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Effects of C-fragment on brain stem neurones in the cat

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The C-fragment of β -lipotropin is a potent analgesic when injected into the cerebral ventricles of the cat (Feldberg & Smyth, 1976, 1977).

We have compared the actions of C-fragment with those of morphine and methionine-enkephalin by iontophoretic application from micropipettes to neurones in the brain stem of decerebrate cats. The neurones tested were in the periaqueductal gray and other medial areas of the mid-brain, in nucleus raphe magnus, and in the medial bulbar reticular formation. Most cells were strongly inhibited by C-fragment while the remainder (6 out of 82) were unaffected, and the time course of the inhibition was similar to that of the iontophoretic application. Morphine and met-enkephalin had depressant effects on the same neurones, except that morphine produced a biphasic response (inhibition followed by excitation) in two neurones in the mid-brain on which C-fragment

exerted only a depressant action. Naloxone (Endo Laboratories) applied by iontophoresis did not block the effects of C-fragment, morphine or met-enkephalin in the areas tested and occasionally exhibited agonist activity.

Although it is difficult to compare potencies with the iontophoretic method, the results suggest that C-fragment is more potent than met-enkephalin since comparable effects were obtained with smaller currents. As C-fragment has more charged side groups than met-enkephalin fewer ions will be ejected by the same current, and it is also likely to be less mobile than the smaller peptide. These considerations suggest that C-fragment is more potent than met-enkephalin in depressing the activity of neurones in the brain stem.

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