Low Protein-High Carbohydrate Diet Upregulates Insulin Signaling In Liver and Increases Insulin Sensitivity of Growing Rats

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Previous results showed that growing rats submitted to low protein-high carbohydrate diet (LPHC-6% protein; 76% carbohydrate) for 15 days, exhibit the same post prandial glycaemia and lower insulinemia, suggesting a state of insulin sensitivity when compared with rats fed control diet (C-17% protein; 65% carbohydrate). The aim of this work was to evaluate the glucose tolerance, insulin sensitivity and insulin signaling pathway in the liver of animals fed with LPHC diet. Male Wistar rats received LPHC or C diet during 15 days and the tests of glucose and insulin tolerance were performed. To investigate changes on insulin signaling pathway in liver, insulin (4U.mL⁻¹) or saline was injected in the portal vein, the liver was dissected and levels of IR and AKT and of AKT phosphorylation levels (basal and stimulated) were evaluated using Western blotting. Data were expressed as means ± SEM, statistically analyzed by Student t-test or ANOVA (p≤0.05). Glucose tolerance (AUC-mg.dL⁻¹.120.min⁻¹) and disappearance rate (Kitt-%.min⁻¹) were higher in LPHC group (18,520 ± 513; 0.039 ± 0.002; respectively), compared to C group (23,670 ± 614; 0.030 ± 0.002; respectively). IR and AKT levels were increased in LPHC when compared to C group (35% and 76%, respectively). The same way, basal and insulin-stimulated AKT phosphorylation levels was higher in LPHC group (157.4 ± 8.4; 497.9 ± 44.5; respectively) than C group (80.89 ± 3.83; 244.0 ± 15.03; respectively). In conclusion, LPHC group presented higher insulin sensitivity, condition that can be associated, at least in part, to higher hepatic insulin sensitivity.

Word Keys: Low-protein and high-carbohydrate diet, insulin signaling, hepatic insulin sensivity.

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