

another, horse serum only (plus saline in each instance to make up a comparable dosage). Serums, saline, etc., were added to the virus mixture as indicated, the combination shaken, incubated for 1 hour and placed in the icebox for 24 hours, warmed and injected as follows: 0.06 cc IC, 0.06 cc IN and 0.5 cc SQ. The final injection mixture was a 2% suspension of virus.

Protection may be said to have been demonstrated if the animals which received the neutralized virus lived at least 21 days without having paralysis after the test was done.

Every one of the positive controls developed paralysis and died within 10 days after the injection. All of the animals, injected with the horse serum lacking any neutralizing antibody titer, also died. None of the animals injected with either the normal pooled convalescent serum or specific horse serum died or developed disease. In the pooled human convalescent serum protected group, 4 of the 20 animals died, a 20% mortality rate. Of the 20 animals injected with the specific neutralizing horse serum and virus, 1 was killed by other rats the first day after the injection; of the 19 that remained, 1 died without signs of paralysis on the thirteenth day. Only one of the 19 died, a 5+ % mortality rate as compared with that of 100% following the injection of serum obtained from the same horse prior to immunization.

These specific neutralization tests demonstrate that the virus material transferred to the cotton rat was truly a poliomyelitis virus strain. Since the original acclimations to the cotton rat were made with Flexner's M.V. strain, it can be assumed that the poliomyelitis strain which had been carried in the rat was the Flexner's M.V. strain.

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Salt After Adrenalectomy. IV. Urinary Nitrogen and Survival Time of the Fasted Adrenalectomized Salt-treated Rat.*

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Adrenalectomized rats kept under optimal living conditions and allowed to drink 1% NaCl solution store fed glucose as liver glycogen

* We wish to acknowledge the assistance of the Federal Works Projects Administration, Project No. OP65-1-08-62, Unit A-5, and the Christine Breon Fund.

almost as well as intact animals. They continue to grow and to maintain a satisfactory state of health; animals so treated have been observed for periods as long as 176 days postoperative.¹ In this study such animals were fasted and the urinary nitrogen and survival time noted.

Our first observations were made upon 3 groups of animals: Rats of Group I (Table I) were subjected to a "sham" adrenalectomy and allowed to drink tap water; those of Group II were adrenalectomized and allowed to drink 1% NaCl only; those of Group III were adrenalectomized and immediately started on a daily dose of 0.5 mg desoxycorticosterone acetate in oil subcutaneously. All rats were fed the stock diet for 10 days after adrenalectomy and then subjected to fasting. From the second day† of fasting until death the urinary nitrogen was determined daily. The survival period in days and the daily nitrogen excretion of these animals are shown in Table I. It will be seen that the salt-treated adrenalectomized rat is able to survive an average of 5.5 days of fasting. This approaches the survival period (6.3 days) of the adrenalectomized rats treated with desoxycorticosterone acetate. The sham adrenalectomized rats

TABLE I.
Nitrogen Excretion and Survival Time of Fasted Adrenalectomized Rats Allowed to Drink 1% NaCl as Contrasted with Sham Adrenalectomized and Hormone Treated Controls.

Group No.	Urinary N mg per day Day of fasting				Fasting survival period, days
	2nd	3rd	4th	5th	
I. Sham adrenalectomized rats on tap water	146 (8)† (120-180)‡	132 (8) (108-166)	133 (8) (106-170)	133 (8) (108-162)	13 (10-17)
II. Adrenalectomized rats on 1% NaCl	133 (9) (116-154)	107 (7) (102-118)	98 (6) (94-102)	97 (5) (92-104)	5.5 (3-10)
III. Adrenalectomized rats on DOCA* 0.5 mg daily	125 (8) (76-146)	97 (7) (88-112)	91 (5) (80-104)	91 (5) (82-106)	6.3 (4-16)

Each group was given the treatment indicated from the time of operation until death due to fasting. Fasting was started on 10th day postoperative.

*Desoxycorticosterone acetate in sesame oil.

†Number of animals in parentheses.

‡Range of values in parentheses.

¹ Anderson, E., Herring, V., and Joseph M., *PROC. SOC. EXP. BIOL. AND MED.*, 1940, **45**, 488.

† The urinary nitrogen output was not determined on the first day of fasting since we did not have an arrangement for separating feces from urine. After the first day of fasting very few feces were passed.

survived an average of 13 days. On the second day of fasting the urinary nitrogen output of both groups of treated adrenalectomized rats (salt or desoxycorticosterone) was only slightly less than that of the sham adrenalectomized controls but after the second day of fasting their output was about 30% less than that of the controls.

In another set of experiments similar studies were made upon 4 groups of animals consisting of sham adrenalectomized rats and adrenalectomized rats given tap water, NaCl and desoxycorticosterone. In order to have all of the adrenalectomized rats in a comparable state of health at the beginning of the fast, adrenal cortical extract (Upjohn) was given for the 5 days after adrenalectomy during which time the animals were fed, and on the 6th postoperative day, which was the first day of the fast. A daily dose of 0.5 cc adrenal cortical extract (Upjohn) was given the first 4 days, and then increased to 1 cc for the next 2 days.

Beginning the first day of the fast the 4 groups of animals were given the following treatment: Group I, sham adrenalectomized

TABLE II.

Nitrogen Excretion and Survival Time of Fasted Adrenalectomized Rats Allowed to Drink Tap Water or 1% NaCl as Contrasted with Normal Controls and Hormone Treated Animals.

Group No.	Fed—5 days postoperative Change in B.W.			Fluid intake during fast, cc/day	Urinary N mg per day Day of fasting						Fasting sur- vival period, days
	Food intake, g/day	Water intake, cc/day	during fast, g/day		2nd	3rd	4th	5th	6th	7th	
I. Control sham adrenalectomized. Tap water during fasting	17	34	—8	14	144 (5)† (134-158)†	131 (5) (127-142)	128 (5) (112-134)	121 (5) (110-132)	111 (5) (102-126)	114 (5) (100-124)	Fed on 8th day
II. Adrenalectomized.* Tap water during fasting	6.4	20	—7	9	78 (5) (54-94)	59 (4) (50-58)	40 (4) (30-52)	36 (1)	—	—	4.8 (3-6)
III. Adrenalectomized* 1% NaCl during fasting	8	22	—6	18	134 (5) (114-156)	126 (5) (116-132)	122 (3) (112-136)	110 (3) (104-116)	93 (2) (84-102)	85 (2) (76-94)	6.4 (4-9)
IV. Adrenalectomized.* Tap water and 0.5 mg DOCA**	6.6	17	—7	8	140 (3) (134-146)	133 (3) (124-140)	122 (3) (114-130)	116 (3) (112-120)	98 (2) (96-100)	86 (1)	7 (6-8)

*The adrenalectomized rats were given adrenal cortical extract (Upjohn) 0.5 cc daily for 4 days postoperative; 1 cc on 5th day and 1 cc on 6th day or first day of fasting.

**Desoxycorticosterone acetate in sesame oil, daily during fast.

†Number of animals in parentheses.

‡Range of values in parentheses.

rats, had tap water to drink; Group II, adrenalectomized rats, had tap water to drink; Group III, adrenalectomized rats, were given 1% NaCl to drink; Group IV, adrenalectomized rats, were given tap water to drink and injected subcutaneously with 0.5 mg desoxycorticosterone acetate daily. The data of this study are shown in Table II. The untreated adrenalectomized rats were the least capable of enduring a fast. Their survival period averaged 4.8 days. The adrenalectomized rats which received NaCl or desoxycorticosterone survived an average of 6.4 and 7 days, respectively. The sham adrenalectomized rats were all alive on the 8th day of the fast when the experiment was terminated.

The untreated adrenalectomized rats showed a marked drop in urinary nitrogen when compared with the controls within 24 hours after stopping the cortical extract. The animals treated with NaCl and desoxycorticosterone showed a urinary nitrogen output which was practically the same as that of the controls through the fifth day of fasting.

In the early stages of acute adrenal insufficiency the output of urinary Na is increased, and that of the K is decreased. As the state of insufficiency advances the urinary Na is decreased due to a decreased blood flow through the kidney. In order to rule out a nitrogen retention due to diminished blood flow through the kidney in the case of the untreated adrenalectomized rat during the second and third days of fasting, the urinary excretions of Na and K were determined in conjunction with the nitrogen output. These data are shown in Table III. The animals of this group were treated in

TABLE III.
Excretion of N, Na and K in Fasted Adrenalectomized Rats.

Group No.	Change B.W. g/day		Water intake, cc/day		Urinary output mg per day					
					2nd day fast			3rd day fast		
	Fed	Fasted	Fed	Fasted	N	Na	K	N	Na	K
I. Sham adrenalectomy, tap water to drink										
W 5769	+3	—8	29	13	150	38	25	134	44	15
W 5776	+6	—6	30	13	162	46	20	148	40	12
II. Adrenalectomy, tap water to drink										
W 5710	—1	—9	16	11	63	104	9	68	90	5
W 5748	+1	—8	16	11	74	96	6	56	110	7

The animals were fed the first 5 days postoperatively and given tap water to drink. The adrenalectomized rats had 1 cc adrenal cortical hormone daily from time of operation through the first day of fasting.

a similar fashion as those of Groups I and II (Table II). The 2 adrenalectomized rats were given adrenal cortical extract, 1 cc daily for the 5 days postoperative during which time they were fed and on the sixth day postoperative which was the first day of the fast. During the second and third days of fasting, the urinary N, Na, and K were determined. It will be noted that the Na excretion is high for the adrenalectomized rats at the same time that the nitrogen excretion is low. It would seem from this that the low nitrogen excretion is not due to decreased renal blood flow but more probably to a diminished protein catabolism. From a comparison of the nitrogen excretion values of the 3 groups of adrenalectomized rats it is apparent that the rats treated with NaCl or desoxycorticosterone have a much greater protein breakdown during fasting than the untreated adrenalectomized rat, and that in fact, the rate of breakdown parallels that of normal rats for at least 5 days of fasting.

Conclusion. Fasted adrenalectomized rats treated with NaCl excrete nitrogen in amounts comparable with that of hormone-treated controls or that of normal animals, for at least 5 days of fasting. The survival time of such animals is also somewhat prolonged.

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Study of the Serum Lipids in Sclerema Neonatorum.

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Although a number of investigations¹⁻⁶ have been made in sclerema neonatorum, no report has been found which deals with lipid analyses both at the time the disease was manifest and again when all evidence of the disorder had disappeared. Furthermore,

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¹ Harrison, G. A., and McNee, J. W., *Arch. Dis. Child.*, 1926, **1**, 63.

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⁴ Kohnstam, G. L. S., and Herbert, F. K., *Arch. Dis. Child.*, 1927, **2**, 349.

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⁶ McIntosh, J. E., Waugh, T. R., and Ross, S. G., *Am. J. Dis. Child.*, 1938, **55**, 112.