action to the pharynx, a phenomenon considered significant in preventing lodging of material on nasal areas. It would seem worthwhile to study the effect of gonadal hormones upon the formation and movement of this nasal sheet.

Summary. 1. In 15 monkeys and 8 humans testosterone propionate effected changes in specialized nasal areas. These changes produced by androgens occurred in both male and female monkeys. 2. In monkeys and in humans congestion, swelling and fluid formation were observed grossly. Histologically, perivascular edema was pronounced in the monkeys. 3. The nasal areas affected are similar to those which exhibit vicarious menstruation. Discussion is given as to possible physiological significance of gonad-controlled function of these areas with regard to warming of inspired air, the prevention of infection, and therapeutic use of gonadal substance in conditions of atrophic rhinitis and nasal hyposecretion.

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Effect of Sodium Chloride Therapy on Oestrous Cycle and Hypophysis of Bilaterally Suprarenalectomized Rats.

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Complete suprarenalectomy in rats results in a suppression or irregular appearance of the oestrous cycle.[1, 8] This has been attributed to an intermediate factor, the impaired gonad stimulating function of the hypophysis. Rubin and Krick,[9] and Gaunt,[3, 4] and other investigators have established the efficacy of salt therapy in maintaining the life of adrenalectomized rats. Experiments were conducted in this investigation to determine the influence of sodium chloride administration in restoring (1) gonadotropic function of the hypophysis and (2) the normal oestrous rhythm. Reference to

1 Corey, E. L., and Britton, S. W., *Am. J. Physiol.*, 1934, **107**, 207.

8 Martin, S. J., *Am. J. Physiol.*, 1932, **100**, 180.

9 Rubin, M. I., and Krick, E. T., PROC. SOC. EXP. BIOL. AND MED., 1933, **31**, 228.

3 Gaunt, R., Tobin, C. E., and Gaunt, J. H., PROC. SOC. EXP. BIOL. AND MED., 1934, **32**, 134.

4 Gaunt, R., Tobin, C. E., and Gaunt, J. H., *Am. J. Physiol.*, 1935, **111**, 321.

a part of this problem was made by Kutz,[7] who reported that 18 suprarenalectomized rats out of 31 showed normal ovarian cycles on salt therapy.

Vaginal smears of 88 young adult (4-6 months old) albino rats, obtained from 3 different colonies, were examined daily and body weights recorded bi-weekly throughout this study. All animals showed 3-4 normal oestrous cycles of 4-6 days duration, before they were subjected to experimentation. Seventy-four rats were bilaterally adrenalectomized and 14 were kept as controls following a unilateral removal of the adrenal gland.

Of the 74 experimental rats, 28 were given tap water and the remaining 46 received 1 or 2% sodium chloride solution in open dishes in addition to the usual rat diet. Ninety percent of the former group died of typical adrenal insufficiency, the average survival period being 11.6 days (range, 6-19 days). Salt therapy in the latter series of 46 experimental rats was continued for 32 days, discontinued for 3-12 days (average 8 days) until signs of suprarenal insufficiency appeared in all animals, and then resumed again for 23-28 days. This procedure was carried out in order to insure that survival was due only to salt therapy. In the first period of salt administration, 26% died with an average survival period of 16.8 days or 5.2 days longer than rats receiving tap water. The body weight of the remaining 34 animals was slightly above the preoperative level and distinctly below that of the control rats. In the period when salt therapy was discontinued 8 rats died from hypoadrenia despite intraperitoneal injections of normal physiological saline. This is in agreement with Gaunt.[7] During the second period of salt administration, 22 rats survived, showing again slight increases in preoperative weight levels and apparently normal body activity.

The oestrous rhythm, with the exception of one or two cycles, remained essentially normal in 55% of the females during the first

TABLE I.
Bilaterally Adrenalectomized Rats Showing Effects on Oestrous Cycle after Two Periods of NaCl Therapy.

Oestrous Effects	First NaCl Therapy* for 32 days	No NaCl Therapy (3-12 days)	Second NaCl Therapy (23-28 days)
Complete cessation of oestrus	4 rats	17 rats	3 rats
Prolonged or irregular cycles	16 "	10 "	7 "
1-2 cycles prolonged, rest normal	19 "	3 "	8 "
Normal oestrous cycle (4-6 days)	7 "	4 "	4 "

*3 rats successfully mated.

[7] Kutz, R. L., McKeown, T., and Selye, H., PROC. SOC. EXP. BIOL. AND MED., 1934, **32**, 331.

TABLE II.
Effects on Immature Ovaries of Implanted Hypophyses of Adrenalectomized Rats after Second NaCl Therapy.

Control		Experimental	
Pairs of Rats	Wt. in mg. Ovaries	Pairs of Rats	Wt. in mg. Ovaries
7	12.8	6	12.9
	13.6		11.8
	13.2		13.3
	13.5		12.6
	11.9		13.7
	12.6		12.9
	14.0	Aver.	12.9
Aver.	13.2		
		4	9.7
			9.9
			9.5
			10.1
		Aver.	9.8

and second periods of salt administration (Table I). It was completely inhibited in 9-13%, and prolonged or irregular in 35%. Initial and temporary postoperative oestrous disturbances paralleled the fall in body weight and was probably due to it.[6] The oestrous cycle of the 34 adrenalectomized rats whose salt therapy was discontinued showed essentially the same disturbance as previously noted.[8] During the first course of salt treatment, 3 of the experimental females were successfully mated. They, however, died of typical hypoadrenia when the foetuses were approximately 10-12 days old. The salt administration apparently was inadequate to maintain life during pregnancy.

Of the rats maintained on the second course of salt therapy 10 were sacrificed on the twenty-third day and 10 on the twenty-eighth day, and the gonad stimulating power of their hypophyses assayed by intramuscular implantation of 2 pituitaries into a 22-day female rat. The donors were grouped so that body weights and oestrous effects were essentially similar. The hypophyseal activity was then compared to that of 14 control rats. Table II shows that the gonad-stimulating potency of adrenalectomized rats maintained for 67-72 days on salt therapy is essentially similar to the controls in 60% of the cases. The remaining group showed a decrease of 33% in hypophyseal potency. All the animals of this latter group showed disturbances in oestrus varying from prolonged or irregular cycles to complete cessation.

In view of the hypophyseal-corticoadrenal interrelationship, it

[6] Kroc, R. L., and Martin, S. J., *Am. J. Physiol.*, 1934, **108**, 438.

appears striking to note that normal oestrous activity can be restored at all with salt therapy in the absence of the adrenal glands. Further, the gonad-stimulating power of the hypophysis of adrenalectomized rats remains unimpaired in the majority of instances on salt treatment. Mating was successful in 3 instances. It is possible that adrenalectomized rats showing impairment in ovarian and hypophyseal function may not have ingested adequate sodium chloride. However, these findings further emphasize the secondary importance of the adrenal cortex on gonadal activity. They also confirm the contention that the suprarenal cortex exerts no direct estrogenic effect,[1, 2] since as many rats showed normal oestrus as those that did not.

If the prevalent theory of corticoadrenal function to maintain the normal osmotic balance of the body is correct, perhaps the administration of sodium chloride in adrenalectomized rats serves to restore the normal electrolytic equilibrium of hypophyseal and ovarian tissue in a manner similar to its action on renal tissue.[5]

Conclusion. Sodium chloride therapy in suprarenalectomized rats during our period of observation was effective not only in prolonging life but also in restoring normal hypophyseal-ovarian activity in 55% of the cases.

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Cultivation of Rabies Virus.*

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Webster and Clow[1] and Kanazawa[2] reported the first success in cultivating rabies virus. The former accomplished this with a medium consisting of Tyrode solution containing normal monkey serum and minced mouse embryo brain, while the latter propagated the virus in Tyrode solution in the presence of rabbit embryo brain tissue, but without the addition of serum.

2 Fitzhugh, O. G., *Am. J. Physiol.*, 1937, **118**, 677.

5 Ingle, D. J., Wilson, H. W., and Kendall, E. C., *Am. J. Physiol.*, 1937, **118**, 302.

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1 Webster, L. T., and Clow, A. D., *Science*, 1936, **84**, 487.

2 Kanazawa, K., *Jap. J. Exp. Med.*, 1936, **14**, 519.