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Histomorphological effects of nicotine on selected parts of the brain of adult wistar rats

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Nicotine has been defined as a potent parasympathomimetic alkaloid that accumulates in the roots and leaves of Nightshade family of plants.

Aim: This study was aimed at evaluating the effects of orally ingested nicotine in the histology of hippocampus, substantia nigra and cerebellum. Materials and Methods: Twenty four adult male Wistar rats (100g - 200g) were randomly divided into 4 groups (group 1 - group 4). Group 1 served as the control group, while groups 2 - 4 were the treated groups. Nicotine was diluted in water and 1ml of the different dosage (2mg/kg/day, 4mg/kg/day and 6mg/kg/day) were administered to the treated groups respectively with the aid of orogastric cannula for 42 days. Animals were euthanized by cervical dislocation at the end of 7, 21 and 42 days so as to demonstrate the dose and time dependant effect of this agent. Brain tissues were harvested, processed and stained using Haematoxylin and eosin according to standard histological techniques. Stained tissue images were captured using digital micrometer eyepiece and cell count was determined using stereological technique.

Statistical analysis: Data obtained were subjected to statistical analysis with the use of statistical package for social sciences (SPSS version 20). Significant differences were obtained using One Way Analysis of Variance with a probability of 0.05 (95% confidence limit) and Tukeys post hoc test was further used to determine the mean significant differences between specific groups.

Results: Histological findings showed mild, moderate and severe hyperplasia in a dose and time dependant manner. However, observations from quantitative analysisalso revealed a dose and time dependant significant increase in neuronal cell count and cell diameter of the hippocampus, Substantia nigra and cerebellum.

Conclusion: This study has demonstrated that oral exposure of Nicotine in rats display proliferative adaptive changes on the hippocampus, substantia nigra and cerebellum in a dose/time dependent manner.

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