These results demonstrate that the rat isolated gastric mucosa secretes acid in response to electrical field stimulation. The effect is mediated by postganglionic cholinergic nerves which do not require mucosal histamine for their action.

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Motor output to flight muscles and inhibition of acetylcholinesterase after injection of dimethoate into locusts

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Smallman & Fisher (1958) showed that inhibition of acetylcholinesterase (AChE) by organophosphorous insecticides increases the acetylcholine content of the insect central nervous system, the rate of increase depending on the degree and duration of AChE inhibition. In this study we have attempted to correlate inhibition of AChE with an example of stereotyped behaviour, the motor output to the flight muscles in the locust (*Schistocerca gregaria*).

Adult locusts were tethered and 50 μm diameter copper wire electrodes inserted into the flight muscles. The locusts were flown in a heated (28°C) airstream and the motor output to the flight muscles monitored (Wilson & Weis-Fogh, 1962) through a transient recorder onto a chart recorder. After an initial five minute control period the animal was injected with a dose of dimethoate, in 20 μl of locust saline, into the terminal abdomen and flown for a further twenty-five minutes. After this time the thoracic ganglia were removed for homogenisation in 0.2 M phosphate buffer (pH 7.4) followed by assay of AChE by the method of Ellman, Courtney, Andres & Featherstone (1961). The interburst intervals (and therefore the wingbeat period) were measured for one second each minute for the control period and one second in each two minutes after injection of the drug or locust saline. The time course of inhibition of AChE was also determined in flying locusts injected with the largest dose of dimethoate (250 μg).

The results (Figure 1) suggest that there is a relationship between inhibition of AChE and change in interburst interval with a threshold for effect at approximately 40% inhibition. This same relationship is found whether the different levels of AChE activity are produced by different doses of dimethoate or by taking locusts at different times after injection of dimethoate (250 μg). These observations are similar to the effects of malathion on levels of cyclic GMP in the central nervous system of the flesh fly (Bodnaryk, 1977).

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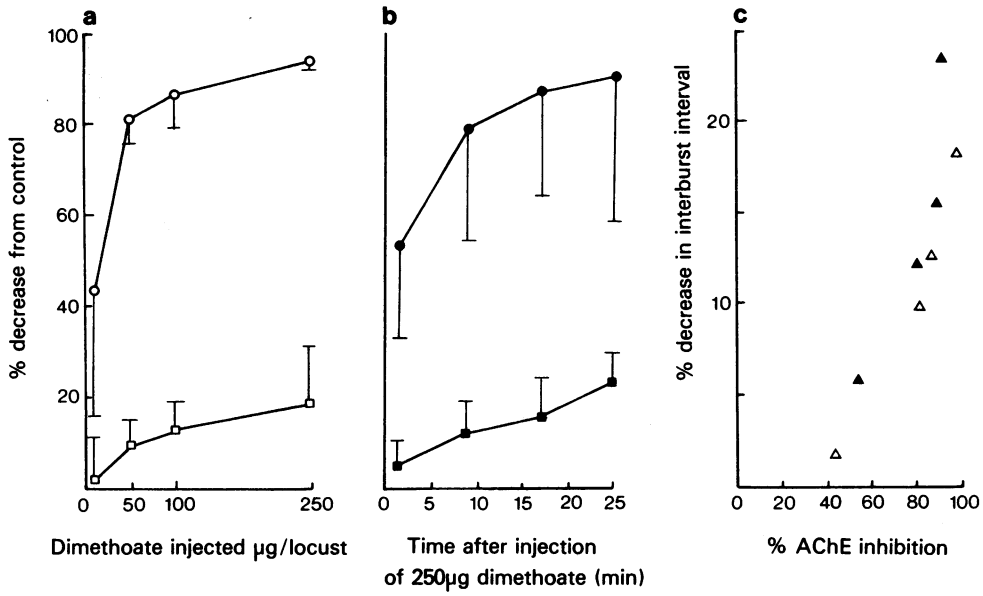

Figure 1 a. AChE, (○) and interburst interval (□) means and s.d. (n = 4) after different doses of dimethoate.
b. AChE (●) and interburst interval (■) means and s.d. (n = 4) at stated times after injection of 250 µg dimethoate.
c. Decrease in interburst interval as a function of AChE after using different doses of dimethoate (△) and 250 µg dimethoate (▲) for different times. Computed from the data of a and b.

The effects of α- and β-adrenoceptor agonists on inflammatory exudation in rabbit and guinea-pig skin

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We have investigated the effects of locally-injected adrenoceptor agonists on plasma exudation in the reversed passive Arthus (RPA) reaction, and on exudation responses produced by histamine, in the skin of the rabbit and guinea-pig.

Plasma exudation and blood flow changes were measured in skin sites as the accumulation of [^{131}I]-albumin and clearance of locally-injected ^{133}Xe, as previously described (Williams, 1976).

Neither noradrenaline (via α-adrenoceptors) nor isoprenaline (via β-adrenoceptors) produced an increase in vascular permeability when injected into rabbit or guinea-pig skin. In both species noradrenaline (10–50 ng/0.1 ml) produced a reduction in blood flow and isoprenaline (50–500 ng/0.1 ml) produced an increase in blood flow. However, in the guinea-pig the isoprenaline effect was not significant in several experiments.

In both species, noradrenaline reduced plasma exudation induced by histamine; e.g. in the rabbit, histamine (2.5 µg/0.1 ml) = 113.6 ± 4.1 µl, noradrenaline (50 ng/0.1 ml) = −1.0 ± 0.8 µl, histamine + noradrenaline = 25.0 ± 2.0 µl, $n = 6$ sites. This effect of noradrenaline, which was abolished by locally-injected phenoxybenzamine, was presumably due to a reduction in blood supply to the tissue.

In the rabbit, isoprenaline produced a marked increase in histamine-induced plasma exudation; e.g. histamine (2.5 µg/0.1 ml) = 11.4 ± 2.7 µl, isoprenaline (0.5 µg/0.1 ml) = 1.7 ± 1.1 µl, histamine + isoprenaline = 56.3 ± 7.4 µl, $n = 6$ sites.