THE ACTIONS OF GALLAMINE ON RABBIT INTESTINE AND ON THE ISOLATED NON-PREGNANT RAT UTERUS

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The action of gallamine on the response of the gut of the rabbit and uterus of the rat to acetyl choline has been investigated. Gallamine had a weak atropine-like action. It also caused increased motility of the rabbit intestine when it was added in large doses. This increased motility was not prevented by atropine but was prevented by the antihistamine chlortrimeton.

Gallamine has an atropine-like action on cat's hearts (Riker and Wescoe, 1951) and on isolated rabbit auricles (Laity and Garg, 1962). Since it is unlikely that gallamine acts on the heart without affecting other organs, its actions on the rabbit's intestine and on the rat's uterus were investigated.

METHODS

Pieces of rabbit jejunum were suspended in 50 ml oxygenated mammalian Ringer solution at 31°C in an organ bath. The temperature was controlled by means of a tempunit (Techno-Cambridge-Ltd). The temperature was kept at 31°C in order to dampen spontaneous contractions. The contractions of the intestine were recorded by means of a frontal writing lever on a smoked drum. Three normal responses to 1.0 μg acetyl choline in the presence of a water control (consisting of a volume of distilled water equal to that containing the gallamine) were recorded for one min each, five mins being allowed between each addition of acetyl choline. These were followed by three responses to the same dose of acetyl choline in the presence of 400.0 μg gallamine (Flaxedil, May and Baker), which was added one min prior to the addition of the acetyl choline. The same was repeated, using 800 μg, 3.2, 6.4, 12.8 and 25.6 mg of gallamine for a dose response curve. A comparison was then made of 4 mg gallamine with 0.5 μg of atropine on a piece of jejunum.

A single horn of mature, non-pregnant uterus was suspended in 50 ml oxygenated mammalian Ringer solution at 31°C. A similar experimental technique to that described for rabbit jejunum was used except that the uterus was allowed to contract for 30 secs and the interval between doses was 3½ mins, and that the dose of acetyl choline was 10.0 μg. A dose response
curve was then made of the inhibitory action of gallamine on the effect of acetyl choline on the uterus. The action of 4 mg gallamine was compared with 0.5 μg of atropine.

RESULTS

The response of rabbit jejunum to 1.0 μg acetyl choline was partially blocked by 400 μg gallamine (Fig. 1). As the dose of gallamine was in-
increase in the degree of block increased (Fig. 2). A dose of 25.6 mg produced

Fig 2. Similar to Fig. 1, Gallamine (F) used was 3.2 mg.
a block of only sixty four per cent (Fig. 3). When compared with atropine, gallamine was found to be weaker and, secondly, the effect could be readily

Fig. 3. Blocking Effect of Gallamine on the Action of Acetyl Choline on Rabbit intestine. (each point represents a mean of two experiments).
Compared with atropine, the effect could be readily washed (Fig. 4). When doses of 2.0 to 8.0 mg gallamine were added to the bath at 37°C, there was an increase in motility which was not blocked by 20 mg atropine sulphate (Fig. 5) but was blocked by an antihistamine, chlortrimeton (Fig 6).

Fig. 4. Comparison of blocking effect of 4 mg gallamine (F) with 0.5 µg of atropine (At) on a piece of rabbit jejunum to the responses of 1 µg Acetyl choline (A). W = washing.

Fig. 5. Effect of 8 mg Gallamine (F) on a piece of rabbit jejunum before and after 1 mg of Atropine sulphate (At).
Fig. 6. Effect of 8 mg Gallamine (F) before and after 1 mg of Chlortrimeton (P).

Fig. 7. Inhibitory effect of 4 mg Gallamine (F) on the response of 10 µg of Acetyl Choline (A) on Rat's uterus.
Gallamine, 4.0 mg reduced the response of a horn of mature non-pregnant rat uterus to 10.0 μg acetyl choline by fifty two per cent (Fig. 7). This effect was not readily reversed by washing. As the dose of gallamine was increased, the block also increased. A dose of 8 mg produced a block of ninety per cent (Fig. 8). It differed from atropine, only being much weaker, otherwise the effect was as persisting as of atropine (Fig. 9).

Fig. 8. Blocking effect of gallamine on the action of acetyl choline on rat uterus. (Each point represents a mean of two experiments).

Fig. 9. Comparison of blocking effect of atropine (At) on a horn of mature non-pregnant rat uterus to the responses of 5 μg Acetyl choline (A). W = washing.
From the result presented above, it would appear that gallamine has weak atropine-like actions on the rabbit jejunum, and on the mature rat uterus. The blocking effect on the rabbit jejunum was weaker and could be more readily washed as compared to that on the rat uterus. An interesting result was that when large doses of gallamine were added to the bath, they caused increased motility of the gut. This effect was not antagonised by atropine, but was antagonised by chlortrimeton. Since gallamine is a weak histamine liberator (Sniper, 1952), the increased motility of the gut produced by gallamine may be caused by histamine liberation. This is also suggested by the fact that chlortrimeton prevents this action of gallamine.

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REFERENCES