

# **The Effect of Temperature on Developmental and Survival Behaviors over Multiple Generations of *Caenorhabditis elegans***

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The goal of this study is to determine how temperature epigenetically affects the developmental time and survival rates of the nematode *Caenorhabditis elegans* (*C. elegans*). It is posited that warmer than established optimal developmental temperatures could induce heat resistance and accelerated development rates in *C. elegans*. The two experiments presented in this report look into how these traits can be inherited. The first experiment collected data over 95 hours of *C. elegans* in 4 groups of differing developmental stages, spanning from eggs to adults. Development stage data was collected for two sample populations of *C. elegans*: an experimental and a control group. The experimental group was the progeny of nematodes developed at 25°C and the control group was progeny of nematodes developed at 20°C. The results demonstrated that the temperature at which the parental generation grew induced no significant difference in development rates between the progeny of the two temperature exposure groups. For the second experiment, the death rates of *C. elegans* were studied at extreme temperatures for the progeny of nematodes grown in the warmer and cooler temperatures. Four groups were tested: a control group, the progeny of *C. elegans* developed at 20°C, as well as generations 2, 3 and 4, the progeny of *C. elegans* developed at 25°C (Generation 1). The groups were placed in an incubator at 37°C for 2 hours after which the nematodes were classified as either dead or alive. The control group had a 96% death rate when exposed to extreme temperatures, generation 2 had the lowest death rate with 54.2%, and the death rate increased in generations 3 and 4. This shows that increased temperatures can induce heat resistance for multiple generations, but that this resistance may be lost over generations. Due to a recent increase in the temperature of Earth's surface and climate change, it's important to understand the ability of *C. elegans* to epigenetically inherit regular development and high survival rates even at warmer temperatures.