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Effect of Pseudopregnancy on the Life-Span of Adrenalectomized Cats.

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Rogoff and Stewart observed that pregnancy and pseudopregnancy would greatly extend the survival periods of bilaterally adrenalectomized dogs.[1, 2] This observation has since been confirmed,[3] and more recently it has been shown that when pseudopregnancy is experimentally induced, it is just as effective in alleviating the symptoms of adrenal insufficiency as spontaneous pseudopregnancy.[4, 5] Experiments on the adrenalectomized, pseudopregnant ferret indicate that it is possible to obtain survivals which are, on the average, 5 times as long as those of the anestrus or male controls.[6]

In the experiments reported here, the right adrenal glands were removed from 10 mature female cats. Nine of these animals were driven into estrus by injections of a menopause urine extract (Gamone*), while the tenth animal came into spontaneous estrus after the operation. Gamone has been found effective in producing estrus and mating reaction in the dog,[7] but for use in the cat it was necessary to run a series of preliminary tests to determine the proper dosage. The results of these experiments indicated that 20 R.U. per kilo body weight per day would produce cornified vaginal smears and typical mating reactions after an injection period of 4 to 6 days (Table I). During the estrus period the cats were mated with a normal male, and in some cases they were greatly stimulated with the glass rod while taking vaginal smears. Thus every attempt was made to secure luteinization of the estrous ovaries by each animal's own pituitary gland secretion.

Immediately at the end of the mating period, the remaining adrenal gland was removed with as much care as possible in order to

1 Rogoff, J. M., and Stewart, G. N., *Am. J. Physiol.*, 1927, **79**, 508.

2 Rogoff, J. M., and Stewart, G. N., *Am. J. Physiol.*, 1928, **86**, 20.

3 Pfiffner, J. J., Swingle, W. W., and Vars, H. M., *J. Biol. Chem.*, 1934, **104**, 701.

4 Swingle, W. W., Parkins, W. M., Taylor, A. R., and Morrell, J. A., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 94.

5 Swingle, W. W., Parkins, W. M., Taylor, A. R., Hays, H. W., and Morrell, J. A., *Am. J. Physiol.*, 1937, **119**, 675.

6 Gaunt, R., and Hays, H. W., *Am. J. Physiol.*, 1938, **124**, 767.

* Through the courtesy of Dr. J. A. Morrell of E. R. Squibb and Sons.

7 Leathem, J. H., *Endocrinol.*, 1938, **22**, 559.

TABLE I.
Data on Pregnant and Pseudopregnant Adrenalectomized Cats.

Cat	Wt, kg	Period injected, days	Total R.U. injected	Days estrus	No. times mated	Interval between operations, days	Survival period, days*
1	3.2	5	320	5	8	64	20
2	2.9	5	290	6	5	18	26
3	3.1	5	305	6	1	18	35
4	3.3	4	262	6	13	17	22
5	2.2	6	270	5	10	28	21
6	3.0	5	280	6	14	21	28
7	2.3	Spontaneous estrus		6	13	47	20
8	2.9	4	240	5	5	20	14
9	3.2	4	240	4	3	20	24
10	3.2	4	256	5	7	18	22

*Average survival 23.2 days.

minimize the chances of shock affecting the survival time. No cortical hormone was administered, except to cat 1, which received injections for 2 days following the second operation. She survived 20 days after the hormone was withdrawn (Table I).

The survival periods listed in the table indicate that only 1 animal failed to survive as long as 20 days, and that the average for 10 animals was 23.2 days. In contrast to this figure, the average survival period was found, by Swingle and Pfiffner[8] in this laboratory, to be 8.15 days for 138 untreated male and female cats.

Upon autopsy animals 1, 7, 9 and 10 were found to be pregnant. Although the number of pregnant cases is small, it seems likely that the cat and dog do not differ with respect to the extended life-span of pregnant animals after bilateral adrenalectomy. Apparently the difficulties of demonstrating the lengthened survival are greater in the cat. In this connection, previous workers[9, 10] have been unable to demonstrate extensive survival in cats from which both adrenals were removed after pregnancy had been diagnosed.

Sections of the ovaries and uteri of the 6 non-pregnant animals indicated that they were in a regressing pseudopregnant condition. This was most obvious in the tissues of the 28-day and 35-day animals. The number and complexity of the endometrial glands were still great in most cases, and some of the ovarian sections were almost a solid mass of compact luteal tissue. A few of the ovaries exhibited lutein cysts which were attributed to a possible over-dosage of Gamone. These were not found in cats which had survived beyond

[8] Swingle, W. W., and Pfiffner, J. J., *Medicine*, 1932, **11**, 371.

[9] Rogoff, J. M., and Stewart, G. N., *Am. J. Physiol.*, 1929, **88**, 162.

[10] Corey, E. L., *Physiol. Zool.*, 1928, **1**, 147.

24 days. The pseudopregnant condition in the cat has previously been studied in great detail.[11, 12] When it is produced entirely by hormone injections,[11] the length of the period is 40-44 days. On the other hand, pseudopregnancy as the result of a sterile mating is said to end in 33 days.[12] In any case, the luteal phase, during which one may expect survival of the female from adrenal insufficiency, probably lasts about 35 days. It is likely that this figure represents the maximum survival period obtainable under these conditions.

The hormone of the corpus luteum, secreted during the luteal phase of the ovary, is capable of ameliorating the symptoms of adrenal insufficiency. This is in agreement with work on the ferret and the rat[6, 13, 14] in which it has been shown that it is possible to prevent the symptoms of adrenal insufficiency by administration of the proper dosage of pure crystalline progesterone. It should be equally feasible to demonstrate the efficacy of the pure hormone in lengthening the life-span of the adrenalectomized cat.

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Negative Effect of Gastric Juice Administered Intravenously to Patients with Pernicious Anemia.

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Evidence has been produced[1] to show that the site of interaction between intrinsic (gastric) factor and extrinsic (food) factor is in the intestinal tract and not parenterally. It is also true that concentrated gastric juice when administered intramuscularly will produce a hematologic response in a patient with pernicious anemia.[2] It appears from the nature of the response that the stimulus is specific and that concentrated gastric juice does contain a hematopoietic principle

11 Foster, M. A., and Hisaw, F. L., *Anat. Rec.*, 1935, **62**, 75.

12 Gros, G., *C. R. Soc. de Biol.*, 1935, **118**, 1575.

13 Greene, R. R., Wells, J. A., and Ivy, A. C., PROC. SOC. EXP. BIOL. AND MED., 1939, **40**, 83.

14 Fischer, A., and Engle, M., *Lancet*, 1939, **236**, Feb. 11, 354.

1 Castle, W. B., Heath, C. W., Strauss, M. B., and Heinle, R. W., *Am. J. Med. Sci.*, 1937, **194**, 618.

2 Morris, R. S., Schiff, L., Burger, G., and Sherman, J. E., *Am. J. Med. Sci.*, 1932, **184**, 778.