levels; (*b*) a clear facilitating effect was evident in high avoiding strains trained under the three types of complex tasks reported above; (*c*) arecoline and pilocarpine exerted an impairing effect independently of the dose (0.1–5.0 mg/kg).

These findings support the view that as at peripheral ganglionic sites, there is also a distinction between the muscarinic and nicotinic actions of acetylcholine in the CNS (Feldberg, 1945).

A comparison between the neurophysiological, biochemical and behavioural effects of the cholinergic agents is more complex and suggests that each of these drugs exerts different actions at different levels.

The effects of nicotine on the arousal levels appear to be completely different from those exerted by amphetamine. On the basis of a dual memory storage mechanism, the results are consistent with the hypothesis that memory consolidation processes are enhanced by nicotine and physostigmine.

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The analgesic activity of levallorphan

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Levallorphan (N-allylnormorphinan), clinically employed as a morphine antagonist, is considered devoid of analgesic properties in animals and man (Flodes, Swerdlow & Siker, 1964). Other morphine antagonists, which are recognized as potent analgesics in man, only inhibit the painful reaction of inflamed tissues to noxious stimuli in animals. The analgesic activity of levallorphan tartrate (Roche) was therefore studied in comparison with morphine hydrochloride and nalorphine hydrochloride in CF1 mice (18–23 g) and Long Evans rats (140–180 g). Two types of experiments were carried out reproducing: (*a*) non-inflammatory pain according to Woolfe & MacDonald (1944), Bianchi & Franceschini (1954) and Randall & Selitto (1957); (*b*) inflammatory pain, according to Hendershot & Forsaith (1959) and Randall & Selitto (1957). In the latter test one paw was injected with carrageenin.

In "non-inflammatory" pain the ED50 of morphine was from 1 to 2.5 mg/kg subcutaneously with a clear dose/effect relationship. Levallorphan and nalorphine were inactive in doses up to 10–20 mg/kg subcutaneously. In "inflammatory" pain all the compounds were active. In the test of Hendershot & Forsaith (1959) the ED50 of morphine was 0.43 mg/kg subcutaneously; nalorphine and levallorphan induced a 50% inhibition of the responses at doses of 0.31–0.62 mg/kg subcutaneously, although a clear dose/effect curve was lacking. In the test of Randall & Selitto (1957) morphine was active at 2.5 mg/kg subcutaneously and nalorphine and levallorphan at 10 mg/kg subcutaneously.

As far as the analgesic activity of these drugs in man is concerned, it is worth noting that Keats & Telford (personal communication) recently found that 8 mg of levallorphan and 10 mg of morphine produced similar relief of post-operative pain. By the same method, nalorphine was equiactive with morphine (Lasagna & Beecher, 1954).

Our data confirm the validity of the phenylquinone test for prediction of analgesic activity from animal to man (Collier, 1964), and suggest that inflammatory pain reproduces in animals a situation nearer to the corresponding human pathology than non-inflammatory pain.

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Relationship between calcium-45, N-acetylneuraminic acid and some drugs on the isolated rat fundus strip preparation

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The role of gangliosides and N-acetylneuraminic acid (NANA) in the 5-hydroxytryptamine (5-HT) receptor has recently been outlined by several authors. Further it was suggested that during 5-HT induced muscular contraction, a 5-HT-gangliosides complex acts as carrier for calcium through the lipoidal cell membrane to the contractile structures.

The present experiments were carried out to find whether NANA acts as a specific or non-specific carrier for the calcium ions. Rat fundic strips were incubated for 8 min with ^{45}Ca (5 μc/ml.) in 10 ml. of oxygenated Tyrode medium. The total tissue radioactivity was determined by liquid scintillation counting (Humphreys, 1965). The calcium uptake was measured in the presence of 5-HT, (+)-amphetamine or furtrethonium (HFUR): amphetamine acts on the same receptor as 5-HT, and the cholinergic drug on a different one (Vane, 1960 ; Innes, 1963).

The experiments were performed on normal tissues and after destruction of NANA with neuraminidase plus EDTA (Woolley & Gommi, 1966). In normal tissue, 5-HT and HFUR significantly increase the concentration of ^{45}Ca in the tissue ; (+)-amphetamine does not influence calcium uptake, in comparison with the controls.

When endogenous NANA is destroyed, the uptake of radioactivity into the tissue is not affected by the drugs: in particular the 5-HT-induced increase of the tissue radioactivity is reduced to control values.