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Effect of tocopheryl acetate in neurobehavioral activity of cigarette of smoke exposed Swiss albino mice

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Background & Aim: Cigarette smoke exposure is well known abuse which impairs neurobehavioral activity by oxidative damage to sensory and motor areas of cerebral cortex. Aim of the present study is to report the effect of tocopheryl acetate on oral administration in impaired neurobehavioral activity of cigarette smoke exposed Swiss albino mice.

Method: Total 36 adult Swiss albino mice were assigned into six different groups. Group-1 (n=6, distilled water and standard diet), group-2 (n=6, tocopheryl acetate induced), group-3 (n=6, soyabean oil induced as vehicle), group-4 (n=6, cigarette smoke exposed), group-5 (n=6, cigarette smoke expose plus tocopheryl acetate) and group-6 (n=6, cigarette smoke plus soyabean oil). Frequency of cigarette smoke exposure was 3 times a day for 20 minutes each time and tocopheryl acetate with dose of 200 mg/kg/day in 0.3 ml of soyabean oil as vehicle orally through oral gavage for 28 days. On 29th day morning, the mice were subjected to perform neurobehavioral test such as open field tests and force swim test. After completion of the test, mice were sacrificed by cervical dislocation and brain was autopsied to estimate Malondialdehyde (MDA), Superoxide Dismutase (SOD) and Reduced Glutathione (GSR) for oxidative level and histopathological examination of brain.

Results: The treated mice exposed to cigarette smoke showed decreased motor activity in open field test and increased anxiety in force swim tests. On histopathological examination, marked neuronal damage was observed in motor area of cerebral cortex. Oxidative level in neuronal tissue was highly variable by an increased level of MDA (815.2 ± 56.62 , $p < 0.0001$) and decreased level of SOD (1.5 ± 0.54 , $p < 0.001$) and GSR (0.025 ± 0.007 , $p < 0.001$) as compared to control group. Administration of tocopheryl acetate improved the neurobehavioral activity and maintained oxidative level significantly ($p < 0.0001$ in MDA, $p < 0.001$ in SOD and GSR).

Conclusion: Tocopheryl acetate can prevent neuronal damage due to cigarette smoke exposure. Thus, it can be used as a protective agent for neurobehavioral impairment, neuronal cell damage and altered oxidative level occurring in cigarette smokers.

Biography

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