

the adrenals might have resulted in an increase in lymphoid tissue, since it is well known that after removal of the adrenals the thymus and other lymphoid tissue hypertrophies.

Summary. 1. Alexandrines or roof rats (*Rattus rattus*) have shorter small intestines and longer large intestines than do Norway rats (*Rattus norvegicus*). 2. The intestines

of Norway rats have about twice as many Peyer's patches on the average as do those of Alexandrine rats, averaging 16-19 as compared to 9. 3. The intestines of domestic Norway rats have more Peyer's patches than do those of wild Norways. 4. Peyer's patches first become visible when the rats reach an age of 15 days. The number does not appear to change with age.

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Effect of Interval Between Hypophysectomy and Injection of Gonadotrophin on Ovulation in the Rat.*

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Hertz and Meyer¹ have shown that if young adult female rats are hypophysectomized during the first 2 hours of proestrus ovulation is prevented during the subsequent 46-hour period. It was concluded that a hypophyseal hormone (LH) is required for ovulation in the rat and that the quantity required is secreted subsequent to early proestrus.

The work reported here was undertaken to determine how long after hypophysectomy mature follicles retain their ability to ovulate in response to a single intravenous injection of human chorionic gonadotrophin, and is preliminary to a series of experiments designed to study the hormonal requirements for normal development of follicles and ova just prior to ovulation.

Method and Materials. The 72 rats employed in this experiment were 3- to 5-month-old virgin females of the Sprague-Dawley strain.

All hypophysectomies were carried out during the first 3 hours of proestrus using virtual-

ly the same technique described by Hertz and Meyer.¹

The intravenous injections of the purified human chorionic gonadotrophin, prepared essentially by the method of Gurin, *et al.*,² were given in one of the tail veins with the exception of a few injections which were made into the heart. Fifty and 100 γ doses of the dry powder in an alkaline saline solution at a concentration of 100 γ /cc were given but since the results for the 2 doses were comparable, they have been combined in Table I. The timing of the injections in relation to hypophysectomy is also shown in this table.

Autopsies were carried out 30 to 50 hours after the injections allowing ample time for all the ova which had ovulated to reach the oviduct. The sella was examined with magnifying spectacles to determine if the hypophysectomy had been complete. The ovaries and oviducts were removed and fixed in FAA or Zenker's solution.

Serial sections of one ovary and oviduct from each rat were made and stained with hematoxylin and eosin. The sections were then examined for the presence of ova in the ovi-

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¹ Hertz, Roy, and Meyer, R. K., *Proc. Soc. Exp. Biol. and Med.*, 1946, **63**, 71.

² Gurin, S., Bachman, C., and Wilson, D. W., *J. Biol. Chem.*, 1939, **128**, 525.

TABLE I.
Effect of Varying the Interval Between Hypophysectomy and Gonadotrophin Injection on Ovulation in the Rat.

Hrs from hypophysectomy to injection	No. of rats hypophysectomized	No. of rats ovulated
0	6	6
2	6	5
4	9	8
6	8	7
8	12	11
10	14	6
12	8	1
19	6	0
24	5	0

duct, newly formed corpora lutea, and pre-ovulatory follicles.

Results and Discussion. The results as summarized in Table I show that in a high percentage of the animals tested the mature follicles retain their ability to ovulate in response to an intravenous injection of chorionic gonadotrophin provided the injection is made within 8 hours after the hypophysectomy. If the interval between hypophysectomy and injection is extended to 10 or more hours, the percentage of animals which will respond

declines rapidly with no animals responding after 12 hours.

The data show that the pituitary is necessary for maintaining the mature follicles found in early proestrus so that they will ovulate in response to a gonadotrophic stimulus. They also indicate that after hypophysectomy the amount of the pituitary hormones responsible for the maintenance drops rapidly to a level in the blood below that required to keep the follicles in a condition where they can be ovulated.

It was found that the follicles in the ovaries of the rats injected 8 to 12 hours following hypophysectomy which failed to ovulate often showed a marked degree of luteinization, but when the interval was extended to 19 hours or more luteinization did not occur.

Summary. After an interval of about 10 hours following hypophysectomy in early proestrus, the mature follicles in the ovary of the rat become refractory to a single intravenous injection of human chorionic gonadotrophin but the ability of the follicle to luteinize is retained for a longer time.

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Statistical Evaluation of Growth Curves.

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In an article with the above title which appeared in this journal,¹ Weil compares the growth curves of groups of experimental animals subject to different treatments. Five treatments are compared against each other and a control, 30 rats are used for each treatment and the weight of each rat is determined at weekly intervals. Weil proposes a method of analysis in which he constructs a frequency distribution for each treatment taking all the weights of the rats over the period of

the experiment and then applies the chi-square test to examine differences between those frequency distributions for the various treatments.

This is an oversimplified method of analysis and not a valid one. The fallacy lies in the tacit assumption that all the observations within each of the frequency distributions are independent. Although the 30 rats in each group are independent, the repeat weighings on each rat are certainly not so. In practically all biological work, the main source of variability lies between animals;

¹ Weil, C. S., PROC. SOC. EXP. BIOL. AND MED., 1947, **64**, 468.