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Partial lesion of the dopaminergic innervation of the ventral striatum induces "depressive-like" behavior of rats

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Abstract:
Depression is a frequent comorbid disorder in Parkinson's disease (PD) which may precede appearance of its motor symptoms by several years. Pathomechanisms underlying PD have been suggested to be responsible for the PD-related depression.
The aim of the study was to examine the influence of a partial lesion of striatal dopaminergic terminals on the "depressive-like" behavior of rats in the forced swimming test (FS). 6-Hydroxydopamine (6-OHDA) was injected bilaterally into the ventro-lateral region of the caudate-putamen (CP) (3.75 μg/2.5 μl/side). The locomotor activity and behavior of rats in the FS were measured 2 and 4 weeks after the operation. The lesion extent was analyzed by biochemical and immunohistochemical methods.
Two weeks after the operation, the 6-OHDA-treated rats displayed a prolonged immobility in the FS. This effect disappeared after 4 weeks. The locomotor activity was not influenced by 6-OHDA. Levels of dopamine, DOPAC and HVA were decreased in the nucleus accumbens (NAC) 2 weeks after 6-OHDA but were not changed in the CP, frontal cortex (FCX) and substantia nigra (SN). No significant effect of 6-OHDA on tyrosine hydroxylase-immunoreactivity in the CP and NAC were found.
The present study indicates that a relatively small lesion of dopaminergic terminals in the ventral striatum, which does not produce any motor disturbances, may induce "depressive-like " symptoms.

Key words:
ventral striatum, forced swimming test, 6-OHDA, rat, depression, Parkinson's disease