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Researches Classified – Panel Awards - Basic

Influence of hypercaloric diet on mice: a reflection of human population

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Introduction: In recent decades, hypercaloric diets have been associated with obesity, being one of the main public health problems in developed and developing countries. This excessive consumption of hypercaloric foods, associated with sedentary lifestyle and genetic factors, leads to chronic obesity and the deposition of fat in the tissues, leading to metabolic disorders with systemic consequences for the individual.

Objectives: To evaluate the influence of the cafeteria diet in the population through an experimental study in rats.

Methods: Sprague- Dawley rats were divided into 4 groups: 2 controls (who received common rodent feed) and 2 fed with a cafeteria diet (equivalent to human). The cafeteria diet was introduced from 6 weeks of age, estimated human age (HA) of 7 years, and maintained for at least 11 weeks (sufficient period to analyze a chronic exposure). The variables analyzed were weight, naso- anal length (NAL), Lee index (equivalent to human BMI), fasting glycemia (FG), perigonadal fat (PF) and inguinal fat volume (IFV). Data were analyzed by the ANOVA statistical test and considered significant with $p < 0.05$.

Results: Ten rats (Control 1 - C1 and Diet 1 - D1) were analyzed at 17 week-old (HA = 20 year-old) and 8 rats (Control 2 - C2 and Diet 2 - D2) were analyzed at 26 week-old (HA = 32 years). The mean weight at C1 was 250.14g, D1 was 332.65g ($p = 0.01$), C2 was 263.089g and D2 was 426.76g ($p < 0.001$). Regarding the Lee Index values, groups C1, D1, C2 and D2, respectively, mean values of 303.37; 313.43; 298.12; 332.63 (where $p = 0.45$ between C1 and D1 and $p = 0.002$ between C2 and D2). The mean FG score was 76.06 mg/dl ($p = 0.26$), the mean PGF was 8.21 g ($p < 0.001$ in the comparison between the control and intervention groups at 2 moments) and the mean IFV was 5.08 ml, with a significant relationship between C1 and D1 ($p = 0.007$) and C2 and D2 ($p = 0.001$).

Discussion: Preclinical studies generally have as limitation the fact that they do not use a human-like organism. However, its great advantage over clinical studies is the possibility to minimize the biases related to the individual's genetics and life-style. In this way, this study, mimic in controlled conditions, the hypercaloric feeding in which the human population is submitted. Conclusion: Significant correlations were observed regarding weight and mean fat, comparing the control

and diet groups. The cafeteria diet alone was able to induce obesity in rats when exposed to a long period (groups 2). Although there was no increase in glycemic levels among the 4 groups (adult rats still young), the increase in visceral and subcutaneous fat was significant even in very young rats (groups 1).

Keywords: Hypercaloric diet; Mice; Fat; Cafeteria diet; Population.