Effects of Cannabidiol Exposure on Cortisol Levels in Danio rerio Embryos with Heat Induced Stress

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Stress is a growing issue in society, and results in the excretion of the stress hormone, cortisol. Cannabidiol (CBD) is anecdotally suggested to reduce stress; yet very little scientific research has been conducted on its efficacy. In this research, the ability of CBD to mitigate the effects of stress in a zebrafish embryo model was tested. Zebrafish embryos were exposed to two different concentrations of CBD dissolved in their holding water for 24 hours prior to receiving a heat shock stress-inducing treatment; after which, cortisol levels in the embryos and egg water were tested using a cortisol ELISA assay. I hypothesized that early exposure to CBD in the heat stressed zebrafish embryos would result in a lowered cortisol secretion. Data collected from the CBD treatment group was compared to the no CBD control group. The results of the study supported my hypothesis with embryos exposed to 10 mg/L of CBD exhibiting a decrease in cortisol production of 81.967 pg/mL compared to no CBD treatment group. This difference was statistically significant on a difference in means two-tailed t-test with a p-value of 0.002. The embryos exposed to 6 mg/L of CBD showed a decrease in cortisol production of 63.048 pg/mL compared to no CBD treatment group, with a statistically significant difference of 0.007. At 6 mg/L of CBD compared to 10 mg/L of CBD, there was an increase in the amount of cortisol, 18.913 pg/mL, which was a statistically significant difference with a p-value of 0.01. This research adds to the growing body of scientific knowledge on the use of CBD as a medical treatment for stress and supports the need of further research on the effects of CBD in the body.

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