without serious impairment of the capacity of parathyroid glands to maintain a normal plasma calcium level. At higher I^{131} dosages, however, the parathyroid glands are severely damaged, and the plasma Ca^{++} falls to the same level as that observed in surgically thyroparathyroidectomized animals.

Summary. Serum calcium levels have been measured in adult female Sprague-Dawley rats whose thyroid glands had been removed either with I^{131} or by surgery. The mean serum Ca^{++} level of rats whose thyroids had been completely ablated with 5 μC/g body weight of I^{131} was within normal limits, 9.3 $\pm$ 0.02 mg 100 ml. Complete destruction of the parathyroids, as well as the thyroid gland, was effected by a dosage of 50 μC/g I^{131}.

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Role of Adrenaline and Nor-Adrenaline on Response of Cold-Acclimatized Animals to Chlorpromazine. (24059)

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Adrenaline has proved important in increased potential for chemical regulations observed in cold-acclimatized animals(1-7). Recently Hart(8) and Sellers(9) summarized present knowledge on acclimatization to cold in homeotherms. In terms of survival, acclimatization may be defined as an acquired increase in resistance to hypothermic effect of cold environment. Recently we reported that acclimatized animals are not only resistant to hypothermia caused by cold temperatures but also to that induced by chlorpromazine(10). The present study was designed to find out if decreased hypothermic effect observed in acclimatized animals after chlorpromazine injection was related in some way to adrenaline or nor-adrenaline action.

Methods. White male rats weighing 200 g were used. Thirty rats, acclimatized to cold for 4 weeks at 40°F were divided into 5 groups which were treated respectively with: (1) chlorpromazine (CPZ) (10 mg/kg); (2) CPZ (10 mg/kg) + adrenaline bitartrate (0.2 mg/kg of base); (3) CPZ (10 mg/kg) + nor-adrenaline bitartrate (0.2 mg/kg of base); (4) CPZ (10 mg/kg) + dibenamine (20 mg/kg) and (5) CPZ (10 mg/kg) + pyribenzamine (10 mg/kg). Five groups of control animals, non-acclimatized to cold, were treated in the same manner. All drugs were injected intraperitoneally. Rectal temperatures were measured with a thermocouple inserted at a depth of 40 mm. The cold-acclimatized animals after being in the cold for 4 weeks were kept for 24 hours at 72°F prior to drug injection. The experiment was performed in room maintained at 72°F.

Results. Fig. 1 illustrates the typical CPZ hypothermia which is not, however, significantly affected by injections of either adrenaline or nor-adrenaline. The potentiation of CPZ hypothermia by dibenamine and pyri-

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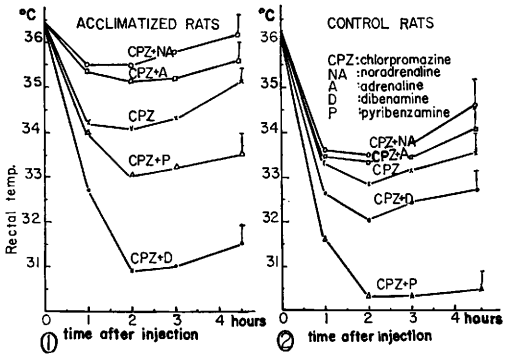

FIG. 1. Hypothermic responses to chlorpromazine, adrenaline, nor-adrenaline, dibenamine and pyribenzamine in rats acclimatized to cold (6°C) for 4 wk. Stand. error is indicated for each group.

FIG. 2. Hypothermic responses to chlorpromazine, nor-adrenaline, dibenamine and pyribenzamine in non-acclimatized animals. Stand. error is indicated for each group.

benzamine is of the same magnitude as the one reported recently(11). Results shown in Fig. 2 when compared with those shown in Fig. 1 confirm our previous findings(10). Indeed acclimatization to cold alleviates some of the hypothermic effect of CPZ. Also in Fig. 2 it is shown that both adrenaline and nor-adrenaline prevent to some extent the hypothermia of CPZ in acclimatized animals. In acclimatized and control animals both pyribenzamine and dibenamine potentiate the hypothermia of CPZ. In the acclimatized animals dibenamine is much more potent than pyribenzamine in that respect. In non-acclimatized animals pyribenzamine potentiates the CPZ hypothermia much more than dibenamine. It is also interesting to note that the antagonistic effect of acclimatization with regard to the hypothermia of CPZ is completely abolished by dibenamine.

Discussion. Hsich and Carlson(1) have shown recently that the increase in oxygen consumption caused by sympathomimetic substances is larger in acclimatized animals. It is possible then that acclimatized animals have become sensitized to adrenaline and nor-adrenaline. This may be the reason why these two substances antagonize the hypothermic effect of CPZ in the acclimatized animals but not in the control group (Fig. 1, 2). The fact that an adrenergic blocking agent, in this case dibenamine, completely abolished the antagonistic effect of cold-acclimatization on CPZ hypothermia, confirms this hypothesis. On the other hand it could be said that if cold-acclimatized animals are sensitized to adrenaline, they are desensitized to histamine since an antihistamine was less effective in potentiating CPZ hypothermia after acclimatization. Confirming this conclusion is the finding reported recently that acclimatization to cold prevents the thermic response to histamine(10). This conclusion was also reached in a previous study on systemic adaption of humans to a local cold stress(12).

Summary. The antagonistic effect of acclimatization on CPZ hypothermia is associated with increased sensitization of tissues to adrenaline and nor-adrenaline. Although normally these substances have no effect on CPZ hypothermia, they potentiate the antagonism of acclimatization towards CPZ. Furthermore dibenamine completely abolished this antagonism. On the other hand results are presented suggesting that acclimatization to cold may also be associated with a desensitization to histamine.

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