The Ability of Vitamin E to Improve the Reproduction, Locomotor Fitness, and Metabolic Respiration of Nicotine-Induced D. melanogaster

Qadri, Ibrahim (School: Valley Stream South High School)

As of 2021, 20.7% of Americans have reported consuming nicotine, which is known to severely decrease the viability of human sperm, accelerate the loss of eggs, and alter the respiratory systems of a human fetus. Antioxidants have been previously researched to combat the effects of nicotine, and in this research study, the ability of Vitamin E to mitigate the effects of nicotine on respiratory and reproductive health through multiple generations is examined. To do this, this study measured the carbon dioxide production, the number of pupae produced, and the percent of pupae hatched of the parent flies, as well as the carbon dioxide production of their offspring. It was found that nicotine significantly worsens respiratory fitness as well as reproductive health. However, Vitamin E significantly improved the respiration and reproductive health of parent flies exposed to nicotine, although that improvement decreased as the amount of nicotine increased. Additionally, the offspring of parents exposed to nicotine had worse respiratory fitness, with the offspring of parents exposed to both Vitamin E and nicotine having significantly better respiration rates. Novel findings of this study were that when just the female parent fly was exposed to nicotine, its offspring had deficient respiratory fitness than when just the male parent was exposed. Additionally, the effects of nicotine are reduced in the offspring generation. Such results have significant implications for pregnant women exposed to nicotine, reproductive research, as well as individual consumers of nicotine products looking to improve their respiratory and reproductive health.

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