p-Chloro diphenyl diselenide protects against metabolic alterations induced by monosodium glutamate exposure in rats

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Introduction: In animals, monosodium glutamate (MSG) induces neuroendocrine alterations through hypothalamic lesion resulting in obesity. Organic selenium compounds have many different pharmacological actions such as, antihyperglycemic and antihypercholesterolemic and regulate the glucose and cholesterol cell metabolism. The aim of this study was to evaluate the effect of p-chloro-diphenyl diselenide (p-ClPhSe)$_2$, an organic selenium compound, in a model of obesity induced by MSG.

Material and Methods: At the first postnatal day male newborn Wistar rats were divided in two groups: I- MSG: rats received a subcutaneous injection of MSG (4g/kg body weight/day) and II- Control (saline solution 0.9%) in a similar volume (1 mL/kg), from the 1$^{st}$ to 10$^{th}$ postnatal day. At the 45$^{th}$ postnatal day, the animals were divided in four groups: I – Control; II – (p-ClPhSe)$_2$, III – MSG; IV – MSG + (p-ClPhSe)$_2$. (p-ClPhSe)$_2$ (10 mg/kg) or vehicle (mineral oil, 1 mL/kg) was administered by the intragastric route for 7 days. After treatment, plasma was obtained to determine glucose and lipid levels. The animals were killed and livers removed and the activities of hexokinase and glucose-6-phosphatase (G-6-Pase) were determined. The animals were used according to the guidelines of the Committee on Care and Use of Experimental Animal Resources, the UFSM, Brazil (#031/2014). Results and discussion: The results showed an increase in triglyceride and cholesterol levels induced by MSG and treatment with (p-ClPhSe)$_2$ protected against dyslipidemia. MSG-treated rats had a slight reduction in glycemia, an increase in hexokinase and a decrease in G-6-Pase activity, which could explain the reduction in plasma glucose levels in these animals. Treatment with (p-ClPhSe)$_2$ protected against alterations in liver enzymes and restored glycemia. Conclusion: These results indicate that a series of alterations which are characteristics of an early metabolic disorder were caused by MSG in rats and that treatment with (p-ClPhSe)$_2$ restored the metabolic homeostasis in 45-day-old rats.

Keywords: Metabolism, monosodium glutamate, organoselenium

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