

[J Clin Biochem Nutr.](#) 2010 Sep;47(2):121-9. Epub 2010 Jul 6.

## Neuroprotective Effects of Astaxanthin in Oxygen-Glucose Deprivation in SH-SY5Y Cells and Global Cerebral Ischemia in Rat.

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### Abstract

Astaxanthin (ATX), a naturally occurring carotenoid pigment, is a powerful biological antioxidant. In the present study, we investigated whether ATX pharmacologically offers neuroprotection against oxidative stress by cerebral ischemia. We found that the neuroprotective efficacy of ATX at the dose of 30 mg/kg (n = 8) was 59.5% compared with the control group (n = 3). In order to make clear the mechanism of ATX neuroprotection, the up-regulation inducible nitric oxide synthase (iNOS) and heat shock proteins (HSPs) together with the oxygen glucose deprivation (OGD) in SH-SY5Y cells were also investigated. The induction of various factors involved in oxidative stress processes such as iNOS was suppressed by the treatment of ATX at 25 and 50  $\mu$ M after OGD-induced oxidative stress. In addition, Western blots showed that ATX elevated of heme oxygenase-1 (HO-1; Hsp32) and Hsp70 protein levels in in vitro. These results suggest that the neuroprotective effects of ATX were related to anti-oxidant activities in global ischemia.

PMID: 20838567 [PubMed - in process]PMCID: PMC2935152