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NMDA receptors mediate nitric oxide donor-induced panic-like behaviours and fear-induced antinociception organised by anterior hypothalamus neurons

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It has been established that the excitatory imbalance in the hypothalamus of rodents provokes fear-related defensive reactions. In addition, these defensive reactions elaborated by hypothalamic nuclei may cause antinociception. There is evidence that nitric oxide (NO) donor microinjected in limbic structures can evoke defensive responses. It is known that this neuromodulator can be mediated by another excitatory system such as glutamatergic ones. The purpose of this study was to investigate the effects of the pretreatment of the anterior hypothalamus (AH) with AP-7 (an NMDA receptor antagonist) on behavioural and antinociceptive responses evoked by intra-AH microinjections of the NO donor SIN-1. The experiments were performed using male C57BL/6 mice weighing 30-35g. A guide-cannula was stereotaxically implanted in the AH. Before the experiment, the rats were submitted to three baseline measurements of the control tail-flick latencies. In experiment I, rats received saline or 75, 150 and 300 nmol/0.1µL SIN-1 into the AH. In experiment II, it was performed intra-AH microinjections of saline or 2 nmol/0.1µL AP-7. Ten minutes later, SIN-1 (300 nmol) was injected in the AH. Each rodent was placed in polygonal arena and analysis of panic-like behaviour was performed for 10 min, followed by the nociceptive threshold recording at each 10 min for 60 min. SIN-1 at 300 nmol was the most effective in causing panic-like reactions and a higher antinociceptive response. In addition, both these effects were inhibited by pretreatment with AP-7. Our data suggest that panicogenic and antinociceptive effects evoked by intra-AH microinjection of NO donor depend on NMDA receptor activation.

Biography

Luiz Luciano Falconi Sobrinho has graduated in Physiotherapy from the University of Ribeirão Preto in 2000. He has experience in the area of Neurological Physiotherapy. He has completed his Masters in Neurology from the Medical School of Ribeirão Preto – USP in 2015. He is currently pursuing his PhD in Neurology from the same institution, developing works in Neuropsychopharmacology and exploring the following themes: Mechanisms of Pain Control, Defensive Behaviour, Anxiety and Panic.

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