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Effect of Administration of Desiccated Thyroid During Pregnancy in the Albino Rat.

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Several years ago the observation was made by one of us (S.L.) that pregnant rats which received desiccated thyroid did not show the rather marked reduction in weight noted in similarly treated animals which were not pregnant. This observation has been extended and the rate of oxygen consumption under comparable conditions has been determined.

Methods. Thirty-three young, mature rats of approximately the same weight (180 gm.) and age and from the same colony were used. These were divided into 3 groups of 10, 11, and 12 rats respectively. After a period of 5 days of control feeding of the same amount (15 gm. daily) of a standard diet (Steenhock), they were assumed to be in a normal, pre-experimental condition. All rats received the same diet and the amount given above. The only variables in the three tests were pregnancy and the feeding of desiccated thyroid.

The *first group* were *not mated* and received in their diet daily 100 mg. of *desiccated thyroid*. This was continued for a period of 16 days, during which time body weight and rate of O₂ consumption were determined at 2- to 3-day intervals. This group served as *thyroid-fed, non-pregnant controls*, a 16-day period being chosen because that was the period of treatment and observation in the thyroid-fed, pregnant animals.

The *second group* were *mated* and given the same diet *without thyroid*. Determinations of O₂ consumption and body-weight were started after mating and continued to delivery. This group served as *non-thyroid fed, pregnant controls*.

The *third group* were *mated* and given the same diet *with thyroid*. The thyroid was not given until from 5 to 10 days after placing

the female with the male, or until we were certain that the rats were pregnant. It is for this reason that the 16-day period of thyroid feeding is shown in the figure.

The apparatus used for measuring oxygen consumption was a closed system¹ consisting of a bell jar with enclosed soda-lime tray, the former resting on a wooden base. The base was perforated by a copper tube connected to a spirometer from which readings of cc. of O₂ used could be measured directly. The rats were fed about 4 p.m. and the O₂ consumption determined about 12 a.m. This was done because we were interested only in comparative rates of O₂ consumption and believed that more comparable rates could be obtained in "hyperthyroid" rats by not fasting them for 16 or 24 hrs., as is usually done in determining basal metabolism. The rate of O₂ consumption in the graph (Fig. 1) is expressed in cc. of O₂ per 200

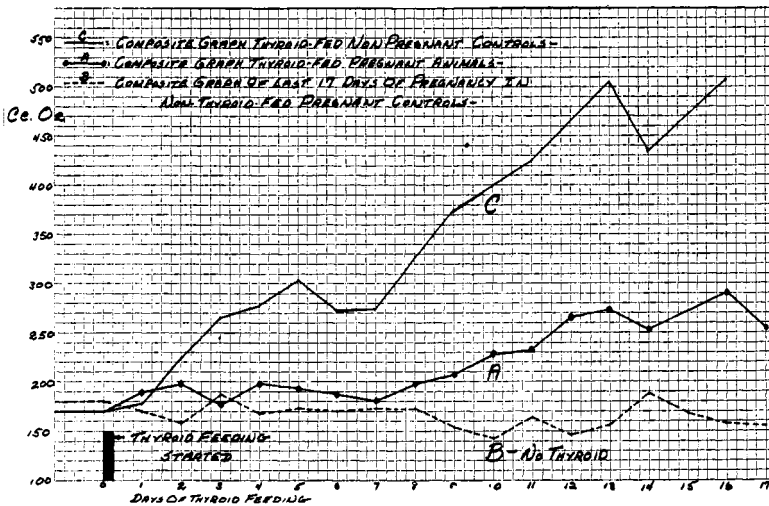


FIG. 1.

gm. of body-weight per hr. for purposes of comparison, the data being shown to be statistically significant.

Results. Loss of weight. Of course, the non-pregnant rats fed thyroid (Group I) lost weight. During a 12-day period of thyroid feeding, they lost 24 gm. (av.) per 200 gm. of body-weight. However, the pregnant rats fed thyroid (Group III) during a comparable 12-day period did not lose weight, but gained 47 gm. (av.) per 200 gm. of body weight. During the entire period of pregnancy the non-thyroid fed, pregnant controls (Group II) gained 61 gm. (av.).

¹ Tainter and Ryland, PROC. SOC. EXP. BIOL. AND MED., 1934, **32**, 361.

Thus, pregnancy prevents loss of weight in the rat receiving 100 mg. of desiccated thyroid per day; in fact, the pregnant rats receiving this dose of thyroid actually gained about as much weight as the pregnant controls for an analogous period of time. (The 15 gm. daily ration was entirely consumed by the thyroid-fed rats, but not always by the non-thyroid-fed.)

Oxygen consumption. The averaged results of the O_2 consumption rates are shown in the accompanying figure. By the method we employed, pregnancy had little effect on the rate of O_2 consumption (Curve B, graph). By comparing curves A and C, it is clear that the rate of O_2 consumption in the thyroid-fed, non-pregnant control rats was definitely greater than that of the thyroid-fed, pregnant rats, both of which groups received the same amount of food and thyroid daily. On comparing Curve A with Curve B it is evident that the thyroid fed to the pregnant rats (Curve A) increased somewhat the rate of O_2 consumption. In all probability had the dose of thyroid been smaller, Curve A would have approximated Curve B. Thus, by determining that amount of thyroid fed to a pregnant rat which would not cause an elevation in O_2 consumption, one might approximate or obtain an index of the extra-demand for thyroid secretion created by the state of pregnancy.

Summary and conclusions. Three groups of mature female rats of approximately the same age and weight and from the same colony were placed on the same amount of a standard diet. One group served as thyroid-fed (100 mg. desiccated thyroid), non-pregnant controls; the second group served as non-thyroid fed, pregnant controls; the third group, for about 16 days prior to parturition, received 100 mg. desiccated thyroid daily. The first group lost 24 gm. (av.) of weight in 12 days and the O_2 consumption markedly increased; the second group gained 61 gm. of weight during the entire period of pregnancy and the O_2 consumption did not change appreciably; the third group gained 47 gm. during the comparable period of 12 days used in the first group, and the O_2 consumption was increased, but not to the extent as in the first group. Thus, according to the criteria of body weight and O_2 consumption pregnant rats are more tolerant to desiccated thyroid than non-pregnant rats. The mechanism of the increased tolerance remains for the present unknown.