PREVENTIVE EFFECTS OF FISH OIL ON METABOLIC DYSFUNCTION OF ADIPOCYTES ISOLATED FROM ANIMALS INDUCED TO OBESITY BY A HIGH FAT DIET

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Introduction and Objectives: The efforts dedicated to finding the cure for obesity and associated disorders lead to an intense interest in adipocyte metabolism. The consumption of ω-3 fatty acids (FA) presents beneficial effects on changes caused by obesity. The aim of this study was to characterize the metabolic changes of isolated adipocytes from obese mice induced by high fat (HF) diet, supplemented or not with fish oil [rich in ω-3 FA (EPA/DHA, 5:1)] with emphasis on the differential response of subcutaneous and visceral adipose deposits, inguinal (ING) and retroperitoneal (RP) region, respectively.

Materials and Methods: C57BL/6J mice received control (CO) or HF diet for 12 weeks. Supplementation with fish oil (2 g/Kg p.c., 3 times/week) was initiated 4 weeks before the induction of obesity, remaining until the end of the protocol. The white adipose tissue (WAT) ING and RP were removed for isolation of adipocytes that were subjected to biological test of [³H]2-deoxy-D-glucose uptake and lipolysis, in the presence or absence of insulin and isoproterenol, respectively.

Results and Conclusions: The glucose uptake stimulated by insulin was significantly reduced in the HF group compared to the CO, in ING adipocytes. Fish oil showed a protective effect on this parameter, preventing this fall in HF+ω-3 group. In RP adipocytes, there was no significant difference between the groups concerning the glucose uptake, but they were severely affected by the HF diet in relation to lipolysis, since the HF group showed an impressive increase in lipolysis (basal and stimulated by isoproterenol), when compared to CO. Again, the fish oil prevented this effect. ING adipocytes did not show any differences on lipolitic response between the groups. In conclusion, metabolic activities of subcutaneous and visceral adipocytes were differently affected by a HF diet and the ω-3 FA was able to prevent the metabolic dysfunctions observed.

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Key Words: Adipose tissue; Lipolysis; Glucose uptake.