ing only $10^{2.9}$ mouse LD_{50}. Circulating interferon was detected in the former group at 4 and 6 hours following inoculation but at no time was it found in birds given the smaller dose. Interferon appeared more rapidly and in higher titer in the serum of 3-month-old chickens inoculated with $10^{10.1}$ mouse LD_{50} of virus.

The advice and encouragement of Dr. D. M. McLean throughout this project is gratefully acknowledged.

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Received May 28, 1965. P.S.E.B.M., 1965, v119.

Effect of Hypophysectomy on Feed Intake in Rats.*† (30424)

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The variation in normal feed intake of mature female rats of the Sprague-Dawley-Rolfsmeyer strain has been reported(1). It has been suggested that feed intake is primarily under neural regulation. The literature has been reviewed recently by Anand (2). That the endocrine glands and their hormones may also play an important role in the regulation of feed intake has been recognized but only limited research of a quantitative type has been reported.

Study of the endocrine control of feed intake may involve the administration of graded levels of the hormones to normal animals or the influence of endocrine gland removal on feed intake may be observed with subsequent replacement therapy.

The effect of thyro-parathyroidectomy and of adrenalectomy separately and together on feed consumption has been reported from this laboratory(3). In addition, the effect of alloxan diabetes on feed consumption has been observed(4).

It has been recognized for many years that hypophysectomy of the rat reduces feed intake but quantitative studies have not been reported(5). Since the pituitary is a key

* Contribution from Mo. Agr. Exp. Sta. Journal Series No. 2954. Approved by the Director.
† Aided in part by research grants from USPHS.

endocrine gland, the effect of its removal upon feed consumption is of primary importance.

Materials and methods. Virgin female rats of the Sprague-Dawley-Rolfsmeyer strain were maintained on water and Purina Lab Chow with an energy value of 4.41 calories per gram and 23.4% total protein, in an animal room maintained at a constant temperature of 78 ± 1°F.

The animals were hypophysectomized by the parapharyngeal approach under ether anesthesia. Following the operation, the rats were first injected with 30,000 nuits of Penicillin G. Due to losses sustained, in the second experiment animals were given also 3 μg L-thyroxine/100 g bw and 1 mg cortisone/rat for 2 days during the recovery period, then withdrawn. Completeness of hypophysectomy was checked by immediate cessation of growth, iodine-I^{131} uptake, persistence of juvenile hair, target organ weight, and examination of the sella turcica.

Feed consumption was determined by the method described(6).

In Experiment I, a group of 14 animals was hypophysectomized and the mean feed consumption determined during the period of 6 to 13 days following the operation and again 40 to 47 days later. For controls, a group of 10 rats was sham-operated, then feed consumption determined at the same time intervals. In Experiment II, the mean normal feed intake of a group of 18 animals was determined prior to hypophysectomy. The feed intake was then determined again 10 to 17 days after the operation. For controls, a group of 12 animals was sham-operated and treated similarly.

Results. In the sham-operated group in Exp. 1, the mean daily feed intake was 14.58 g and 8.62 g/100 g bw. In comparison, the hypophysectomized rats consumed 10.15 g/day from days 6 to 13 after the operation, a reduction of 30.4%. The feed intake/100 g bw was 6.18 g, a reduction of 28.3% (Table I).

After 40 to 47 days, the sham-operated rats consumed 13.69 g/day and 6.53 g/100 g bw. The hypophysectomized rats consumed

TABLE I. Feed Intake of Hypophysectomized Rats Compared with Sham-Operated Controls.

		Days after operation, 6-13					Days after operation, 40-47				
Exp I	No. of animals	Mean body wt, g	Feed intake, g/day	Change, %	Feed intake, g/100 g bw	Change, %	Mean body wt, g	Feed intake, g/day	Change, %	Feed intake, g/100 g bw	Change, %
Sham-operated controls	10	169	14.58		8.62		209	13.63		6.53	
Hypophysectomized	14	164	10.15	−30.4*	6.18	−28.3*	171	8.34	−38.9*	4.88	−25.3*

* $P > .001$

TABLE II. Comparison of Feed Intake Before and After Hypophysectomy.

		Before operation			After operation, 10-17 days				
Exp II	No. of animals	Mean body wt, g	Feed intake g/day	Feed intake g/100 g bw	Mean body wt, g	Feed intake, g/day	Change, %	Feed intake, g/100 g bw	Change, %
Sham-operated	12	215	12.36	5.75	222	14.41	+16.6[1]	6.49	+12.9[2]
Hyp.	18	232	14.45	6.23	206	9.98	−30.9[3]	4.84	−22.3[3]

[1] P >.005 [2] P >.05 [3] P >.001

8.34 g/day, a reduction of 38.9%, and 4.88 g/100 g bw, a reduction of 25.3%.

In the second experiment, the feed intake before and after the operation was compared. The sham-operated group showed an increase of 16.6% in feed/day and 12.5% increase/100 g bw measured 10 to 17 days after operation. The hypophysectomized group before operation consumed 14.45 g/day and 6.23 g/100 g bw. After operation the animals lost a mean of 26 g in body weight. Their mean feed consumption 10 to 17 days after the operation was 9.98 g/day, a reduction of 30.9% and 4.84 g/100 g bw, a reduction of 22.3% compared to their prior consumption (Table II). In a comparison with the sham-operated group, the hypophysectomized animals showed a reduction of 31.4%/day and of 25.42%/100 g bw.

On the basis of mean daily normal feed consumption before operation, the 18 hypophysectomized rats were divided into 3 groups. The group with the highest normal feed consumption had a mean of 16.34 g/day. Their mean decrease after hypophysectomy was 25.72%. The second group had a mean feed consumption of 14.10 g/day. They decreased 28.57%. The third group had a mean feed consumption of 12.63 g/day. They decreased 33.12%.

Discussion. For estimation of the influence of hypophysectomy upon feed consumption in the rat, two methods were employed. In the first experiment, the feed consumption of sham-operated animals was compared to hypophysectomized animals at 2 periods after the operation. In the second experiment, the feed consumption of the same animals was compared before and after the operation and with sham-operated controls. The results were quite similar in the 2 experiments. On the basis of daily feed intake, hypophysectomy depresses feed intake about 30% in a period of 6 to 17 days. There may be a further slight depression of feed intake at longer intervals.

It is interesting to note that the rats with the higher normal feed intake showed slightly less percentage decline in feed consumption after hypophysectomy than did the rats of lower normal feed intake. It is suggested that this may be due to the fact that the rats with higher normal feed intake secreted optimal amounts of other hormones not controlled by the pituitary or its target glands.

Hypophysectomy removes TSH and ACTH from the circulation. Thus such animals would be comparable to thyroidectomized and adrenalectomized rats. It was shown in the previous study(3) that thyroidectomy causes a gradual decline in feed consumption up to 24% at 60 days and 31% after 189 days. After adrenalectomy feed consumption was quickly reduced 27% and after the 2 operations to 30%. The fact that hypophysectomy reduces feed consumption to about the same extent that the 2 operations produced indicates that thyroxine and corticosterone may have a major influence on feed consumption although the gonadotropin and growth hormone may be involved.

In a study by Evans *et al*(7) concerning hormonal factors influencing calorigenesis, it was reported that thyroxine and the adrenal hormone (hydrocortisone) play important roles in heat production. Later Evans *et al* (8) presented evidence indicating that growth hormone intensified the action of TSH on calorigenesis.

Summary. The effect of hypophysectomy on feed consumption in the rat was determined by two methods. A reduction was observed when operated rats were compared with sham-operated controls, and the feed

consumption of the same rats before and after the operation was compared.

The two methods indicated that hypophysectomy reduced the mean daily feed intake about 30%. These results are quite similar to the observation that the combined operations of thyroidectomy and adrenalectomy reduced feed intake about 30%, indicating that the lack of thyroxine and corticosterone may be the major hormones concerned in feed intake of those secreted by the pituitary and its target glands.

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Received May 28, 1965. P.S.E.B.M., 1965, v119.