

TABLE I. Mammary Gland DNA Levels in Mice at Various Time Intervals After Ovariectomy and Normal Involution After 20 Days Lactation.

Treatment group	No. of mice	DFFT,* mg	DNA/mg of DFFT, μ g	Total DNA, mg	Final mean body wt, g	Total DNA/ 100 g final body wt, mg
Intact virgins	28	43.3	41.2	1.76 $\pm$.07†	29.5	5.93 $\pm$.16 ¹
33-days post-ovariectomy	12	53.8	37.5	1.95 $\pm$.17	32.3	6.01 $\pm$.30 ²
60- " "	23	56.4	30.8	1.70 $\pm$.08	29.8	5.69 $\pm$.22 ³
150- " "	14	58.5	28.3	1.58 $\pm$.13	31.7	4.91 $\pm$.30 ⁴
20-days lactation	30	308.5	22.1	6.65 $\pm$.18	31.4	21.35 $\pm$.87 ⁵
5- " involution	28	104.7	29.9	3.12 $\pm$.14	31.1	9.95 $\pm$ 0.81 ⁶
10- " "	29	83.0	34.2	2.82 $\pm$.13	31.0	9.05 $\pm$ 0.31 ⁷
15- " "	15	63.6	30.2	1.93 $\pm$.13	28.6	6.75 $\pm$ 0.39 ⁸
20- " "	15	72.0	27.9	2.00 $\pm$.14	32.7	6.07 $\pm$ 0.31 ⁹
5-days involution + 100 μ g HCA/day	11	115.8	31.6	3.65 $\pm$.34	27.5	13.14 $\pm$ 0.95 ¹⁰
10-days involution + 250 μ g HCA/day	18	98.5	30.2	2.93 $\pm$.18	27.4	10.78 $\pm$ 0.70 ¹¹

Student's "t" Probability

1 vs 4	.01
2 vs 4	.01
3 vs 4	.05
5 vs 6, 7, 8, 9	.01
6 vs 8, 9	.01
7 vs 8, 9	.01
6 vs 10	.05
7 vs 11	.05

* Dry, fat-free tissue.

† Mean $\pm$ standard error.

Summary. The mammary glands of intact virgins and ovariectomized mice after 33 days had DNA levels essentially equal. Only after 150 days of involution was a significant decrease in DNA observed. Following the weaning of normal 20 day lactating mice, the DNA level was reduced from 21.35 mg/100 g to 9.95 mg after 5 days, a decrease of 53.4%. At 20 days of involution, DNA had decreased to 6.07 mg/100 g, a total decrease of 71.6%. This level of DNA is comparable

to the virgin condition. Hydrocortisone acetate injected daily at 100 μ g/day for 5 days or 250 μ g/day for 10 days was effective in retarding involution.

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Feed Consumption During Lactation and Involution in Sprague-Dawley-Rolfsmeyer Rats.* (28359)

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Limited data are available on the feed consumption of lactating rats. Nelson and Evans (1) indicated that the feed intake was usual-

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ly 2 to 3 times that of non-lactating rats. In a previous study(2) with mature non-lactating rats of the Sprague-Dawley-Rolfsmeyer strain, mean daily feed consumption was observed to be 5.26 g/100 g BW with a range of 3.32 g. In similar rats injected daily with 3 μ g thyroxine (T_4)/day/100 g BW, mean

TABLE I. Parameters of Daily Feed Consumption During Lactation and Involution in Sprague-Dawley-Rolfsmeyer Rats.

Day of lactation or involution	N	Total feed consumption/day (g)			Feed consumption/100 g BW/day (g)			Chi-square test probability	
		Mean	S.D.	S.E.	Mean	S.D.	S.E.		
1	34	9.55	3.67	.63	3.51	1.35	.23	<.50	>.40
2	34	14.13	5.03	.86	5.18	1.76	.30	<.10	>.05
3	34	17.35	4.81	.83	6.40	1.33	.23	<.30	>.20
4	34	18.92	6.01	1.03	6.97	1.88	.33	<.70	>.60
5	34	20.43	5.84	1.00	7.69	1.95	.34	<.20	>.10
6	34	23.56	5.15	.88	8.51	2.02	.35	<.025	>.01*
7	34	26.41	5.52	.95	9.77	1.94	.33	<.30	>.20
8	34	26.19	5.34	.92	9.59	2.07	.36	<.40	>.30
9	34	27.95	6.19	1.06	10.27	2.41	.41	<.20	>.10
10	34	29.31	6.98	1.20	10.66	2.67	.46	<.05	>.025*
11	34	30.20	6.71	1.15	10.91	2.44	.42	<.60	>.50
12	34	31.46	6.93	1.19	11.45	2.51	.43	<.90	>.80
13	34	33.30	6.11	1.05	12.12	2.26	.39	<.70	>.60
14	34	32.68	6.56	1.13	11.75	2.22	.38	<.50	>.40
15	34	33.27	8.24	1.41	12.56	2.18	.38	<.70	>.60
16	34	32.20	10.10	1.73	12.12	3.27	.57	<.80	>.70
17	34	36.03	8.42	1.44	13.03	2.96	.51	<.40	>.30
18	34	35.94	7.57	1.30	13.04	2.69	.46	<.40	>.30
19	34	37.20	7.00	1.20	13.54	2.68	.46	<.30	>.20
20	34	38.68	7.12	1.39	14.09	3.13	.55	<.10	>.05
21	15	33.42	9.38	2.42	12.03	3.10	.68		
22	15	21.07	7.30	1.88	8.50	3.48	.87		
23	15	19.17	8.14	2.10	7.40	3.69	.99		
24	15	19.84	7.27	1.88	7.50	3.18	.85		
25	15	20.16	5.81	1.50	7.20	1.41	.36		
26	15	18.72	4.39	1.13	7.07	1.84	.48		
27	15	18.18	2.76	.71	6.67	.75	.19		
28	15	16.91	2.52	.65	6.40	.88	.23		
29	15	15.71	2.54	.65	5.87	.90	.24		

* Levels of significance.

feed consumption was increased to 6.0 g/day (3). It has been shown, further, that the thyroxine secretion rate (TSR) of these rats doubles during lactation(4). It is quite possible that the secretion rate of other hormones increases during lactation and may cause increased feed consumption.

In nutrition studies, the feed consumption of the non-lactating animals is considered the *maintenance requirement for lactation*. It is suggested that the maintenance requirement of the lactating animal may be considerably above that of the dry animal and, therefore, estimations of the efficiency of the mammary gland in converting nutrients into milk may be in considerable error.

The present study was conducted to determine the mean and variation in feed consumption of this strain of rats during lactation and following weaning.

Materials and methods. Pregnant rats were placed individually into 8" × 10½" × 6"

metabolism cages. Purina lab pellets, having an energy value of 4.41 calories per gram and 23.4% total protein(2), were ground into mash. Each lactator received 50 g feed per day. Residual feed was weighed each day and daily consumption was calculated by difference. An Ohaus Triple Beam Balance, accurate to 0.01 g, was used in weighing feed. Body weights of lactators were recorded every other day. Litters were standardized at 6 pups per litter on day 4 of lactation. Pups were separated from the mother on day 20 of lactation. Thirty-four lactators were used to obtain feed consumption data during lactation. Fifteen of these were continued for an additional 9 days during the involution period to determine the rate at which feed consumption would return to a normal level.

Results. Feed consumption data were calculated separately for each of 20 days lactation and 9 days involution on both a total

basis and a per unit of body weight basis (Table I). Mean total feed consumption increased gradually throughout the 20 days of lactation from 9.6 g/day on day 1 to 38.7 g/day on day 20. When calculated on a body weight basis these ranges were from 3.5 g/day/100 g body weight on day 1 to 14.1 g on day 20. In each case the increase was approximately 4-fold.

Feed consumption was reduced very rapidly when the pups were separated from the mother. By day 23 (or the third day of involution) the consumption was approximately half as great as it had been 3 days previously. By day 29 (9 days of involution) feed consumption had decreased to a level of 15.7 g/day or 5.9 g/day/100 g body weight. This compares with a normal mean of 5.3 g/day/100 g BW in females of this strain of albino rats(2).

To determine whether or not the sample of 34 animals represented the entire population of this strain, the chi-square test for "goodness of fit"(5) was applied separately to each day's observations and only to values based on body weight corrections. As seen in Table I, the probability levels indicate that all days except day 6 and day 10 had values which were distributed not significantly different from a normal curve.

Discussion. Feed consumption during lactation of albino rats increases at a decreasing rate through 20 days of lactation. Several days are required before feed consumption exceeds the normal level. By day 12 of lactation it reaches 2 times the normal level. At the same time TSR goes from 1.3 μ g per 100 g body weight to 2.2 μ g, thus roughly doubling(4). Milk production on day 14 of lactation is approximately 9 g/10 hr or 22 g per day. This 22 g of milk contains approximately 48 calories(6). Based on 80% digestibility approximately 13.6 g of feed per day are required for the milk and the remaining 19 g are required for maintenance

of a metabolic rate which is approximately double that of the normal animal. Based on body weight of a lactator at day 14 of lactation and based on the value of 5.3 g per 100 g body weight as normal feed consumption, the lactator on this day would consume only 15 g feed for body maintenance if her metabolic rate were not doubled. She would consume only 10% more than normal if only the TSR were doubled(3). This leaves approximately 2 g of feed per day which are required for increased metabolic needs not attributable to the increase in TSR. Whether or not increases in other hormones, such as adrenal corticoids, to normal animals at levels previously indicated for lactating animals, will result in feed consumption levels to account for this difference remains for future study.

Summary. Daily feed consumption was determined in 34 lactating rats of the Sprague-Dawley-Rolfsmeyer strain. Feed consumption increased at a decreasing rate until it was 2.5 to 3 times normal at day 20 of lactation. Standard deviations, calculated separately for each day, increased as the means increased. Total feed consumption varied from 9.6 ± 3.7 g (Mean and S.D.) on day 1 to 38.7 ± 8.1 g on day 20 of lactation. Feed consumption per 100 g body weight was 3.5 ± 1.4 g, on day 1 and 14.1 ± 3.1 g on day 20, then returned to normal by 9 days after weaning the pups.

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