Depressant-like and Anxiogenic-like Effects of Subcutaneous Injection of Monosodium Glutamate in Neonatal Mice

Quines C. B.; Da Rocha, J. T., Gai, B. M., Bortollato, C. F., Rosa, S.G., Nogueira, C.W.

Laboratório de Síntese, Reatividade e Avaliação Farmacológica e Toxicológica de Organocalcogênios, UFSM, Santa Maria-RS, Brazil.

Introduction: Monosodium glutamate (MSG) is one of a number of salt forms of glutamic acid, a non-essential amino acid, with unique flavour-enhancing qualities, that is widely used as a food additive. However, the safety of the use of MSG has raised concern. Currently, clinical studies began to be made to better understand the toxic effects of MSG. It has been reported that neonatal mice, when given subcutaneous doses of MSG, developed brain lesions which were characterized by intracellular edema and neuronal necrosis in the hypothalamus. The purpose of this study was to investigate the behavioral effects of subcutaneous injection of MSG in newborn rats. Material and Methods: Newborn Wistar rats (both male and female) were divided into two groups: 1) MSG: received a subcutaneous injection of MSG (4g/kg body weight per day) during the first 5 days of life, 2) Control: subcutaneous injection of saline (0.1%) during the first 5 days of life. Animals aged 60 days were evaluated in the activity chamber (locomotor activity, fecal pellets, vocalizations and urine), forced swimming test and contextual fear conditioning test. Results and Discussion: No changes in the locomotor activity were observed in both groups. On the other hand, MSG rats had increased number of fecal pellets, occurrence of vocalizations and urine in the activity chamber when compared to the control group, suggesting an anxious behavior. In addition, on the contextual fear conditioning test, the MSG group increased the time of freezing behavior, confirming the anxiogenic-like behavior. In the forced swimming test, the MSG group showed an increase in immobility time, demonstrating a depression-like behavior. The results demonstrate that the newborn animals submitted to subcutaneous injection of MSG are more susceptible to developing anxiogenic-like and depressant-like behavior, but more studies are needed to better understand the toxicological mechanisms of MSG-induced behavioral alterations.

Keywords: MSG, depression, anxiety, rats.

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