Evaluation of Hepatic Stress in Models of Neuroendocrine and Exocrine Obesity in Rats


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Introduction: Obesity is a major public health problem worldwide. This can be experimentally induced by high calorie diet (cafeteria diet (DC)) and/or neonatal administration of monosodium glutamate (MSG), and there are no studies in the literature comparing the two models of liver injury. The present study aimed to compare, on female Wistar rats, models of obesity, exocrine and endocrine, in order to check if the difference between them occurs as oxidative stress and antioxidant defense liver.

Material and Methods: The animals received 4g/Kg/dia of MSG from the 2nd to the 14th day of life with alternating intramuscular applications. After weaning, the animals were divided into groups (n=6): G1-control, G2-DC, G3-MSG and G4-MSG+DC. After 5 weeks they were euthanized and liver removed for verification of liver damage. Fragments of tissue were designated for histological analysis performed with hematoxylin-eosin and the remainder kept at -80°C for determination of malondialdehyde, the technique of reactive substances to thiobarbituric acid, antioxidant enzyme superoxide dismutase (SOD), the method of self-oxidation of pyrogallol, quantized to 535 nm, and determination of HSP70 protein by western blot. Results and Discussion: The exocrine model has demonstrated to cause higher liver damage than the endocrine, showing higher levels of malondialdehyde (µM/mg protein): G2 (0.257±0.039) and G4 (0.260±0.047) compared to G3 (0.207±0.043) and G1 (0.166±0.017) and higher fat accumulation and sinusoidal congestion. Due to high production of free radicals and in order to neutralize them, it has showed higher SOD activity (U/mg protein) in G2 and G4: G1 (3.20±0.31), G2 (4.55±0.18), G3 (3.93±0.25) and G4 (4.76±0.12), and high amount of HSP70. Conclusions: Therefore, the experimental model of obesity using high calorie diet proved to be the best method to use in evaluation studies of liver damage caused by obesity, because it was more efficient in increased oxidative stress in this tissue.

Keywords: oxidative stress, obesity, cafeteria diet, monosodium glutamate, Wistar rats, superoxide dismutase, HSP70.

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