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A case of hyperglycemia in a thyroidectomized sheep.

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A series of experiments was undertaken recently to determine the effects of administration of thyroxin, thyroid extract, and iodine upon thyroidectomized and normal sheep. A study of the blood sugar was to form a part of the research.

Preliminary examinations yielded the following typical data: Normal sheep, 60-68 mgms. per 100 cc.; thyroidectomized sheep, 51-57 mgms. per 100 c.c. The data for each sheep varied within a narrower range.

One thyroidectomized sheep (No. 11), the subject of this report, showed a condition of hyperglycemia, instead of the typical hypoglycemia. While the figures varied within a wider range, they were all definitely above the normal level. Three successive analyses yielded the following values: 78, 70, and 84 mgms. per 100 c.c.

The effect of thyroxin upon No. 11 has been compared with that upon normal and typical thyroidectomized sheep. The effect upon normal sheep (1W) was immediate and gradual, rising to a maximum of 84 mgms. per 100 c.c. on the 10th day. One of the thyroidectomized sheep (No. 1) showed an immediate rise from its basal figure of 55 mg. to 76 mg. per 100 c.c., continuing on to a maximum of 83 on the 5th day. Another (No. 4) rose more gradually, and with fluctuations, to 71 mgms. per 100 c.c. on the 14th day.

No. 11, the experimental cretin showing hyperglycemia, went from his average of 77 mg. per 100 c.c. to 86 mg., showing 87 mg. 3 days later and then dropping to a very much lower range (53-71 mg. per 100 c.c.), again behaving atypically.

A definite explanation of the hyperglycemia and the subsequent drop of blood sugar had to be deferred until a post mortem. Hypertrophy of the adrenals or degeneration of the isles of Langerhans were among the possibilities to be investigated.

Comparative data showed hypertrophy of the adrenals. No. 11's glands weighed 4.91 gms. (right) and 5.22 gms. (left) as compared with 1.5-2 gms. in a normal sheep.

Histological examination showed hyperemia and hemorrhage in the adrenals, which may explain the drop. The pancreas was normal.

Pathological examination showed the immediate cause of death apparently pulmonary oedema. All the fat of the body showed myxoedema which did not give any fat reaction with Herxheimer's stain. The entire extent of the aorta and the pulmonary arteries, together with the larger branches, showed calcified plaques in the media next to the intima. The intima was normal. Sections of these did not give any fat or iron reactions. In the heart there was myxoedema of the subepicardial fat and scattered areas where the myocardium had apparently reverted to an embryonic type with large nuclei and a large amount of cytoplasm with longitudinal striations of the periphery. There was also marked hydropericardium and hydrothorax. The kidneys showed congestion of the glomeruli and an enormous amount of colloid in the Bowman capsules, in the convoluted and collecting tubules. The adrenals showed marked hyperemia and hemorrhage areas. There was a considerable amount of cortical tissue out of proportion to the medullary tissue. (Hyperemia and hemorrhage of the adrenals have been ascribed to toxemia). The pancreas seemed to contain a normal number of islands of Langerhans.