# ANTINOCICEPTIVE EFFECT INDUCED BY SENSORIMOTOR CORTEX STIMULATION IN NORMAL RATS.

Erich Talamoni Fonoff*, Camila Squarzoni Dale**; Rosana de Lima Pagano**; Renata Giorgi**, Gerson Ballester*, Manoel Jacobsen Teixeira*.
*Division of Functional Neurosurgery of Psychiatry Institute. Hospital das Clinicas of School of Medicine of University of São Paulo, São Paulo, Brazil.
**Laboratory of Pathophisiology, Butantan Institue, São Paulo, Brazil.

Introduction. Neuromodulation has been used for treatment of various neurological conditions including neuropathic pain. Recent clinical data reveals that chronic motor cortex stimulation (MCS) is effective in treatment of many neuropathic pain syndromes, suggesting that motor cortex may play an important role in the modulation of pain perception, whereas activating the endogenous antinociceptive system. However, the mechanisms of action in MCS are uncertain and it has only been tested under the bias of neuropathic conditions. The present study was designed to investigate the effect of sensorimotor cortex electrical stimulation on behavioral responses to nociceptive stimuli in normal rats.

Methods. Chronic surgical implantation of epidural stainless steel electrodes over the sensorimotor cortex were made in 16 normal adult Wistar rats. A week later they underwent electrical stimulating (1,0V; 60Hz; 210μs) cerebral cortex during 15 minutes. Towards the end of the stimulation period, paw pressure test and tail flick essay were accessed to evaluate the pain threshold. The scores during stimulation were compared to the scores before the stimulation and to non-operated controls. Open field testing was also performed in all animals in order to rule out any changes in spontaneous behavior or motor impairment.

Results. Electrical stimulation of sensorimotor cortex increased substantially the pain threshold of animals in both testing methods. The paw pressure test revealed an increasing of pain threshold on the contralateral side of cortical stimulation ($P<0,05$); however, the pain threshold in ipsilateral paw remained unchanged. No behavioral or motor impairment was observed in the stimulated rats in open field testing when compared with control animals ($P<0,05$).

Discussion and Conclusions. These results reveal a clear antinociceptive effect of sensorimotor cortex stimulation in normal animals without any behavioral changes. It is remarkable that both testings, cortical mediated (paw pressure) and spinal reflex dependent (tail flick) revealed increased pain thresholds. This antinociceptive effect not only may be proof of the endogenous antinociceptive system activation by cortical stimulation, but also that it influences the activity of different sites of sites of the central nervous systems. This model makes possible further investigation of underlying mechanisms of MCS in rats.