The effect of omega-3 on cognition in hypothyroid adult male rats

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Abstract:

Thyroid hormones and omega-3 are essential for normal brain functions. Recent studies have suggested that omega-3 may protect against the risk of dementia. The aim of this study was to investigate the effect of hypothyroidism on spatial learning and memory in adult male rats, the underlying mechanisms and the possible therapeutic value of omega-3 supplementation. Thirty male rats were divided into three groups; control, hypothyroid and omega-3 treated. Hypothyroidism induced significant deficits in working and reference memories in radial arm maze, retention deficits in passive avoidance test and impaired intermediate and long-term memories in novel object recognition test. Serum total antioxidant capacity (TAC) and hippocampal serotonin and γ-aminobutyric acid (GABA) levels were decreased in the hypothyroid group as compared to the control group. Moreover, the hippocampus of hypothyroid rats showed marked structural changes as diffuse vacuolar degeneration and distortion of the pyramidal cells. Immunohistochemistry showed that the expression of Cav1.2 (the voltage dependent LTCC alpha 1c subunit) protein was increased in the hypothyroid group as compared to the control group. Omega-3 supplementation ameliorated memory deficits, increased TAC, decreased the structural changes and decreased the expression of Cav1.2 protein. In conclusion omega-3 could be useful as a neuroprotective agent against hypothyroidism-induced cognitive impairment.

Keywords:

hypothyroidism, cognition, omega-3, Cav1.2, GABA and serotonin

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