

The effects of linolenic acid administration on the memory and motor behaviour in mice trained for physical exercise

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Abstract

Background. Research regarding nutrition and how it affects the mechanisms of cognitive and mnemonic functions are continually being developed. Several studies have demonstrated a link between the levels of omega-3 fatty acids and the memory, where the stress during physical exercise plays an important role.

Aims. Our study sought to determine whether high doses of linolenic acid administered for a medium period of time, have effects on the memory functions and motility, both in healthy mice and in those with linolenic acid included in the diet.

Methods. For our study 80 white mice (*Mus musculus* - albino), male, aged 4 weeks with no known pathology, weighing 15 to 20 g were used. There were four groups of 20 mice: group I – control; group II – animals that underwent physical exercise; group III – animals with linolenic acid in their diet; group IV – animals with linolenic acid in their diet, which underwent physical exercise. During the 21 experimental days, the mice in all four groups were subjects for the labyrinth test, the values taken into consideration being for day 1 (Test I), day 7 (Test II), day 14 (Test III) and day 21 (Test IV).

Results. Our results have shown statistically significant differences between the values observed in groups I-II, I-III, I-IV, II, III and II-IV ($p < 0.001$) in all tests. With the exception of test 2 ($p < 0.05$), there were no statistically significant differences between the values observed in groups III-IV. Our study confirms that there are beneficial effects after increased consumption of alpha-linolenic acid; there could also be seen an improvement of the memory and of the ability to respond and adapt to a new situation.

Conclusions. A high intake of linolenic acid improves the reactions in new situations and improves the memory in mice. An increased intake of linolenic acid associated with physical exercise, diminishes the scroll times of the labyrinth and has beneficial effects on the memory.

Keywords: linolenic acid, physical exercise, mouse, cognitive function.