

**ROLE OF HISTAMINE, AND ITS INTERACTION WITH CORTICOTROPIN  
RELEASING FACTOR AND BOMBESIN, IN FOOD INTAKE REGULATION  
OF CHICKENS**

by

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(ABSTRACT)

The present set of experiments were designed to examine the role of histamine, and its interaction with corticotropin releasing factor (CRF) and bombesin (BM) in food intake regulation of chickens. The hypothesis being tested was as follows: One component of the neuroregulation of food intake involves histaminergic activity in the hypothalamus, acting on either H<sub>1</sub> or H<sub>2</sub> receptors, how these receptors interact with CRF neurons and if BM elicits its effects on feeding through CRF release. Single Comb White Leghorn (SCWL) and broiler cockerels were utilized for these experiments. Birds were stereotaxically implanted with a 23-gauge thin-walled stainless steel guide cannula, and were provided a mash diet and water for *ad libitum* consumption. All compounds were infused into the right lateral ventricle. Effects were monitored at 15-minute intervals through three hours postinjection.

Experiment 1 examined the effects of intracerebroventricular (ICV) injections of histamine (HA) and two HA antagonists, the H<sub>1</sub> receptor antagonist chlorpheniramine maleate (CM) and H<sub>2</sub> receptor antagonist cimetidine (CIM), on food and water consumption and body temperature. Histamine was infused using 0, 25, 50, and 100 µg per 10 µl of artificial cerebrospinal fluid (aCSF). Histamine significantly decreased food and water consumption ( $P \leq 0.05$ ) over the three hour observation period in a dose-dependent manner. Histamine was then infused to observe if the decrease in water intake was dependent upon the decrease in food intake. Birds were not allowed access to feed during this experiment. Water intake was not affected by HA in either SCWL or broilers when food was not available. To observe the effects of HA on thermoregulation, HA was infused using the same dosages and body temperature recorded for three hours. Histamine produced hypothermia at a dose of 25µg in SCWL

cockerels, with a quadratic trend at 165 and 180 min. Broiler cockerels did not show hypothermia, but rather a constant hyperthermia compared to the control with a quadratic trend throughout the latter part of the experiment. The last phase of the first set of experiments, birds were pretreated with either CM or CIM (100 $\mu$ g/10  $\mu$ l aCSF) followed by HA. When the birds were pretreated with either CM or CIM, the hypophagic responses to HA were attenuated. The pair of experiments that utilized H<sub>1</sub> and H<sub>2</sub> receptors demonstrated that these receptors are involved in the neural regulation of food intake. These experiments also demonstrated that the aphagic effects of HA on food intake can be blocked with the pretreatment of antihistaminics affecting both H<sub>1</sub> and H<sub>2</sub> receptors.

In Experiment 2, studies were conducted to determine if neuronal CRF elicited its effects on feeding through the release of HA. Birds were infused with 0 or 20 $\mu$ g CRF and either 0 or 100  $\mu$ g of CM or CIM. CRF decreased food and water intake in both SCWL and broiler cockerels. When birds were pretreated with CM, the hypophagic responses to CRF were attenuated. When birds were pretreated with CIM, the hypophagic responses of CRF were attenuated in broiler cockerels; this response was not seen in SCWL cockerels. Water intake followed a similar pattern. It was concluded that, contrary to studies showing that HA causes the release of CRF in other species, CRF may cause the release of HA in chickens.

Experiment 3 was designed to investigate whether bombesin (BM) elicited its effects on feeding through the release of CRF. Birds were infused with either, 0 or 0.5 $\mu$ g BM, 0 or 5 $\mu$ g  $\alpha$ CRF (9-41) (CRF antagonist), or a combination of both. These compounds were infused to test whether the effects of BM could be blocked with the pretreatment of anticorticotropics. Food and water consumption were significantly decreased ( $P \leq 0.05$ ) with the infusion of BM in both SCWL and broiler cockerels. Food intake was not affected with the infusion of  $\alpha$ CRF in SCWL or broilers cockerels. However, water consumption was increased when birds were given ICV injections of  $\alpha$ CRF. When birds were pretreated with  $\alpha$ CRF, the anorexigenic and adipsic effects of BM were attenuated. It was concluded that BM elicits its effects on feeding through the release of CRF. These results also demonstrate that the aphagic effects of BM could be blocked with the pretreatment of anticorticotropics.

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