What You Eat, What You Are: Diet-induced Epigenetic Alteration of Tenebrio molitor's Pigmentation

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The existing studies in the broader literature have investigated epigenetics with the class Mammalia, contrary to the class Insecta that remained uninvestigated. To these ends, this study aims to demonstrate how the color of insects is influenced by epigenetic changes, with a particular emphasis on how diet can change the pigmentation of insect exoskeleton. The study proposed the hypothesis that parental generation tenebrio molitor with methyl-abundant diets will undergo more frequent DNA methylation in their dark-colored pigmentation gene, which will be passed to their F1 (offspring) generation and yield offspring with a brighter exoskeleton. To test the hypothesis, the study prepared 3 groups of Tenebrio molitor: the control group was given lettuce (Lactuca sativa) grown with normal water and the experimental groups were given lettuce grown with water with methyl group donor diluted. After these parental generations oviposit, a spectrophotometric comparison of the exoskeleton pigmentation of the F1 generation validated that the F1 generation of experimental groups has a significantly brighter color. This study is significant in that it demonstrated that the pigmentation of insects is determined by epigenetic influence, suggesting a new direction for future genetic research in insects as well as the insect industry.

Awards Won:
Second Award of $2,000