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.

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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-

* 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.

tion proved fatal to the animals in the course of a few months. For this reason it was impossible to keep male and female animals together and to observe the changes of the vagina existing at the time of mating. The females either died shortly from the daily manipulations for vaginal smears or they showed an aversion to mate.

We conducted experiments in 10 female animals of various ages at different seasons of the year, continuing in 2 of the animals over a period of 4 months. Even when smears were taken twice daily neither cornification nor proestrus occurred. Morphologically the vaginae were continuously in the characteristic stage of diestrus. Since the other animals kept under the same conditions but in which no vaginal smears were taken, bred rapidly and continuously, it must be assumed that in *Microtus guentheri* mating takes place when the vagina does not show typical cornification.

Vaginal Reaction of Microtus after Administration of Estrogenic Hormone. In order to ascertain whether or not the vagina of *Microtus guentheri* is able to develop the stage of cornification, we injected estrogenic hormone into 8 castrated as well as into non-castrated animals. No difference could, however, be observed in the behavior of the two groups. The reaction to estrogenic hormone (estrone or estradiolbenzoate) is shown by the following figures: 100 I. U., anestrus; 500 I. U., proestrus; 5000 I. U., estrus.

It was quite evident that *Microtus guentheri* does not respond to comparatively large doses of estrogenic hormone (100 I. U.). The stage of cornification can, however, be obtained by giving enormous doses (5000 I. U.).

Ovarian Reaction of Microtus guentheri to Administration of Gonadotropic Hormone.† For these experiments we used 29 three-week-old females in which the vagina was still closed and gave them 1-3 injections of gonadotropic hormone prepared from various sources. (a) The animals (11) proved to be unresponsive to gonadotropic hormone from pregnancy urine (10 to 2000 RU). In some instances a certain amount of follicular enlargement (which could only be ascertained by histological examination occurred after administration of 2000 RU. At no time did we find a positive vaginal smear. (b) More marked reactions were obtained with gonadotropic hormone from the blood serum of pregnant mares‡ as shown in Table I (11 animals).

Table I demonstrates that Microtus, which is otherwise rather

† We tested the preparations used in these experiments. One RU is the minimum amount of gonadotropic hormone which produces an estrous reaction on the infantile 3-weeks-old rat.

‡ We used Antex of Lovens Kemiske Fabrik, Kopenhagen.

TABLE I.

Dose of gonadotropic hormone from the serum of mare's blood	Apr. 1 Follicle maturation	Apr. 2 Follicle hemorrhage	Apr. 3 Corpus luteum formation
5 RU	—	—	—
10 RU	±	—	—
30 RU	+	—	—
100 RU	+	—	—
1000 RU	+	—	—

indifferent, responds very readily to the administration of as little as 10 RU of gonadotropic factor from mare's blood. It is, however, worthy of record to note that even the highest dosage (1000 RU) only induces follicular maturation (Apr. 1), and never the formation of follicular hemorrhage (Apr. 2) or corpus luteum (Apr. 3).

(c) The strongest reactions occurred in connection with hormone derived from animal hypophysis as shown in Table II (8 animals).

Table II shows that *Microtus guentheri* readily responds even to small doses of gonadotropic factor of pituitary origin. After administration of 4 RU follicle ripening occurred and after 8 RU corpus luteum formation took place. It is most interesting that in this animal corpus luteum formation is procured only with gonadotropic factor from hypophyseal glands and not with that derived from either mare's blood or pregnancy urine. The absence of follicle hemorrhage need not surprise us, since this reaction also occurs very rarely even in rats and guinea pigs.

Summary. In *Microtus guentheri* no vaginal cycle with a cornification stage occurs as in white mice and rats. Injections of large doses of estrogenic hormone, however, induce cornification. Gonadotropic hormone derived from different sources produces different reactions, that from pregnancy urine shows no effect, that from mare's blood serum induces follicle maturation without luteinization even in large doses, while that from animal hypophysis produces follicular maturation and corpus luteum formation. The *Microtus guentheri* may therefore be readily used as a test animal in differentiating the various types of gonadotropic hormone, especially as to their source of origin.

TABLE II.

Dose of gonadotropic hormone from animal hypophyses	Apr. 1 Follicle maturation	Apr. 2 Follicle hemorrhage	Apr. 3 Corpus luteum formation
1 RU	—	—	—
2 RU	—	—	—
4 RU	+	—	—
8 RU	+	—	+