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Treadmill exercise enhances 5-hydroxytryptamine synthesis and tryptophan hydroxylase expression in dorsal raphe of 6-hydroxydopamine-induced Parkinson's disease in rats

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In Parkinson's disease (PD), there are evidences for dysfunction of 5-hydroxytryptamine (5-HT) system and degeneration of 5-HT neurons in dorsal raphe. Tryptophan hydroxylase (TPH) is the rate-limiting enzyme in the 5-HT synthesis. In present study, we investigated the effects of treadmill exercise on the synthesis of 5-HT and the expression of TPH in the dorsal raphe using by immunohistochemistry. Unilateral lesion in the nigrostriatal dopamine pathways was made by unilateral injection of 6-hydroxydopamine into the striatum in rats. The rats in the exercise group were forced to run on the treadmill for 30 minutes once a day for 14 consecutive days after 6-OHDA injection. On the two weeks after injection of 6-OHDA, marked decrease in the numbers of 5-HT-positive and TPH-positive cells in the dorsal raphe was observed. It indicates that 6-OHDA-induced destruction of dopaminergic neural system caused impairment of serotonergic neural system. However, treadmill running increased 5-HT synthesis and TPH expression in the dorsal raphe of 6-OHDA-lesioned animals. The present study suggests that treadmill exercise is effective for the symptom improvement in Parkinson's patients.

Author Keywords : Parkinson's disease; 6-Hydroxydopamine; 5-Hydroxytryptamine Tryptophan hydroxylase; Dorsal raphe

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Evaluation of clay effect on algae growth

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This study was performed to evaluate the clay effect on algae growth which was a primary producer, in view of food chain in ecosystem. In water as clay minerals caused turbidity, a low sedimentation, high adsorption capacity with organic matter, adsorption - desorption effect with ionic chemicals. Hence clay minerals were supposed to have a significant effect on the aquatic system. In study we tried to turn out NOAEL (No-observed-adverse-effect-level) of clay materials on the algae growth through the examination of the impact assessment using Kaolinite, Sericite and Montmorillonite. The study was carried out by the risk assessment 72h-EC50 with the concentration of a current turbidity in order to clarify the standard for a management of the turbidity from clay materials. This study indicated : (1) In both of Kaolinite and sericite, the 72h-EC50 of them shows 2,752 mg/L and 2,775 mg/L, respectively. (2) On the other hand, in the case of montmorillonite, the 72h-EC50 is not shown a significant difference to that of control samples. (3) It can be explained that is also a very important parameter in algae growths. The visible transmissivity cause an algae growth increases with increasing the visible transmissivity of clay materials. (4) It is demonstrated algae growth is affected by the characteristic of clay materials. (5) We can evaluate the 「Risk assessment caused clay materials」 using the algae growth rate.