

Effect of Underfeeding on Thyroxine Secretion Rate of Female Mice.* (25885)

G. W. PIPES, J. A. GROSSIE AND C. W. TURNER†

Dept. of Dairy Husbandry, University of Missouri, Columbia

It is generally recognized that underfeeding reduces thyrotropin (TSH) secretion and thyroid function. However, quantitative data on effect of underfeeding on thyroxine (T₄) secretion rate is not available. Development of a method of determining thyroxine secretion rate (TSR) in mice(1,2) makes such studies possible.

Materials and methods. Adult female Swiss Webster (Beyer strain) mice, kept at temperature of $78 \pm 1^\circ\text{F}$ were used. Normal mice were found to consume an average of 1.3 g/10 g body weight/day of Purina Lab. Chow. Other groups received 75 and 50% of this amount of feed daily for 16 days. Each mouse then received i.p. $6 \mu\text{C}$ I¹³¹. Three days later, whole body count was made at a distance of 2 in. Then L-thyroxine was injected at rate of $0.25 \mu\text{g}/100 \text{ g/day}$. At 2 day intervals counts were repeated. If thyroidal-I¹³¹ was not blocked (95-100% of previous count) $0.5 \mu\text{g}/100 \text{ g}$ T₄ was injected with further increments of $0.5 \mu\text{g/day}$ until TSR was reached. Conventional corrections were made for background and I¹³¹ decay.

Results. The control group showed a slight but not significantly higher mean TSR in comparison with previous study(1). Body weight was not altered on $\frac{3}{4}$ full feed, but was reduced 17.3% on $\frac{1}{2}$ feed (Table I). Mean TSR on $\frac{3}{4}$ feed was reduced significantly to $0.93 \mu\text{g}/100 \text{ g/day}$ or 33% in comparison with control group, whereas the $\frac{1}{2}$ fed group showed a further reduction to $0.80 \mu\text{g}/100 \text{ g/day}$ or 41%.

Discussion. Indirect evidence of reduced thyroidal function resulting from varying degrees of underfeeding such as thyroidal uptake of I¹³¹(3,4) lowered levels of PBI(5) and depressed rate of release of thyroidal-I¹³¹

(6) have been presented. These have been shown to be poor indices of thyroidal function in comparison to determination of TSR(7). The present study indicated that $\frac{3}{4}$ full feed significantly decreased TSR (33%) without an effect upon body weight. These observations indicate that pituitary-thyroid axis is sensitive to mild underfeeding resulting in reduced TSR sufficient to maintain body weight by a rapid reduction in BMR.

This degree of underfeeding should not be considered a stressful situation but rather a rapid adjustment of thyroxine secretion to meet the environmental problem of reduced energy intake.

Upon reduction of feed intake to $\frac{1}{2}$ normal, further reduction of TSR 41% associated with a decrease in body weight might produce stress. The possible influence of ACTH and increased release of glucocorticoids under such conditions upon thyroid function is unresolved. Several workers have reported reduced thyroidal-I¹³¹ uptake when ACTH or cortisone was administered(8,9,10, 11) but the effect upon release rate has varied from no effect(9,10), increased effect(12), to reduced effect(13).

Study of the influence of these hormones upon TSR will aid in resolving this problem. If it is shown that ACTH and the glucocorticoids depress TSR, it is believed present data indicate such an effect occurs only upon severe underfeeding ($\frac{1}{2}$) and is secondary to direct depression of TSH secretion caused by underfeeding.

Summary. Adult female Swiss Webster mice kept at temperature of 78°F were observed to eat 1.3 g/10 g body weight/day of Purina Lab. Chow. Their daily L-thyroxine secretion rate (TSR) was $1.38 \pm .173 \mu\text{g}/100 \text{ g body weight}$. Mice fed $\frac{3}{4}$ ration for 16 days showed TSR of $0.93 \mu\text{g}/100 \text{ g/day}$, a significant reduction of 33%, yet no loss in body weight occurred. On $\frac{1}{2}$ ration the TSR

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TABLE I. Effect of Underfeeding on Thyroxine Secretion Rate in Female Mice.

Treatment, rate of feeding	No. of animals	Body wt, g		TSR, $\mu\text{g}/100 \text{ g/day}$	Decrease, %	Frequency distribution of TSR					
		Initial	Final			.25 μg	.5 μg	1 μg	1.5 μg	2.0 μg	2.5 μg
Control *	58			$1.25 \pm .05$			3	30	18	7	
Control 2 †	16	30.3	30.4	$1.38 \pm .173$	100		4	3	4	3	2
$\frac{3}{4}$ ‡	14	28.5	30.1	$.93 \pm .180$	33	2	7		3	1	1
$\frac{1}{2}$ §	13	31.0	24.8	$.81 \pm .142$	41	2	6	1	4		

* Wada *et al.*(2). † 2 vs 3 $p < .05$. ‡ 2 vs 4 $p < .01$. § 3 vs 4 not significant.
1 vs 2 not significant.

was reduced to $0.80 \mu\text{g}/100 \text{ g/day}$ or 41% associated with a 17.3% reduction in body weight. These data suggest that pituitary-thyroid axis is sensitive to slight reduced energy intake by reduction in TSR sufficient to maintain body weight.

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Ciliocytophthoria in Sputum from Patients with Adenovirus Infections.*† (25886)

CYNTHIA H. PIERCE AND ALICE W. KNOX (Introduced by James G. Hirsch)
*Rockefeller Inst. and Dept. of Microbiology, College of Physicians and Surgeons,
Columbia University, N. Y. C.*

Papanicolaou(1) described morphologic abnormalities in ciliated epithelial cells exfoliated from the respiratory tract of certain patients with acute or chronic pulmonary disease. He designated this phenomenon ciliocytophthoria (CCP). Further observations in our laboratory established an association of CCP with virus infections of the human respiratory tract(2). CCP was found to be present in persons suffering from viral infections but absent in those with bacterial pulmonary disease. Of the viral illnesses studied

in which CCP was observed, only those due to influenza were documented by laboratory data (*i.e.* virus isolation or rise in serum antibody). The remainder were classified on the basis of clinical and laboratory findings as diseases of probable viral etiology. The present report presents data derived from screen-

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