

## 11104 P

**Effect of Exercise on Growth and Cataract Development of Rats Fed Galactose.\***

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The high blood galactose and galacturia always found in rats on rations containing as much as 25% galactose,<sup>1</sup> raises the question as to the efficiency of the utilization of this sugar for muscular work. A brief study of this problem was made possible by the loan of some revolving exercise cages. The rations were those previously reported and were fed *ad lib*.

Littermates on the 25% galactose diet were divided between stationary and exercise cages as were control animals from the respective litters on a similar diet containing glucose in place of galactose. Exercise was entirely voluntary and the number of revolutions per week was recorded. Basal caloric requirement was calculated from body weight according to the formula of Diack<sup>2</sup> and caloric intake from food consumed (4.19 cal. per gram).

Growth was remarkably constant and similar for all groups, male and female, with and without exercise, and showed no difference due to type of single sugar in the diet. The calculated extra calories consumed above that required for basal expenditures was similar in the 2 ration groups (65-69% for glucose, 65-71% for galactose) and was not consistently greater for the exercise rats as might have been expected. Rats on galactose rations were just as active as those on glucose rations, the extent of exercise ranging from 5,656 to 28,538 revolutions per week for 4 weeks of the experiment. All of the galactose-fed rats had developed cataract at the end of this time and the experiment with them was discontinued.

Sugar determinations indicated the same degree of galactemia (202-255 mg/100 cc) in both galactose groups regardless of exercise and a normal blood sugar (106-134 mg/100 cc) in both glucose groups.

The only difference was in the rate of cataract development which was significantly delayed in the exercise group on galactose. The litters used in this experiment were extremely susceptible showing 100% cataract on the galactose ration, but the time when lens opacities appeared in stationary cages was 20.6 days while for those in

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<sup>1</sup> Mitchell, H. S., Merriam, O. A., and Cook, G. M., *J. Nutrition*, 1937, **13**, 501.

<sup>2</sup> Diack, S. L., *J. Nutrition*, 1930, **3**, 289.

exercise cages it was 28.0 days, a difference which cannot be ignored in view of the consistency of the figures making up each average.

One must conclude from these findings that a large part of the galactose must become available either directly or indirectly for muscular and other caloric needs. Since galactose furnishes about 24% of the total calories in the diet, a failure to use any major proportion of it would be reflected in an increased food intake or a slower rate of gain—neither of which occurred. Moreover, the increment of sugar which escapes glycogenesis and accounts for that found in the blood stream is not significantly changed by exercise, but in spite of these findings, the injury to the eye is somewhat delayed when exercise is permitted.

### 11105

#### Vaginal Cycle of *Microtus guentheri* and Its Response to Estrogenic and Gonadotropic Hormones.

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*Microtus guentheri*, one of the Muridae is a crop destroyer and generally feared on account of its extreme fertility.

The animal matures at a comparatively early age, mating taking place on the 28th day of life. In captivity, breeding occurs throughout the year and as early as 26 days after first copulation the first litter is delivered. After 2 weeks during which time nursing of the young takes place, the mother is again capable of mating. We are indebted for these data to Prof. Bodenheimer, who stimulated us to study the sex cycle of these animals.\*

*The Vaginal Cycle of Microtus guentheri.* Regular examinations meet with a certain amount of difficulty as these animals are accustomed to freedom and do not allow vaginal smears to be taken as easily as do albino rats and mice. If one grasps these animals by a fold of skin they tear away, shedding some of their epidermis. If one grips them by the tail, which is about 2 cm long, they shed the skin of this part too and the tail soon becomes necrotic. The most suitable method was to hold them by the limbs, but eventually this manipula-

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\* In 1935, Prof. Bodenheimer, Head of the Division of Entomology of the Hebrew University, Jerusalem, brought some of these animals from the Emek Yesreel (Palestine) to Jerusalem and succeeded in breeding them in his laboratory and we are indebted to him for supplying us with these experimental animals.