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Effects of Melatonin on Behavioural Activities in Acetaminophen-Induced Autism in Rat

ABSTRACT:

The present study aims to investigate the effect of acetaminophen in male rats after early postnatal exposure to acetaminophen on several behavioural alterations and its role to precipitate autistic-like behaviour with investigating the ameliorating role of melatonin on these parameters. Thirty healthy Albino male rat pups were used in this study. On a postnatal day 3 (PND3), the rat pups were divided into three groups (10 pups per group). Group 1: As a control group, pups injected with normal saline for 7 days subcutaneously then administered with normal saline for 2 weeks orally. Group 2: pups injected acetaminophen subcutaneously in a dose (50mg/kg) once daily for 7 days, then these pups were administered with normal saline for 2 weeks. Group 3: includes pups that were injected acetaminophen subcutaneously in a dose (50 mg/kg) once daily for 7 days then administered with melatonin (10 mg/kg) for 2 weeks. Behavioural tests, such as nest seeking, were performed at PND 9; negative geotaxis test was done at "PND 15 and 17", an open field test was done at PND21. The present study demonstrated that acetaminophen exposed rat pups exhibited a significant difference in behavioural tests: nest seeking test showed that the pups of group 2 to approach the maternal bedding was (10.00 ± 1.51) sec which was significantly higher than the time of the control group (4.50 ± 2.19) sec. At PND15, the negative geotaxis test showed a significant increase in time spend to rotate 180° of the pups of group 2 (7.30 ± 2.86) sec when compared with that of the control group (3.50 ± 0.63) sec and melatonin treated group (4.56 ± 0.63) sec. While at PND17, pups showed a significant increase in time spend to rotate 180° in negative geotaxis test in group 2 (7.40 ± 2.90) sec compared with that of the control group (3.12 ± 1.33) sec, and that of the melatonin treated group (4.18 ± 1.43) sec. Data of open field test showed that pups of group 2 were traveled significantly more total distance (number of squares crossed) (31 ± 8.34) compared to those traveled by pups of control (20 ± 4.08) and melatonin treated groups (22 ± 7.43). Administration of acetaminophen at dose 50 mg/kg from PND 3 to PND10 induces autistic-like behavioural manifested by several alterations in rat pups. These alterations were ameliorated by melatonin administration (10 mg/kg for 2 weeks) after exposure to acetaminophen.