Resistance exercise has beneficial effects on neurobehavioral deficits induced by the administration of monosodium glutamate in rats


1 Laboratório de Síntese, Reatividade e Avaliação Farmacológica e Toxicológica de Organocalcogênios, DQ, CCNE, UFSM, CEP 97105-900, RS, Brasil.

INTRODUCTION: Monosodium glutamate (MSG) is widely used as a food additive, however, the safety of its use has raised concern. In animal models, MSG induces endocrinological and behavioral alterations, among them memory deficit in rodents. Exercise has been reported to play a protective role against memory impairment and multidimensional effects on brain performance. The aim of this study was to investigate if resistance exercise has beneficial effects on memory impairment and locomotor deficit induced by MSG in rats.

MATERIAL AND METHODS: At the first postnatal day male 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%, 1 mL/kg), from the first to the tenth postnatal day. At the 60th postnatal day, the animals were divided in four groups: I – Control; II – MSG, III – Exercise; IV – MSG + Exercise and submitted a resistance exercise protocol. The exercise protocol consists in 10 rises in a vertical ladder with 1 min interval, adding an overload (10% per week relative to body weight) during five days on six weeks. After that, the animals were submitted to rotarod, open field test (OFT) and object recognition test (ORT). 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 administration of MSG induced locomotor deficits in rats which were demonstrated in the rotarod task and the OFT. MSG caused long-term memory impairment, without altering short-term and location memory. Exercise was effective against locomotor deficits and memory impairment caused by MSG administration to newborn rats.

CONCLUSION: The present study demonstrated that newborn rats exposed to MSG are more susceptible to develop neurobehavioral deficits and that the use of resistance exercise improved these behavior alterations.

Keywords: Exercise; monosodium glutamate; memory

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