Effect of Graded Levels of Dietary n-3/n-6 PUFA on Blood and Brain Lipids

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The health benefits associated with regular fish consumption are well established. These are due, in part, to the high concentrations of n-3 polyunsaturated fatty acids (n-3 PUFA), mainly docosahexaenoic (DHA, 22:6n-3) and eicosapentaenoic (EPA, 20:5n-3) acids. The majority of dry brain's matter is composed of lipids, mainly n- 3 and n-6 PUFA essential for brain function. Nevertheless, the impact of different n-3/n-6 ratios in diets and the effects in mammal lipid brain are less studied. Having this into account, this study attempted to evaluate the effect of three diets with different n-3/n-6 ratios, corresponding to a high, moderate and low EPA+DHA level (control group), in brain of male Wistar rats. Canned sardine was selected as n-3 PUFAs source due to its high levels of EPA and DHA. Therefore, twenty seven male Wistar rats (nine *per* group) were fed diets with 0% (control), 25% and 50% of canned sardine during three months. Total blood was collected and washed red blood cells (RBC) membranes were used for fatty acid profile analysis by GC-FID. Serum was used for lipid biomarkers evaluation. Brain was removed and immediately frozen at –80 ºC for further analyses. One-way ANOVA and Tukey's honest significant difference were used to access differences among dietary groups ($p<0.05$). RBC's membranes fatty acid composition showed an elevated percentage in the total n-3 PUFA with increasing dietary n-3/n-6 ratio. These results were reflected in the omega 3 index (EPA+DHA) that ranged from 1.1 in control group, to 5.2 in the intermediate group and to a value of 10.7 in the highest n-3/n-6 ratio diet. DHA deposition rate in brain was lower for the diet with the highest n-3/n-6 ratio compared with the moderate level. These preliminary data seems to point out a DHA brain's plateau level attained with a diet containing around 500 mg/100g of EPA+DHA. Correlations between dietary n-3 PUFAs levels and the blood biomarkers such as interleucina-1 were established. Significant increase of IL-1 was recorded for the highest sardine level suggesting that n-3 and n-6 content and ratio in the diet could have influence in the inflammatory status.

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