

was almost complete obliteration of the follicular cavity by newly formed lutein tissue. This variation in the development of the corpora lutea at a fixed time following the onset of proestrus is in keeping with the variation in the time of ovulation of different follicles within a single ovary.

The data support the conclusion that a hypophyseal hormone is required for ovulation and luteinization in the rat. It seems clear that this hormone must be secreted in sufficient quantities subsequent to the onset of proestrus, to produce ovulation and luteinization in the intact rat, as hypophysectomy in the early proestrus effectively prevents ovulation.

The procedure and results described in

this paper provide the basis for further studies of the factors concerned with ovulation and corpus luteum formation in the rat.

Summary. Hypophysectomy of adult female rats within 2 hours after the beginning of proestrus prevents ovulation from occurring within a 46-hour postoperative interval. Sham hypophysectomy does not prevent ovulation as shown by the presence of partially developed corpora lutea and tubal ova. It is concluded that a hypophyseal hormone (LH) is required for ovulation and luteinization in the rat and that the quantity of hormone needed to produce ovulation and luteinization is secreted subsequent to early proestrus.

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Further Studies on Galactose Paralysis in the Rat.

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The occurrence of paralysis has been observed in rats fed galactose on certain purified rations.¹ The purpose of the present experiment was to determine the effects of B vitamins on the incidence and severity of the above condition.

Procedure and Results. Female rats of the Sprague-Dawley strain were raised to maturity on a stock ration and selected for the present experiment at approximately 3 months of age and an average weight of 160 g (range 145 to 178 g). Four experimental rations were employed: diet I consisting of glucose alone; diet II of 50% glucose and 50% galactose; diet III of 50% glucose, 50% galactose and the following synthetic vitamins per kg of ration: thiamine hydrochloride 200 mg, riboflavin 400 mg, pyridoxine hydrochloride 20 mg and calcium pantothenate 200 mg; and diet IV of 40% glucose, 50% galactose and 10% yeast* pro-

viding the same amounts of the B vitamins as were present in diet III. Animals were placed in individual metal cages with raised screen bottoms to prevent access to feces, and sufficient food was administered to assure *ad lib.* feeding. Feeding was continued for 75 days or until death, whichever occurred sooner; and food and water intake determined daily for all rats.

Results are summarized in Table I. All animals fed galactose-containing diets developed a typical "galactose paralysis" consisting in early stages of an irregular and wobbly gait and progressing to the point of complete disuse of the hind limbs. One hundred per cent of the rats were affected, with severe paralysis developing in general by the 35th day. No significant differences in time of onset or severity of paralysis were observed on the various rations employed. Subsequent to the 35th day a rapid improvement occurred in the paralytic condition of rats fed the yeast-containing ration (diet IV); animals regained use of their limbs and by the 50th day no evidence of paralysis was observed in any of the surviving rats of this group. Recovery of paralyzed rats did not occur on the other rations

¹ Ershoff, B. H., *Am. J. Physiol.*, 1946, **147**, 13.

* Hi-Ribo No. 24, Anheuser-Busch, Inc., St. Louis, Mo. Each gram contained the following vitamin potencies according to the manufacturer: thiamine, 2 mg; riboflavin, 4 mg; pyridoxine, 100-170 µg; pantothenic acid, 200-250 µg; and nicotinic acid, 400-500 µg.

TABLE I.
 Summary of Experimental Data.

Group	No. of animals	Initial body wt (g)	Dead wt of decedents (g)	Survival (days)*	No. of rats paralyzed (%)	No. of rats recovered from paralysis (%)	Avg daily intake per rat during 1st mo. of exp.	
							food (g)	water (cc)
Diet I	8	159.2	76.4 (8)	41.2 ± 3.6	0	—	7.7	6.0
II	12	160.4	71.6 (12)	37.9 ± 4.7	100	0	12.8	38.5
III	6	160.8	72.2 (6)	47.3 ± 3.7	100	0	13.4	43.5
IV	8	159.7	88.2 (3)	67.8 ± 4.1	100	87.5	15.8	59.7

The values in parentheses indicate the number of animals which died of which this is an average.

* Including standard error of the mean calculated as follows: $\sqrt{d^2/n} / \sqrt{n}$ where "d" is the deviation from the mean and "n" is the number of observations.

† The experiment was terminated on the 75th day of feeding at which time 5 of the 8 rats in this group were still alive.

employed. All animals fed galactose-containing rations developed mature bilateral cataracts from the 18th to 27th day of feeding, no significant differences being noted in time of appearance or the subsequent condition of the cataracts on the various diets employed. Paralysis and cataract were not observed in animals fed glucose alone (diet I). Food and water intake as well as length of survival was significantly greater on diet IV than on other rations tested.

Although yeast did not prevent the occurrence of paralysis, rats on diets containing this nutrient recovered rapidly from their paralytic condition in contrast to the continued paralysis in animals similarly treated but receiving their B vitamins in synthetic form. These results indicate (1) that the paralysis was reversible and (2) that some factor(s) in yeast other than thiamine, riboflavin, pyridoxine or pantothenic acid was responsible for the above effect.

Although paralysis may readily be demonstrated in rats fed galactose on certain purified rations,¹ this condition has not been reported for animals fed galactose on a more complete ration,^{2,3} indicating that the purified diets employed were deficient in some

factor necessary for the prevention of the paralytic condition. Attempts to prevent paralysis, however, with a single food supplement have been unsuccessful. Neither glucose, butter fat nor corn oil when fed in conjunction with galactose has prevented paralysis.¹ Unpublished work from this laboratory indicates that a diet of 50% casein† and 50% galactose was similarly ineffective. In addition neither thiamine hydrochloride, riboflavin, pyridoxine hydrochloride, calcium pantothenate, salt mixture‡ nor yeast* when fed with glucose and galactose was effective in this regard. Paralysis was readily prevented, however, by a diet of galactose 50.5%, casein† 25.0%, yeast* 10.0%, corn oil 10.0% and salt mixture‡ 4.5% together with vitamins A, D and E. Male and female rats of the Sprague-Dawley strain have been maintained in our laboratory for 9 weeks on the above diet with no adverse effects except the appearance of cataract. Similar results have been reported by Boutwell *et al.*² for a 6-week period in rats fed synthetic diets also containing galactose as the sole carbohydrate. Inasmuch as paralyzed rats in the

† Vitamin Test Casein, General Biochemicals, Inc., Chagrin Falls, Ohio.

‡ Salt Mixture No. 1, Sure, B., *J. Nutrition*, 1941, **22**, 499. Paralysis was not prevented by diets containing 45% glucose, 50% galactose, and 5% of salt mixture.

² Boutwell, R. K., Geyer, R. P., Elvehjem, C. A., and Hart, E. B., *Arch. Biochem.*, 1945, **7**, 143.

³ Mitchell, H. S., *Proc. Soc. Exp. Biol. and Med.*, 1935, **32**, 971.

present experiment recovered on diet IV in the absence of fat soluble vitamins, it would appear that these substances were not responsible for the protective effect of the above diets. The data suggests, therefore, either that "galactose paralysis" is due to a multiple deficiency developing when the various supplements were fed singly or that rations indicated above permitted the synthesis either by the animal's own tissues or its intesti-

nal flora of substances capable of preventing paralysis.

Summary. Rats fed a diet consisting of glucose and galactose developed a severe flaccid paralysis of the hind limbs. Addition of yeast or synthetic B vitamins to the above diet failed to prevent the appearance of paralysis, although recovery subsequently occurred in animals receiving yeast.

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An Improved Rabbit Holder.

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In studies requiring repeated injections into the ear veins of rabbits, accidental extravasation with subsequent loss of the vein occurs not infrequently even under the best conditions. With the use of the conventional box-like rabbit holder there is rarely suf-

ficient immobilization of the rabbit's head and ears to assure careful entry of the needle into the vein or to prevent its dislodgement by a sudden jerk of the animal's head.

Preliminary trials with a plaster mask shaped to accommodate the rabbit's head

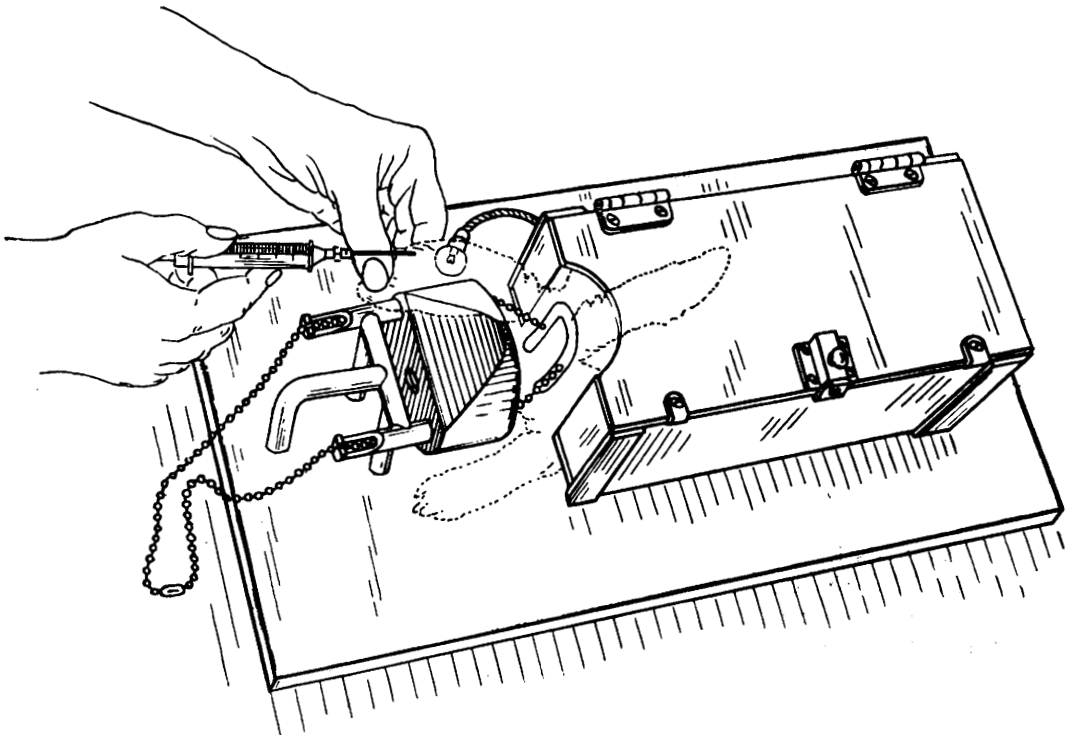


FIG. 1.