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# Alfa-Tocopherol supplementation induces morphological changes in the hippocampus of adult offspring

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$\alpha$-Tocopherol, the main form of vitamin E in mammal organisms, is a potent fat soluble antioxidant and scavenger of hydroperoxyl radicals. It has been considered an important molecule during fetal and early postnatal life, playing fundamental roles in protecting the developing organism against oxidative stress. In fact, free radicals have been indicated as causative agents of pregnancy-related disorders, such as preeclampsia and maternal diabetes, inducing serious complications in both the mother and fetus. On the other hand, it has been demonstrated that maternal supranutritional dietary intake of $\alpha$-Tocopherol in rats depresses PKC activity and reduces synaptic long-term potentiation in developing hippocampus (1). This effect seems to persist into adulthood, with behavioural alterations in hippocampus-dependent learning. To better understand if $\alpha$-Tocopherol supplementation through pregnancy and lactation could cause developmental deficit in adult rat offspring, ultrastructural morphometric studies have been carried out to evaluate possible changes in density and morphological features of asymmetric, axo-spinous synapses within hippocampal CA1 stratum radiatum (2). Transmission Electron Microscopy analyses showed that the hippocampus of adult rats born to dams fed with supranutritional doses of $\alpha$-Tocopherol displayed high density of asymmetric axo-spinous synapses, large astrocytic coverage of presynaptic terminals and high number of axo-spinous synapses contacted by astrocytic endfeet at bouton-spine interface, when compared to the controls. These findings suggest that $\alpha$-Tocopherol supplementation induced anatomical changes such as a surplus of axo-spinous synapses and an aberrant glia-synapse relationship, thus promoting permanent deficits in hippocampal synaptic plasticity and spatial learning in adult offspring.

### References

[1] Betti et al. (2011) Maternal dietary loads of $\alpha$-tocopherol depress protein kinase C signaling and synaptic plasticity
in rat postnatal developing hippocampus and promote permanent deficits in adult offspring. J Nutr Biochem 22: 60-70; doi: 10.1016/j.jnutbio.2009.11.014.
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Keywords

$\alpha$-Tocopherol; hippocampus; Transmission Electron Microscopy.