**The Level and Extent of Pain Expression from Thoracic Facet Joints: A c-fos time-series analysis**

R. Hayek, S. Ali, J. R. Bassett

Department of Chiropractic, Division of Environmental and Life Sciences Macquarie University 2109

Sydney Australia

The expression of the c-fos immediate early gene (c-fos mRNA and c-fos protein) has been extensively used to trace stimulated neurones in the central nervous system. Previous nerve tracing technique studies from our lab have suggested that sensory nerves from the upper thoracic facet joints in the rat relay nociceptive information to projection neurones like the spinothalamic tract in the superficial dorsal horn of the spinal cord. The pattern of c-fos expression has been shown to correlate well with these neuronal tracer studies.

This study uses in-situ hybridisation of c-fos mRNA and irnmunohistochemical detection of c-fos protein to further trace pain pathways from upper thoracic facet joints (TI to T4). In addition the level of c-fos mRNA and protein expression with increasing level of noxious pain stimulation (formalin challenge test) will be presented. Further, the time course of c-fos mRNA and protein expression before and after different levels of noxious stimulation will be analysed. Correlation of this data will add to our understanding of c-fos involvement in the pain circuitry associated with spinal facet joints.

Experiments are currently performed on naive acclimatised adult rats (300-400g). The animal s are surgically dissected to expose the joint space which is then infused with either SµL of I.5% formalin in saline for up to a period of two hours. The joint is then washed with saline, animal overdosed with anaesthetic and perfused first with saline followed by paraformaldehyde. The fixed spinal cord is then removed and 40µm transverse sections cut for in situ hybridisation and c-fos immunohistochemistry.

In order to determine the c-fos dose response to differing levels of stimuli and determine the time course ofc-fos expression, facet joints **will** be stimulated for I minute but with II range of formalin concentrations and c-fos expression monitored after stimulus removal for a further 4 hrs. Control experiments will receive all of the steps outlined above including anesthetic and surgery, however, only a saline injection is delivered into the facet joint.

88