine if a malnourishing diet negatively affects development and cognition in D. melanogaster, if consuming eggs reduces those effects, and whether childhood or adulthood diet has a greater effect on adulthood cognition. An additional experiment was conducted to determine if these dietary effects translated into the F1 generation. Three different diets were created-a control diet containing 0.389 calories/gram, a malnourishing diet containing 0.241 calories/gram, and an egg-enriched diet containing 0.266 calories/gram. Seven different groups were reared on a specific combination of the three diets (one in childhood, one in adulthood). The length of each larva in the third instar and the time taken for each fly to develop was recorded. Learning and memory was tested using a negative reinforcement assay. To conduct the second experiment, the flies from each group were transferred to control diet vials immediately after testing. The entire experiment was then repeated with the F1 generation. It was found that malnourished Drosophila experienced decreased development and cognition compared to those reared on the control diet. However, Drosophila reared on the egg-enriched diet had improved development and cognition compared to malnourished Drosophila. Furthermore, those malnourished in childhood experienced greater cognitive decline than those malnourished in adulthood, indicating that their childhood diets had a greater impact on cognition than their adulthood diets. Additionally, the development and cognition of the F1 generation mimicked the parental generation, indicating that the diets of the parental generation affected the F1 generation.

Awards Won: