

Lactogen Content of Pituitary Glands from Rats on Vitamin Deficient Rations.*

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Due to the general influence of the pituitary gland on body function it is important to increase our knowledge of those factors which alter pituitary secretion. Marrian and Parkes¹ reported that vitamin B deficiency, causing loss of body weight or partial inanition, brought about the cessation of estrus and atrophic changes in the ovary. The administration of anterior pituitary substances during the experimental anestrus resulted in the immediate appearance of estrous changes and in ovulation. Evans and Simpson² showed that there was a decreased amount of the gonad-stimulating hormone present in the anterior pituitaries taken from animals fed a diet deficient in the antineuritic factor. Mason and Wolfe³ found an increase in the gonad-stimulating capacity of the anterior pituitaries of male rats which had been fed a diet deficient in vitamin A and which induced xerophthalmia. Furthermore, vitamin E deficiency seemed to have the same effect. Nelson⁴ assayed pituitary glands from rats which had been on vitamin E deficient rations and found these glands more potent for the gonad-stimulating hormone than pituitaries from normal animals, but less potent than glands from castrates. Female pituitaries were comparable to glands obtained from normal males. However, Rowlands and Singer⁵ reported that vitamin E deficiency caused a definite decrease in the capacity of the pituitary body of the non-pregnant rat to cause ovulation in the estrous rabbit and therefore, a decrease in the content of luteinizing or ovulation-producing substance.

We were interested in determining the lactogen† content of pituitary glands from rats on vitamin deficient rations. Litter-mate rats were paired according to sex and one of each pair fed a vitamin-

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¹ Marrian, G. F., and Parkes, A. S., *Proc. Royal Soc. B*, 1929, **105**, 248.

² Evans, H. M., and Simpson, M. E., *Anat. Rec.*, 1930, **45**, 216.

³ Mason, K. E., and Wolfe, J. M., *Anat. Rec.*, 1930, **45**, 232.

⁴ Nelson, W. O., *Anat. Rec.*, 1933, **56**, 241.

⁵ Rowlands, I. W., and Singer, E., *J. Physiol.*, 1936, **86**, 323.

† In conformity with the usage of estrogen and androgen proposed by the American Medical Association, it is suggested that the term lactogen be applied to the lactogenic hormone.

TABLE I.
Lactogen Content of Pituitary Glands from Rats on Vitamin-deficient Rations.

Vitamin deficiency	No. of animals	Aver. body wt. when sacrificed, gm.	Aver. pituitary wt., mg.	Bird units per pituitary gland	Bird units per mg. pituitary tissue	Bird units per 100 gm. body wt.
A	12*	136	4.5	0.65	0.144	0.48
A	12†	89	3.2	0.40	0.125	0.45
B complex	15*	119	4.5	0.87	0.193	0.73
B complex	15†	41	1.9	0.57	0.300	1.39
D	11*	72	2.4	0.52	0.217	0.72
D	11†	72	2.3	0.36	0.157	0.50
E	18*	285	9.9	1.13	0.114	0.39
E	18†	222	9.7	1.13	0.117	0.51

*Control animals

†Vitamin deficient animals.

deficient ration. The other one of the pair received the same ration plus the vitamin supplement. The rats were fed these rations until vitamin deficiency expressed itself, as determined by the usual methods. Groups of rats were fed rations deficient in the following vitamins: vitamin A, vitamin B complex, vitamin D, and vitamin E. At the end of the experimental feeding period the animals were sacrificed, their pituitaries removed, weighed, and assayed. The glands were assayed by injecting the macerated suspended tissue intradermally over the crop glands of common pigeons, the control pituitary gland over one crop gland and the experimental pituitary gland over the opposite crop gland. (For full details of the technique see paper by Reece and Turner.⁶)

The lactogen content of the pituitary glands from rats on vitamin A deficient rations compared favorably with that of the control rats even though they were somewhat lighter in weight. The pituitaries from rats on vitamin B complex deficient rations were much lighter in weight than the pituitaries from control rats. The experimental pituitary glands contained somewhat less lactogen per pituitary gland, but on the basis of equal weight of pituitary tissue the experimental pituitary glands were superior to control pituitaries. Pituitaries from rats on vitamin D deficient rations contained somewhat less lactogen per gland and per milligram of pituitary tissue than pituitaries from control rats. Per pituitary gland and per unit weight of pituitary tissue, the glands from rats on vitamin E deficient rations compared favorably with glands from control rats. The results are summarized in Table I.

⁶ Reece, R. P., and Turner, C. W., *Mo. Agr. Exp. Sta. Res. Bul.*, 1937, 266.