

CANNABIDIOL OIL ATTENUATES DIABETIC-INDUCED HIPPOCAMPAL NEURONAL DEGENERATION IN DIABETIC WISTAR RATS

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INTRODUCTION: Over 537 million people are living with diabetes mellitus (DM), projected to rise to 783 million by 2045 globally. DM is associated with hippocampal alterations, including reduced neuronal counts and increased apoptosis, which contribute to cognitive decline. Cannabidiol (CBD) oil has been reported to promote neuronal survival in rodents. This study evaluated the effects of CBD oil on hippocampal neuroanatomy in streptozotocin (STZ)- induced diabetic Wistar rats over a 21-day period.

MATERIALS AND METHODS: Brain tissues from 28 male Wistar rats (7 normal, 7 STZ diabetic, 7 STZ+CBD-treated, 7 STZ+vehicle) were sectioned and stained with Cresyl violet for hippocampal volumetric, neuronal counts, and Giemsa stain for apoptotic cell count (Ethics number: SMUAREC/M/06/2024: PG_O). The data were analyzed using one-way ANOVA in SPSS.

RESULTS: The granule cell layer volume was significantly higher in vehicle-treated rats compared to other groups ($P = 0.002$). In the cornu ammonis, both vehicle- and CBD-treated rats had significantly greater volumes than other groups ($P < 0.001$). No significant changes were observed in the dentate gyrus ($P = 0.096$) or pyramidal layer ($P = 0.125$). Neuronal counts were significantly higher in CBD-treated rats ($P = 0.002$). Apoptotic counts in the dentate gyrus were significantly elevated in STZ-diabetic rats compared to all other groups ($P = 0.002$).

DISCUSSION AND CONCLUSION: CBD oil mitigated diabetes-associated neuronal loss and apoptosis, likely through its neuroprotective and antidiabetic effects. These findings suggest CBD oil may help preserve hippocampal neurons and reduce apoptosis in diabetic conditions.