both vagal and transmural stimulation. An example of this effect is shown in Figure 3 in which the amplitude of the after-contraction caused by stimulation at 2 pulses/sec was enhanced by physostigmine as large as those produced by 20 pulses/sec in the absence of physostigmine. Adrenergic neurone blocking agents, bretylium (10^{-6}–10^{-5} g/ml) and guanethidine (10^{-6}–5×10^{-5} g/ml), had little effect on these relaxations and contractions.

From these results, the after-contraction caused by vagal stimulation in an atropinized preparation seems to be mediated through a cholinergic ganglionic synapse which is effectively blocked by hexamethonium. The excitation of the postganglionic fibers of this presumed ganglion may also be easily elicited by transmural stimulation and causes the after-contraction. In some experiments, such an after-contraction was enhanced by physostigmine. In conclusion, it must be stated that the after-contraction is not necessarily only a myogenic rebound phenomenon of the initial relaxation, but originated mainly from the excitation of certain nerve structures.

Zusammenfassung. Die Wirkung elektrischer Reizung einerseits vagal, andererseits transmural auf isolierte Muskelpräparate vom Hühnervormagen wurde untersucht und gefunden, dass eine nach Aufhören der Reizung beobachtete Nachkontraktion nicht als «rebound» zu betrachten ist, sondern cholinergische Züge zeigt.

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Temperature Changes Following Microinjection of Histamine into the Thermoregulatory Centers of the Rat

A wide variety of chemical compounds has been reported to modify body temperature by effecting neurons in the hypothalamic thermoregulatory centers[1]. Several of these substances are endogenous amines and have been implicated as possible central neurotransmitters. The major candidates for such a role are acetylcholine[1–3], norepinephrine[1,4] and serotonin[1,4].

Histamine is generally found throughout the body stored in connective tissue mast cells. The amine is concentrated in the hypothalamus[5] where it is bound in the nerve endings[6]. This distribution corresponds to that of norepinephrine and serotonin although it has not been demonstrated that histamine is similarly located within the synaptosomes.

The present study was undertaken to determine the effect of histamine on the hypothalamic thermoregulatory centers.

Methods. Male Sprague-Dawley rats, weighing 220–260 g, were used. Experiments were conducted with the animals in plastic restraining cages in a temperature-controlled cabinet maintained at 22 ± 0.5 °C. Core temperature was monitored by a thermistor probe inserted 6 cm into the rectum.

Guides for intracerebral injection cannulae were implanted stereotaxically under pentobarbital anesthesia. At least 7 days were allowed for recovery from the surgical procedures before the experiments were begun. The injection sites were confirmed histologically at the end of each experiment.

Histamine was dissolved in saline and adjusted to pH 6.0–6.5 with NaOH (0.1 *N*). A volume of 1 µl was used for all intracerebral injections. The doses used, expressed as the base, are given in the text.

Results. Microinjection of histamine (1 µg) into the rostral hypothalamus produced an immediate fall in body temperature which continued for approximately 20 min. Figure 1 illustrates the relationship between the dose of histamine and the fall in body temperature. At the highest dose employed in this study (5 µg) the mean fall in core temperature was 2.0 ± 0.3 °C (S.E.M.) in 4 animals. Threshold effects were observed with as little as 0.5 µg.

The influence of the antihistaminic agent, chlorcyclazine, on the centrally induced hypothermic effect of histamine was examined in 3 experiments. Chlorcyclazine (5 mg/kg, i.p.) was administered 1 h prior to the intracerebral injection of either 2.5 or 5 µg of histamine. Histamine had no effect in animals pretreated with the antihistamine. 1 week later, however, the same animals, without pretreatment, responded to the same dose of histamine with a fall in body temperature. Figure 2 illu-

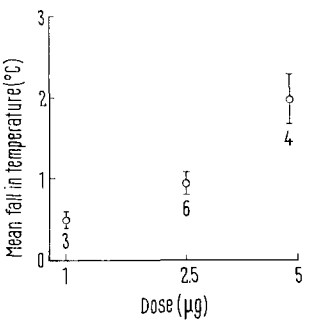

Fig. 1. Mean fall in temperature following microinjection of different doses of histamine into the thermoregulatory centers of the rat. Vertical bars represent standard errors of the mean and numbers refer to total animals in each group.

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strates the results of one of these experiments. Chlorcyclazine alone caused no significant change in body temperature.

Histological examination revealed that all of the injection sites were in the anterior or preoptic hypothalamic nuclei, within 1 mm of the midline.

Discussion. Microinjection of histamine into the rostral hypothalamic nuclei of the rat caused a fall in body temperature. Although histamine may have acted directly upon the hypothalamic thermoregulatory neurons the marked vasodilating activity of this amine cannot be ignored. However, since the carotid artery blood perfusing the rostral hypothalamus is at a lower temperature than the cerebral tissue, the increased blood flow resulting from dilation of the hypothalamic blood vessels would be expected to cool the hypothalamus[7] and lead to a rise in body temperature[8]. The hypothesis that histamine acts directly upon hypothalamic neurons is consistant with similar actions of the amine on autonomic and other central neurons[9–11]. The mechanism of action is unclear, however, since both excitatory and inhibitory effects of histamine have been reported at various neurons[10–13].

An indirect mechanism to explain the fall in body temperature following intracerebrally injected histamine, may be postulated also. Histamine is known to release catecholamines from chromaffin tissue[14]. Thus the possibility exists that the hypothermia observed in the present investigation was due to endogenous norepinephrine released from sites within the hypothalamus. Norepinephrine has been shown to modify body temperature in the rat[15,16].

The ability of chlorcyclazine to inhibit the centrally induced fall in body temperature suggests that specific receptors are involved in the response. Whether the antihistamine acted at receptors on the thermoregulatory neurones or at sites necessary for norepinephrine release is not yet known.

Several endogenous amines have been implicated as neuromediators in the hypothalamic thermoregulatory centers: acetylcholine[3], norepinephrine[4,15,16] and serotonin[4,15] can all modify core temperature when injected into the rostral hypothalamic nuclei. Histamine, together with the enzymes necessary for its synthesis and metabolism, is present in the hypothalamus[17]. It is therefore tentatively suggested that histamine should be considered among the candidates for a role as a neurotransmitter in the thermoregulatory centers of the rostral hypothalamus[18].

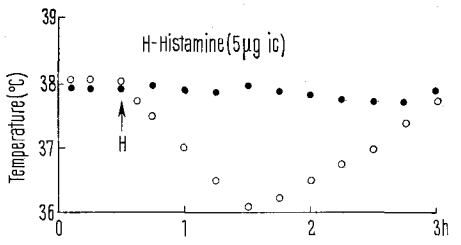

Fig. 2. Temperature records following microinjection of histamine into the rostral hypothalamus. Solid circles, pretreated with chlorcyclazine (5 mg/kg i.p.) 1 h prior to histamine; open circles, same animal 7 days later treated with histamine alone.

Résumé. Par administration intracérébrale (hypothalamus rostral), l'histamine engendre de l'hypothermie chez le rat. L'administration d'une antihistamine, 1 h avant l'injection de l'histamine empêche cet abaissement de température. On discute la question de savoir si l'histamine peut être ou non un neurotransmetteur dans les centres thermorégulateurs.

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Recherches sur les variations de la densité des microorganismes dans le colon du Lapin domestique

Le Lapin présente la particularité de déféquer deux types d'excréta appelés fèces de type jour et fèces de type nuit[1]. L'animal réingère ces dernières, cette pratique est appelés cæcotrophie ou pseudo-rumination[2].

La richesse en azote[3] et en vitamines[4] des fèces de type nuit nous a conduit à étudier la répartition quantitative des microorganismes dans le colon, organe ou se différencient les deux types de fèces.

Techniques. Les Lapins utilisés sont de race commune, mâles ou femelles âgés de 3 à 4 mois. L'étude quantitative des microorganismes est effectuée par la méthode de GALL[5]. La saison et le régime induisent des variations quantitatives des microorganismes[6]. De ce fait, nos expériences ont été groupées en mai–juin–juillet. Le régime est constitué d'avoine, luzerne, sèche, végétaux frais.

Les animaux sont sacrifiés à différentes heures de la journée et l'ensemble cæcum-colon est retiré du tube digestif; quatre échantillons sont prélevés comme suit: a) début colon; b) milieu colon proximal; c) fin colon proximal; d) ampoule rectale. Sur chaque échantillon,