

THE EFFECT OF PRISTINE C₆₀ FULLERENE ON COLONIC MOTILITY IN RATS WITH 6-OHDA-INDUCED PARKINSON'S DISEASE

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Diagnosis of Parkinson's disease (PD) are preceded 20 years or more by numerous non-motor symptoms (prodromal phase), such as delayed motility of gastrointestinal tract (constipation) [1]. The pathogenic process that causes PD is presumed to be underway during the prodromal phase, involving regions of the peripheral and central nervous system in addition to the dopaminergic neurons of the SN. Oxidative stress is thought to be one of the mechanisms of PD pathogenesis [2]. In present study we tested the hypothesis that treatment with C₆₀FAS, which has antioxidant properties, can improve colon motility in rats with 6-OHDA-PD.

The unilateral dopamine deficiency was induced in male Wistar rats (220-250 g) by stereotaxic (AP = -2,2; ML = -1,5; DV = 8,8) microinjections of selective neurotoxin 6-hydroxydopamine (6-OHDA, 12 µg). The control group was injected 2 µl 0,9 % NaCl. The C₆₀FAS was given daily for 2-11 days i.p. at doze 75 mg/kg. The percentage of destroyed dopaminergic neurons was evaluated by IHC staining of tyrosine hydroxylase (TH)-positive neurons in midbrain. Levels of spontaneous and carbachol-stimulated colon motility was estimated by ballonographic method *in vivo*.

6-OHDA rats treated by C₆₀FAS showed positive tendency to increase the number of tyrosine hydroxylase (TH)-positive cells in midbrain and increased by 7% the body weight *vs.* placebo-treated animals. We found profoundly decreased carbachol-stimulated colon motility in rats with 6-OHDA-PD *vs.* the sham-lesioned animals. C₆₀FAS improved increased in 2-fold the index of stimulated colon motility, tonic and phase index *vs.* sham-lesioned rats.

These findings suggest that C₆₀FAS might be promising experimental basis for the treatment of the early non-motor symptoms of PD.

[1] L. V. Kalia, A. E. Lang, Parkinson's disease, *The Lancet*, 386(9996), 896–912 (2015).

[2] J. Guo, X. Zhao, Y. Li et al., Damage to dopaminergic neurons by oxidative stress in Parkinson's disease (Review), *International Journal of Molecular Medicine* 41, 1817-1825 (2018).