EFFECTS OF OBESITY AND WEIGHT LOSS ON PLASMA GHRELIN CONCENTRATIONS IN DOGS

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Objectives: The recently discovered hormone ghrelin has been recognised as an important regulator of GH secretion and energy homeostasis in different species (Kojima et al., 1999). The aim of this trial was to study the effects of obesity and weight loss on total plasma ghrelin concentration in dogs.

Materials and Methods: Twenty-four beagle dogs (12 control and 12 obese) fed a maintenance diet (Royal Canin Premium Croc, crude protein 24.0 %, fat 16.1 %, 4140 kcal/kg as fed) were used. The obese group was divided in 2 similar subgroups and submitted to a weight loss protocol with 2 different nutritional treatments: a high protein -hypocaloric diet alone or supplemented with 2% SC-FOS (Royal Canin Veterinary Diet Obesity, crude protein 34.0 %, fat 10.0 %, 3017 kcal/kg as fed). Once dogs have reached their optimal body weight (BW), they were fed the maintenance diet again. Total plasma ghrelin, glucose and insulin were measured with commercial kits and leptin was assayed using a canine specific ELISA method (Iwase et al., 2000), in fasted dogs before and after weight loss. Plasma ghrelin was also measured 6 months after weight loss. BW, body condition score (BCS), thoracic and pelvic perimeters (TP, PP) and BW loss have been recorded. Data are expressed as mean ± standard error of the mean. Values of $p < 0.05$ were considered as significant.

Results: As SC-FOS supplementation induced no significant difference in blood metabolites, data were pooled. When compared with control lean dogs, obese dogs had significant lower plasma ghrelin (4084±460 and 2336±150 pg/ml, respectively), higher plasma leptin (2.29±0.43 and 13.18±0.93 ng/mL) and insulin (7.83±1.26 and 14.94±1.77 µUI/mL). In obese dogs, no significant difference was observed between the 2 diets - maintenance or hypocaloric diet- for plasma ghrelin, insulin or glucose but leptin was lower with the hypocaloric diet (13.18±1.93 *Vs* 9.88±1.58 ng/mL). Weight loss induced a significant decrease in plasma leptin and insulin with values of 3.0±0.7 and 8.52±0.85 ng/mL respectively and a significant transient increase in plasma ghrelin. Plasma ghrelin concentration was 6148±652 pg/mL just after weight loss and was 4855±557 pg/mL 6 months after, which was not different from control lean dogs. Plasma ghrelin concentration was significantly correlated positively with glucose, BW loss and age and negatively with leptin, BW, TP, PP, BCS and excess BW. Leptin was correlated positively with insulin, BW, TP, PP, BCS and excess BW and negatively with glucose and BW loss.

Conclusions: Data suggest that obesity induced lower plasma ghrelin concentration in dog, as observed in human. After a weight loss protocol, the level of plasma total ghrelin was significantly increased and became higher than in lean control dogs but this increase was transient. Ghrelin and leptin were correlated with anthropometric measures but ghrelin negatively and leptin positively. A relationship with insulin and glucose was showed.

References:

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