BEHAVIORAL ALTERATIONS AFTER UNILATERAL 6-HYDROXYDOPAMINE LESIONS OF THE STRIATUM. EFFECT OF α-TOCOPHEROL

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6-Hydroxydopamine (6-OHDA) injected unilaterally into the striatum of rats induced contralateral circling, and increased the duration of stereotyped movements after subcutaneous (sc) injection of apomorphine both 3 and 13 weeks after surgery. Ten weeks after surgery, the spontaneous locomotor activity during 24 h of observation was decreased. Twelve weeks after 6-OHDA injection, the animals had difficulties in carrying out a spatial navigation task in the water maze when the submerged escape platform was moved to another position on each of four consecutive days. When learning to find a new platform position required switching behavior-strategies, latency and swim paths were increased because of significantly more perseverative crossings of the previous platform positions. Intraperitoneal (ip) injection of α-tocopherol for 8 days increased the ability of naive control animals to find the hidden platform positions in the water maze one week later. In intrastriatal sham-operated rats, 8 daily pre-injections of α-tocopherol significantly increased the duration and number of bursts of stereotyped movements during 30 min following a sc injection of apomorphine if measured 13 weeks after surgery. In 6-OHDA-lesioned rats, α-tocopherol prevented the increased response to apomorphine, reduced the apomorphine-induced circling at 3 and 13 weeks, and prevented the decrease in spontaneous locomotion at 10 weeks, as well as the perseverative platform crossings which are caused by an impairment in switching behavior-strategies in the navigation task 12 weeks after surgery. α-Tocopherol has, however, no influence on 6-OHDA-induced changes in problem solving strategies. The used model reflects some of the pathological symptoms of Parkinson’s disease, and it seems that α-tocopherol may be an effective drug in the early initial stages of the disease.

Key words: 6-hydroxydopamine, striatum, α-tocopherol, neuroprotection, cognitive shifting, rat

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