

The effects of retinol oral supplementation in 6-hydroxydopamine dopaminergic denervation model in Wistar rats

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Abstract

Vitamin A (retinol) is involved in signaling pathways regulating gene expression and was postulated to be a major antioxidant and anti-inflammatory compound of the diet. Parkinson's disease (PD) is a progressive neurodegenerative disorder, characterized by loss of nigral dopaminergic neurons, involving oxidative stress and pro-inflammatory activation. The aim of the present study was to evaluate the neuroprotective effects of retinol oral supplementation against 6-hydroxydopamine (6-OHDA, 12 μg per rat) nigrostriatal dopaminergic denervation in Wistar rats. Animals supplemented with retinol (retinyl palmitate, 3000 IU/kg/day) during 28 days exhibited increased retinol content in liver, although circulating retinol levels (serum) were unaltered. Retinol supplementation did not protect against the loss of dopaminergic neurons (assessed through tyrosine hydroxylase immunofluorescence and Western blot). Retinol supplementation prevented the effect of 6-OHDA on Iba-1 levels but had no effect on 6-OHDA-induced GFAP increase. Moreover, GFAP levels were increased by retinol supplementation alone. Rats pre-treated with retinol did not present oxidative damage or thiol redox modifications in liver, and the circulating levels of TNF- α , IL-1 β , IL-6 and IL-10 were unaltered by retinol supplementation, demonstrating that the protocol used here did not cause systemic toxicity to animals. Our results indicate that oral retinol supplementation is not able to protect against 6-OHDA-induced dopaminergic denervation, and it may actually stimulate astrocyte reactivity without altering parameters of systemic toxicity

Keywords:

Retinol, Neurodegenerative disorder, 6-OHDA, Neuroinflammation, Vitamin supplementation