The Effect of Timing and Dose of N-Acetylcysteine on Caenorhabditis elegans Lifespan and Healthspan

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Many people think that antioxidants can slow aging and improve overall health, but scientists are not sure that they actually work. In this project, we tested how timing and dose of an antioxidant N-acetylcysteine (NAC) affected Caenorhabditis elegans. The worms were divided into five groups: a control group with no antioxidants, early low dose (1 μM), early high dose (5 μM), late low dose, and late high dose. The lifespan was recorded every other day and the movement was measured by counting body bends in 30 seconds every four days to show how active and healthy the worms were. The results showed that antioxidant effects depended on both timing and dose (linear regression, $p < 0.01$). Some treatments improved lifespan and movement more than others. For example, the early group with a low dose lived the longest and had the slowest rate of death. The groups with a high dose had a fast rate of death and their healthspan was not as good. There was a significant relationship between dose/time and number of bends (ANOVA, $p < 0.01$). The low and control groups were healthier than the high/late groups. These results suggest that antioxidants do not always help and their effects depend on how much and when it is used.

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