

poisoning with dinitrophenol, thyroid extract⁹⁻¹³ result in the loss of estrous cycles in rats. Analysis of these data indicated an underlying common factor, namely, the loss in weight in all of these experimental animals. Corroborative evidence against the assumption of some more specific cause of the anestrus was furnished by the fact that estrous activity was resumed when the weight lost had been regained. On the other hand, insulin injections,¹⁴ manganese-free diets,¹⁵ morphine,¹⁶ and nicotine¹⁷ poisonings in rats, procedures which resulted in no disturbance of nutrition in no way affected the estrous cycle. Our own experiments support the conclusion that in the investigations alluded to above, the loss of estrus was either wholly or at least in part due to the concomitant inanition. The inanition appears to produce anestrus through changes induced in the hypophysis.

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Progesterone Will Maintain Adrenalectomized Rats.*

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Certain observations suggest the possibility that progesterone is capable of maintaining the adrenalectomized animal. (a) There is a chemical similarity in the structure of progesterone and certain of the hormones found in the adrenal cortex.^{1, 2} (b) 21-hydroxyprogesterone (desoxycorticosterone) will maintain the adrenalecto-

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¹⁵ Orent, E. R., and McCollum, E. V., *J. Bioch.*, 1932, **98**, 101.

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¹ Reichstein, T., *Helv. Chim. Acta.*, 1936, **19**, 1107.

² Mason, H. L., Hoehn, W. M., McKenzie, B. F., and Kendall, E. C., *J. Biol. Chem.*, 1937, **120**, 719.

mized animal.⁸ (c) Life is maintained in adrenalectomized animals with functional corpora lutea, as in pregnancy or pseudopregnancy.^{4, 5, 6} (d) Crystalline progesterone is shown to have a sodium retaining action in the adrenalectomized dog which is similar to that exhibited by the cortical hormones.^{7, 8}

On the basis of these findings, it would seem that progesterone should maintain life in adrenalectomized animals. Various observers, however, report evidence to suggest that such is not the case.^{4, 9, 10} It is possible, nevertheless, that inability to record such a phenomenon is due to insufficient dosage, and the following study was undertaken to test this hypothesis.

While this paper was in the process of being written, Gaunt, *et al.*,¹¹ have presented data showing that progesterone maintained life in 9 out of 19 adrenalectomized animals in dosages of 1-2 mg per day.

Procedure. Litter mate, male animals of our stock colony of albino rats were bilaterally adrenalectomized by the lumbar route. The average weight at operation was 41.4 g, the extremes being 36 and 49 g. Each litter was divided into treated and control groups which were kept under identical conditions. The diet consisted of Purina Fox Chow and tap water, supplemented on the first 3 days with powdered milk.

All animals were weighed once daily until death. The treated animals were given 4.0 mg of crystalline progesterone† in oil at the time of weighing, for the first 15 days, starting the day of the operation, some of the control animals being injected with plain oil. The criteria of complete adrenalectomy or absence of accessory adrenal tissue were lack of weight gain and subsequent death. However, the few animals which died within 48 hours of the operation have not been included in this series, as we feel that death in these instances can not be attributed to adrenal insufficiency.

³ Steiger, M., and Reichstein, T., *Nature*, 1937, **139**, 925.

⁴ Swingle, W. W., Parkins, W. M., Taylor, A. R., Hays, H. W., and Morrell, J. A., *Am. J. Physiol.*, 1937, **119**, 675.

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¹¹ Gaunt, R., Nelson, W. O., and Loomis, E., *PROC. SOC. EXP. BIOL. AND MED.*, 1938, **39**, 319.

† We wish to thank Dr. Ernst Oppenheimer of Ciba Pharmaceutical Products for the generous supply of progesterone.

Results. The 11 control animals lived an average of 5.1 days (minimum 3 days, maximum 7 days). The average daily weight change for this group is shown in the graph (Fig. 1).

The 10 animals, treated for 15 days with progesterone, lived an average of 18.0 days (minimum 11 days, maximum 23 days). One of the treated animals, showing a weight gain, died on the eleventh day of unknown cause. The other treated animals all showed a gain in weight. Following the cessation of treatment, these animals lived on an average of 4.76 days (extreme 2 to 9 days). The average daily weight change is shown in the graph (Fig. 1).

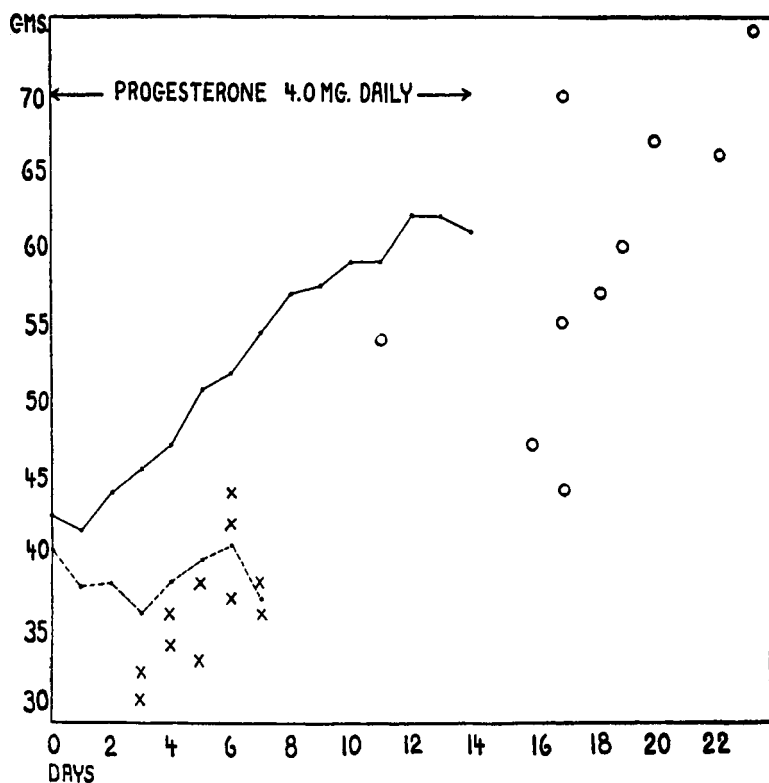


FIG. 1.

Average weights of treated (—) and control animals (.....). "X" shows weight on last day of life of control animal. "O" shows weight on last day of life of treated animal. Note that the smaller animals died sooner after cessation of treatment.

From the graph, it can readily be seen that 4.0 mg of crystalline progesterone per day will maintain life and a gain in weight of immature adrenalectomized male rats. When treatment was discontinued, weight gain ceased and the animals died of adrenal insuf-

ficiency. On the basis of these findings it may be concluded that the negative results reported in the past were due to insufficient dosage.

Conclusions. Progesterone is "cortin-like" in that it will maintain life and weight gain in immature adrenalectomized male rats.

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Selective Bacteriostatic Action of Sodium Lauryl Sulfate and of "Dreft."

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The bacteriostatic action of various soaps has undergone a considerable amount of study by many investigators. Recently, a somewhat related class of substances, the sodium alkyl sulfates, has been synthesized. These substances have also been made use of as detergents in such preparations as "Dreft," "Drene" and other commercial products.

The alkyl sulfates are half-esters of sulfuric acid. In this respect they differ from soaps which are combinations of fatty acids and alkalis. In both cases, however, the alkyl chain probably determines its bactericidal effectiveness. Sodium lauryl sulfate is a sodium alkyl sulfate containing 12 carbon atoms.

The similarity of these substances to soaps suggested the possibility that similar bacteriostatic action might be exhibited by them. Accordingly, sodium lauryl sulfate as such, and "Dreft" which contains a large amount of sodium lauryl sulfate were tested for their bacteriostatic action. Twenty-one strains of Gram positive bacteria, 20 strains of Gram negative bacteria and 6 strains of common molds were used in these studies. In general, all tests were made on Difco standard nutrient agar to which the test substances had been added in varying amounts so as to make concentrations of 1.0% sodium lauryl sulfate and of 1.0, 0.5, 0.25, and 0.1% "Dreft". The plates were streaked with heavy suspensions of the organisms and then incubated at appropriate temperatures for 48 hours.

The effects of sodium lauryl sulfate and of "Dreft" on the growth of the 41 strains of bacteria and 6 strains of molds studied in this investigation are shown in Table I. It is evident that the Gram positive organisms were prevented from growing, whereas the