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## A Comparison of Visceral and Noxious Somatic Influences on Neurons in Rat Nucleus Raphe Magnus

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19. A comparison of visceral and noxious somatic influences on neurons in rat nucleus raphe magnus

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The activities of certain neurons in the spinal dorsal horn can be depressed by widespread noxious stimuli (Le Bars *et al.* 1979), A phenomenon usually referred to as 'diffuse noxious inhibitory controls' (d.n.i.c.). Similar effects have been demonstrated following distension of the urinary bladder or colon (Cadden, this meeting). D.n.i.c. are thought to be mediated by a pathway which relays in the medullary nucleus raphe magnus (n.r.m.) (Dickenson *et al.* 1980). The aims of the present study were to determine whether neurons in n.r.m. could be influenced by visceral and somatic stimuli that produce d.n.i.c., and whether any such neurons have spinally projecting axons.

Unitary extracellular recordings were made in, and adjacent to, n.r.m. by using three-barrelled glass micropipettes in urethane ( $1.4 \text{ g kg}^{-1}$ ) anaesthetized rats. DL-Homocysteic acid was ejected from one barrel of the electrode whilst searching for neurons. Once isolated, neurons were tested for antidromic activation from the lumbosacral spinal cord, for responses to inflation of the bladder and to noxious (pinch or  $52^\circ\text{C}$  water) and non-noxious (brushing and stroking or  $37^\circ\text{C}$  water) somatic stimuli.

A total of 215 neurons were studied, 148 of which were tested with bladder distension. The activities of 53 neurons (30%) were increased by bladder distensions. Threshold pressures which caused this effect were between 5 and 50 mmHg (mean 26.5 mmHg). ( $1 \text{ mmHg} \approx 133 \text{ Pa}$ .) Nineteen of these units were tested for their responses to somatic stimuli. All but one of these neurons showed some form of convergence of visceral and somatic information. The majority (69%) responded only to noxious somatic stimuli and had receptive fields covering 75% of the body or more. The remaining neurons also responded to high intensity stimuli, but some (25%) had more restricted receptive fields and 16% responded to innocuous as well as noxious stimuli.

Nine of the units excited by bladder distension were found to have spinally projecting axons. Six of these were tested for responses to somatic stimuli and all showed convergence of visceral and noxious somatic information. One cell had a high threshold receptive field restricted to the trunk and the remaining five (83%) had extensive, high threshold receptive fields; however, two of the latter also responded to innocuous stimuli.

These data demonstrate that neurons in, and adjacent to, n.r.m. can be influenced by visceral and somatic stimuli that produce d.n.i.c. Some of these neurons have spinal projections and it is possible that they may form the bulbo-spinal limb of the pathway which mediates d.n.i.c.

*References*

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