The ameliorating role of folic acid in rat hippocampus after propylthiouracil-induced hypothyroidism

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\textbf{a b s t r a c t}

The thyroid hormones are recognized as key metabolic hormones that play a critical role in brain development, mediate important effects within the CNS throughout life and regulate the metabolism and functions of various neurotransmitters. Alterations in their normal levels cause some biochemical and clinical abnormalities such as hypothyroidism. Hypothyroidism means that the thyroid gland cannot make enough thyroid hormone to keep the body running normally. Here, we studied the biochemical, histopathological and immunohistochemical changes in the hippocampus of hypothyroid rat at the postpubertal stage, and the possible ameliorating effect of folic acid. Fifty male albino rats were equally divided into five groups; first and second groups were the control and folic acid groups respectively while third group was the hypothyroid group in which rats received PTU in drinking water for six weeks. The fourth and fifth groups were co- and post-treated hypothyroid rats with folic acid respectively. There was a significant increase in total MDA and nitric oxide in the plasma and hippocampus, also significant increase
dopamine and norepinephrine in hypothyroid rats group as compared to control group. On the other hand, there was a significant decrease in hippocampus serotonin in hypothyroid rats group as compared to control group. Also, our results revealed that, folic acid as a treatment was better if it is administered as an adjuvant after returning to the euthyroid state. Hippocampus in hypothyroid rat showed marked histopathological changes as moderate inflammation, oedema, diffuse vacuolar degeneration and distortion in the pyramidal cells. Our immunohistochemical results showed that many microglial cells in the hippocampus of the hypothyroid rats were positive for CD68 immunoreactivity (microglia/macrophage) demonstrating the presence of injury and axonal degeneration. Treatment of hypothyroidism with folic acid depressed the histopathological alternation and depressed the intensity of CD68 immunoreactive neurons demonstrating the recovery of some injury.

**Keywords:**
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**References**


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