

Effect of Chloride on the Thyroid Gland.*

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Hibbard has reported¹ hyperplasia of the thyroid with deficiency of colloid in rats given 2% of calcium chloride or 3% of sodium chloride in the drinking water. The diet consisted of pearled barley, which was low in iodine. Rats given distilled water without the added chloride had histologically normal thyroids. The results were interpreted as indicating that excess of chloride interferes with the utilization of minimal amounts of iodine in maintaining normal thyroid structure.

In the technique devised by the writer and his associates² for the quantitative measurement of the effects of iodine deficiency on the thyroid gland, judgment is based on 3 factors, *viz.*, weight, dry matter and iodine content of the glands. In applying this method to the study of the effect of the chloride ion, the iodine deficient basal diet (diet 342) was varied by changing the salt content from 0 to 4%, and fed to parallel groups of young rats weighing 40-50 gm. for 6 weeks. Each group consisted of 6 animals, equally divided as to sex. The results are shown in Table I.

TABLE I.

Diet No.	Salt, %	Gain in weight, gm.	Food consumed, gm. for each gm. of gain	Thyroid Glands		
				Fresh weight, mg. per 100 gm. body wt.	Dry matter, %	Iodine, dry basis, %
357	0	39.3±1.7	9.72	18.6±0.8	27.0	.049
342	1	90.3±1.9	4.86	18.9±0.4	24.9	.016
358	2	105.0±4.3	4.75	18.9±0.4	24.2	.016
359	4	87.0±3.0	5.25	19.0±0.6	22.7	.013
Colony		125.0	4.01	10.0	32.0	.200

Rats receiving no salt made very poor growth in comparison with the others, notwithstanding their food consumption per gram gain in weight was twice as great. This poor growth and high food con-

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¹ Hibbard, J. S., *Arch. Surg.*, 1937, **26**, 648.

² Remington, R. E., *J. Nutrition*, 1937, **12**, 223.

sumption probably accounts for the higher dry matter and iodine content of the glands, since the diet is not entirely devoid of iodine. The normal values for rats of similar age in our colony are: thyroid weight 10 mg. per 100 gm. body weight, dry matter 32%, iodine on dry basis 0.200%.³ When compared with these values, the rats of all groups had goiter, and increasing chloride up to the point where it began to retard growth did not affect the severity of the condition, with the possible exception noted above. That the enlargement is not as great as has been reported in previous experiments is probably to be attributed to variations in the iodine content of the yellow corn meal.

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Lipid Content of Blood Leucocytes Following Hemorrhage in Rabbits.

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Harlow and Selye¹ reported that a neutrophilic leucocytosis occurred in rats and mice following the administration of various acute, non-specific, damaging stimuli and they considered that this leucocytosis was part of a general response to such types of stimuli, a response which they described as an "alarm reaction". The "alarm reaction," according to Selye,² represents the first stage of a "general adaption reaction," the "stage of alarm" being followed by a "stage of resistance" and finally, if sufficient stimulation be continued, by a "stage of exhaustion." During the course of certain experiments,³ one-quarter of the total blood volume was removed from rabbits and it was thought that such a stimulus might provide an "alarming stimulus" and evoke an "alarm reaction." This amount of blood was taken as quickly as possible by either cardiac puncture or from the marginal ear veins and constituted a distinct shock to the animal; it was the largest amount of blood which could be removed thus and not cause a considerable number of deaths; even removing this amount produced an occasional death.

³ Remington, R. E., Remington, J. W., and Welch, S. S., *Anat. Rec.*, 1937, **67**, 367.

¹ Harlow, C. M., and Selye, H., *Proc. Soc. Exp. Biol. and Med.*, 1937, **36**, 141.

² Selye, H., *Endocrinol.*, 1937, **21**, 169.

³ Boyd, E. M., and Stevenson, J. W., *J. Biol. Chem.*, 1937, **122**, 147.