weeks. Thus cells remaining would continue to produce fibroma virus as they had originally. Fibroma virus, and presumably myxoma, may grow in local areas surrounded by uninfected cells. Distribution of cytoplasmic inclusions in stained preparations of previous testis tissue cultures(5) give support to this hypothesis. The objective of continuing experiments on the Berry-Dedrick phenomenon is to increase the predictability with which it can be performed in tissue culture and to effect a chemical separation of the transforming factor contained in myxoma virus.

Summary. 1. Eleven experiments are described in which fibroma was transformed into myxoma virus in cultures of rabbit tissues, both of testes and of kidneys. 2. The transforming agent (TAM) was myxoma virus inactivated by heating at 65-67°C. 3. Live fibroma virus and TAM were inoculated into tissue cultures simultaneously and TAM was re-added at times of fluid change. 4. A good growth of supporting cells appeared essential to successful transformations.

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Received February 20, 1957. P.S.E.B.M., 1957, v95.

Effect of Insulin on Thyroid Gland Microhistometric Studies.* (23119)

BORIS CATZ

Department of Medicine, University of Southern California School of Medicine, Los Angeles.

Several reports indicate that insulin treatment may affect the structure of the thyroid gland. The results of these investigations are somewhat contradictory: for instance, Watrin and Florentin(1) observed in guinea pigs, and Raiha and Uotila(2) in rabbits, a hypertrophy of the thyroid after administration of large doses of insulin. Raiha(3) and Schulze (4) produced in rabbits and in rats an involution of the thyroid by prolonged administration of insulin; but Schulze(5) himself found no changes in the thyroid of rats when one unit of insulin was given daily for 4 days and Borgorello(6) observed no histological changes in the thyroid of the rabbit, even after prolonged administration of insulin.

With these findings in view we used microhistometric methods to investigate the effect of insulin on structure of thyroid gland of rats exposed to room temperature (24-26°) and to cold (3°C).

Method and materials. Male rats of the Wistar strain, weighing 90 to 125 g were used. The diet, fed *ad libitum,* consisted of ground Purina laboratory chow, which contains according to our determinations, 200 μg of iodine/100 g. The rats received distilled water for drinking. Regular insulin (Lilly) was administered subcutaneously. The animals were kept in individual cages. One-half unit of insulin was given twice daily for 8 days. The controls received 0.1 cc saline subcutaneously at the same intervals. Higher doses of insulin were not used because the cold exposed animals succumbed on injection of slightly increased doses. At the end of the experiments the rats were sacrificed under ether anesthesia by exsanguination from the dorsal aorta. The thyroid glands were removed, dissected free of fat and connective

* This work was supported by grant from N.I.H., Bethesda, Md.

TABLE I. Effect of Insulin on Rat Thyroid Epithelial Height (Mean Acinar Cell Height) at 24°-26°C, Exp. I; and at 2°-3°C, Exp. II.

Groups	No. of rats	Thyroid, MACH* (μ)
Exp. I—8 days, 24-26°C, *ad lib* feeding		
Saline, 0.1 cc sb b.i.d.	8	11.3 ± 0.06†
Insulin, 0.5 u sb b.i.d.	9	13.7 ± 0.3 (p 0.01)
Exp. II—8 days, 2-3°C, *ad lib* feeding		
Saline, 0.1 cc sb b.i.d.	8	14.7 ± 0.18
Insulin, 0.5 u sb b.i.d.	10	12.2 ± 0.15 (p 0.01)

* Mean acinar cell height. † Stand. dev.

tissue, weighed on Roller-Smith balance and transferred to small vessels containing 6 ml Bouin. The mean acinar cell height was measured in sections of the thyroid gland, according to the method of Starr and Rawson(7).

Results. In *Exp. I* the effect of insulin administration for 8 days in rats kept at room temperature (24-26°C) was investigated. Average mean acinar cell height of the thyroid was significantly elevated, 13.7 μ, when compared with the mean acinar cell height of 11.3 μ obtained in the controls. (Table I) (Fig. 1 and 2).

Exp. II. The effect of insulin administration was observed in animals placed in cold room (2-3°) for 8 days. Average mean acinar cell

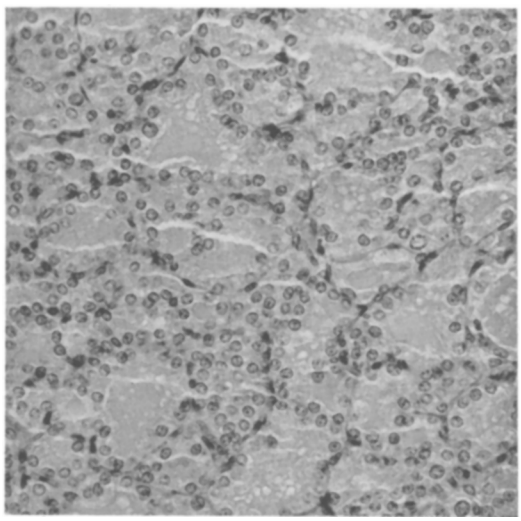

FIG. 1. Photomicrograph (×210) of thyroid gland of rats kept at 24-26°C after receiving insulin, 0.5 unit b.i.d. for 8 days. MACH, 13.7 μ.

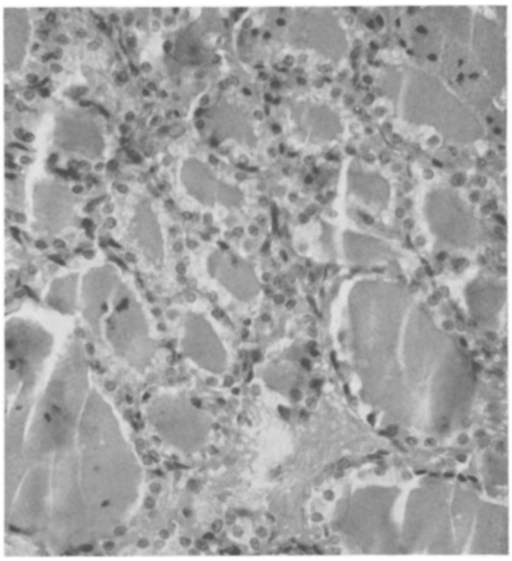

FIG. 2. Photomicrograph (×210) of thyroid gland in control rats kept at 24-26°C. MACH, 11.3 μ.

height of the thyroid after exposure to cold reveals less hypertrophy in insulin treated animals (12.2μ) than in the controls (14.7μ) (Table I).

Discussion. Hypertrophy of the thyroid observed in the insulin treated animals at normal environmental temperature suggests hyperactivity of this gland and confirms the findings of Watrin and Florentin(1) and Raiha and Uotila(2). The mechanism of this hypertrophy may be explained either by the assumption that administration of insulin influences the thyroid by increased release of epinephrine(8), or that an increased release of corticoids is responsible for the hyperplasia of the thyroid, as shown in studies made by us(9) and by others(10,11).

The insulin effect observed in cold exposed animals, indicates that insulin decreases the usually observed hypertrophy of the thyroid. We do not have any explanation for this phenomenon. We assume, however, that there may be an indirect effect involving the pituitary adrenal system. Earlier experiments demonstrated that ACTH injections(9), similar to insulin, decreased the hyperplasia of the thyroid in cold.

Conclusions and summary. Wistar strain male adult rats weighing from 90 to 125 g received 0.5 unit of insulin twice a day for

8 days while at normal temperature (24-26°C), and in the cold room (3°C). At normal temperature the insulin-treated animals showed a significant increase in mean acinar cell height of the thyroid, giving a picture of hypertrophy of the thyroid gland. When the insulin treated animals were exposed to cold the thyroid glands showed a decrease in average mean acinar cell heights, as compared with the cold controls.

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Received February 20, 1957. P.S.E.B.M., 1957, v95.

Effect of Cobalt Administration on Myoglobin Content.* (23120)

WILLARD R. FAULKNER† AND FRANK R. BLOOD

Department of Biochemistry, Vanderbilt University School of Medicine, Nashville, Tenn.

The mechanism of action of cobalt in production of polycythemia is not fully known. It is widely held that cobalt exerts some active stimulus to erythropoietic tissue, since a distinct reticulocytosis precedes the rise in erythrocyte count(1). Van Dyke *et al.*(2) have shown that the life span of erythrocytes is not increased in rats made polycythemic with cobalt. Hyperplasia of the bone marrow occurs(3) with little or no alteration in the total or differential leukocyte count(4).

The work of several investigators suggests that the action of cobalt is mediated through interference with some of the enzymes of cellular respiration(5,6). Such interference may induce a tissue anoxia which in turn elicits compensatory erythrocytosis. If this is the case, myoglobin, which lies intermediate in the chain of respiratory events between the erythrocytes and the respiratory enzymes(7), might be expected to increase in amount so as to augment oxygen transfer. The present study was made to determine the effect of cobalt on myoglobin concentration.

Methods. Twenty-four Sprague-Dawley female rats weighing 118 to 144 g were divided into 2 groups of 6 pairs each. One member of each pair was randomly chosen to be treated while its mate served as the control. The animals were individually caged in air-conditioned quarters and were pair-fed on Purina laboratory meal. Water was available *ad libitum*. Cobalt chloride hexahydrate in aqueous solution was administered by subcutaneous injection. The 6 treated animals of Group 1 received daily 2.5 mg/kg body weight of the compound as a 0.25% solution and those in Group 2 received 5.0 mg/kg body weight as a 0.5% solution. All control animals were injected with a comparable volume of demineralized water. Hematological examinations were made weekly on tail blood. Erythrocyte and leukocyte counts were done by standard technics; hemoglobin was measured as oxyhemoglobin. The packed cell volume was determined by the micromethod of Guest and Siler(8).

At the end of 88 days all animals were sac-

* The material presented here is taken from thesis submitted by Willard R. Faulkner in partial fulfillment of requirements for Ph.D. degree from Vanderbilt University.

† Present address: Department of Clinical Pathology, Cleveland Clinic, Cleveland, O.