Investigating Heat Exposure on Transgenerational Inheritance in C. elegans

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Environmental exposures can impact the expression of genes via epigenome, which is transgenerationally inherited. Short term exposure to unfavorable conditions could permanently alter the expression of DNA in Caenorhabditis elegans. Learning the behavioral and phenotypic changes after controllable exposures can be utilized to protect and assist organisms via epigenetic manipulations. This study investigated the effects of short term exposure to unideal temperatures on the expression of DNA in C. elegans. Worms were exposed to a high temperature (25°C) in increments of three hours, DNA was extracted from 3 worms at each sampling point (3, 6, 9, 12, 24 hours). Using PCR, the expression of two genes controlled by the H3K9me3 histone (ZK262.8 and hsp16.48) was then compared with that of control worms kept at an ideal (20°C) temperature by phenotypic evaluation (worm length), and presence/absence via gel electrophoresis. The lengths of the offspring of the worms exposed for 6, 9, and 24 hours were significantly smaller (T-test unequal variance, $p<0.05$) than the lengths of the offspring of the control groups. This experiment suggests that exposure to 25°C for as little as 6 hours can result in the inheritance of epigenetic material related to the H3K9me3 histone.

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