PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

Effects of Opioid Peptide Agonists Selective for <latex>μ, δ</latex> and <latex>κ</latex> Receptors on Identified Dorsal Horn Neurons

S. M. Fleetwood-Walker, R. Mitchell, P. J. Hope and V. Molony

Phil. Trans. R. Soc. Lond. B 1985 **308**, 427
doi: 10.1098/rstb.1985.0061

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By S. M. Fleetwood-Walker,[1] R. Mitchell,[2] P. J. Hope[1] and V. Molony[1]

[1] *Department of Veterinary Physiology, University of Edinburgh, Summerhall, Edinburgh EH9 1QH, U.K. and* [2] *MRC Brain Metabolism Unit, 1 George Square, Edinburgh EH8 9JZ, U.K.*

The intrathecal infusion of opioid receptor agonists reduces behavioural responses to cutaneous noxious thermal stimuli. Compounds selective for μ- and δ-opioid receptors are clearly effective (Schmauss & Yaksh 1984) but a role for κ receptors is less well established (Han & Xie 1984). The dynorphins, which are present in the dorsal horn, are selective ligands for the κ receptor (Corbett *et al.* 1982). The effects of a dynorphin and those of μ- and δ-selective enkephalin analogues DAGO and DADL, are compared here on the cutaneous sensory responses of single identified dorsal horn neurons whose axons ascend towards supraspinal regions (spinocervical tract, SCT neurons).

Extracellular recordings were made by using multi-barrelled glass electrodes in lumbar cord segments L6/7 of cats anaesthetized with chloralose (60 mg kg^{-1}) and paralysed. Solutions of dynorphin$_{1-13}$ (DYNO), (5 mM), [D-Ala$_2$, MePhe^4, Gly-ol^5] enkephalin (DAGO), (20 mM) and [D-Ala$_2$, D-Leu^5] enkephalin (DADL), (20 mM), all at pH 4.5–5.0, were used for iontophoresis. In 14 out of 16 multireceptive SCT neurons tested with DYNO, a selective reduction was seen in the response to noxious thermal stimulation, but not to innocuous brush or to iontophoretically applied D,L-homocysteic acid. This antinociceptive effect (probably exerted at an indirect site) was not reproduced by DAGO (5/5 cells) or by DADL (6/7 cells), even at currents in excess of 100 nA. These results suggest that a κ receptor is involved in the selective antinociceptive effect of DYNO on ascending somatosensory neurons. Duggan *et al.* reported inhibitory effects of the less selective (but δ/μ preferring) analogue [Met] enkephalinamide when applied either close to, or dorsal to the somata of unidentified lamina IV neurons (see Duggan & North 1984). However, δ/μ receptors seem uninvolved here, at any accessible site, whereas κ sites may have an important antinociceptive role. The effect of DYNO was antagonized by iontophoretic application of naloxone and also the specific α_2 adrenoreceptor antagonist, RX 781094, suggesting a novel mechanism for the mediation of segmental antinociceptive effects through activation of the terminals of descending tracts.

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