

contained something which led to increased blood sugar values in 5 of 6 tests made on normal pigeons.

## 7743 C

## Response of Adult Rat Testes Sex Accessories and Adrenals to Injections of Prolactin.\*

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The testes of mature doves<sup>1, 2</sup> and the ovaries of mature fowl<sup>3, 4</sup> quickly and strikingly diminish in size during dosage with prolactin. In the fowl the oviduct (uterus) simultaneously involutes. In all these cases follicle-stimulating hormone (F.S.H.), admixed with some thyreotropic hormone, has a directly opposite effect. It is of more than theoretical importance to know whether prolactin exercises a similar action in mammals, and for a first test of this point we chose the testes of adult rats. It seemed best to make simultaneously tests of effects of F.S.H. and Prolan (Elberfeld) on some of these adults; and also to search in several organs for size changes which might throw light on the action of each of the hormones used. A group of younger rats was ultimately included in the study.

Adverse effects upon the ovary have been repeatedly reported, and such effects upon the testis occasionally found, from the use of crude anterior pituitary preparations, and attempts have been made to associate such adverse effects with one or another pituitary principle. On this point Loeb<sup>5</sup> recently concluded that the hormone causing follicular atresia is probably closely associated or identical with the thyreotropic hormone. It is therefore noted here that the prolactin used was free or practically free of thyreotropic (and F.S.H.) hormone, and that thyreotropic hormone is found in fair quantity in our F. S. H. preparations (also in all such preparations made by others from pituitary tissue and examined by us).

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<sup>1</sup> Riddle, O., and Bates, R. W., *Endocrin.*, 1933, **17**, 689.

<sup>2</sup> Riddle, O., Bates, R. W., and Lahr, E. L., unpublished data.

<sup>3</sup> Bates, R. W., Lahr, E. L., and Riddle, O., *Anat. Rec.*, 1933, **57**, 30.

<sup>4</sup> Bates, R. W., Lahr, E. L., and Riddle, O., *Am. J. Physiol.*, 1935, in press.

<sup>5</sup> Aff, H. M., and Loeb, Leo, *PROC. SOC. EXP. BIOL. AND MED.*, 1934, **31**, 957.

TABLE I.  
The Response of Testes, Sex Accessories, and Adrenals of the Rat to injections of Prolactin, F.S.H., and Prolan.

Injected or control	Age mo.	Dosage		No. of rats	Body wt. with change gr.	Wts. of untreated left, change in treated right		Organ wts. at end of treatment		
		Units or mg. daily	Duration days			Testes mg.	Epididymis mg.	Prostate + seminal Cowper's glands		
								mg.	mg.	mg.
Muscle extract	7	8 mg.	13-23	4	294+22	1574-28	585-4	2008	54.8	48.0
Prolactin		10 B.U.	15-22	10	290+8	1591+20	601-18	2506*	39.9	57.8
F.S.H.		2.5 mg.	14-21	10	281+14	1620+85	592+52	2537	56.5	46.8
Prolan (Elb.)		30 R.U.	15-23	9	290+1	1541+2	574+29	2866	53.5	52.5
Muscle extract	8+	5 mg.	8	3	314-1	1748-45	617-2	2828	46.7	52.3
Prolactin		20 B.U.	8	3	327+4	1783+2	660+13	3425	42.1	64.2
F.S.H.		5 mg.	8	3	315-12	1780+35	625+73	3395	50.6	65.3
Prolan (Elb.)		90 R.U.	8	3	331-15	1737+16	658-6	4417	74.0	59.8
Muscle extract	2.8	4 mg.	11	4	177+37	1306+150	275-13	1127	24.0	34.7
Prolactin		15 B.U.	12	4	177+30	1316+138	259+5	1166	20.1	39.9
F.S.H.		4 mg.	12	4	176+22	1286+98	286+73	1134	31.5	34.9

\*Omitting an extremely large (5.3 grams) and abnormally hard prostate this average value is 2194 mg.

Before starting injections we removed and weighed the left testis and epididymis of each rat, and in the case of these 2 organs these initial weights serve as a basis for calculating gain or loss of weight by the right testis during injection. We injected a group of 11 rats, aged 1 year or more, obtained through the courtesy of Dr. L. B. Mendel and of Dr. H. C. Sherman, but this material proved too heterogeneous (3 deaths) to justify consideration here. Weights of thyroids, livers and pituitaries were obtained on all rats, but significant differences were not found and those data are not tabulated. The significant data are given in Table I.

Under prolactin dosage no reduction of size in either testes or epididymis is found. Histological differences between the control and treated testes are also not apparent. Perhaps equally remarkable is the slight or absent *stimulating* effect of a potent preparation of F.S.H. on the adult (not senile) rat testis—a result earlier reported by Smith<sup>6</sup> and by Evans *et al.*<sup>7</sup> In our tests, as in those of Moore and Price,<sup>8</sup> Prolan apparently did not increase the weight of testis and epididymis though it led to marked enlargement of the prostate and seminal vesicles. Testis size in the adult rat is apparently little affected by any pituitary hormone which has elsewhere been found to produce marked change in gonad size.

An effect of prolactin on weights of Cowper's glands and adrenals is indicated by these data—Cowper's glands undergoing size diminution and the adrenals an apparent enlargement. The weight difference between the adrenals of the 10 prolactin injected rats of our main (7 mo.) group and the values obtained for the other 23 rats of the group is 5 times its probable error and is probably significant. A different F.S.H. preparation (No. 243) was used, and in higher dosage, on the smallest group (8+ mo.) of rats. At that level of dosage prolactin is detectable in No. 243, and it is therefore possible that prolactin also increased adrenal weight in the F.S.H.-injected rats of that group.

From studies on secondary effects of prolactin in birds it seems probable that the hormone affects Cowper's glands secondarily through the testis. In the case of the adrenals, however, the effect is probably either a direct effect of prolactin, or through a stimulation of the pituitary to a release of adrenotropic principle, or it is

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<sup>6</sup> Smith, P. E., Chap. 15, *Sex and Internal Secretions*. Williams and Wilkins, 1932.

<sup>7</sup> Evans, H. M., Meyer, K., and Simpson, M. E., *Mem. Univ. of Calif.*, 1933, 11, 1.

<sup>8</sup> Moore, C. R., and Price, D., *Am. J. Physiol.*, 1931, 99, 197.

a direct effect of a separate adrenotropic principle still contained in the prolactin (chiefly our No. 237) used in this study.

*Summary.* In adult (not senile) rats injected during 8 to 22 days with 10 or 20 units per day of prolactin the weights of testes were not diminished. By this dosage the weight of Cowper's glands are apparently decreased, and that of the adrenals increased. In relatively high dosage during similar periods follicle-stimulating hormone (+ some thyreotropic) and Prolan are found, confirming earlier work of others, to have almost negligible power to cause an increase of size in such testes. Prolan led to marked enlargement of the seminal vesicles and prostate, and in the heavy dosage used it was apparently adverse to body growth.

### 7744 C

#### Effect of Splenectomy and Other Operative Procedures on Platelets as Determined Volumetrically.

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An increase in the number of circulating thrombocytes has been observed following operations,<sup>1, 2</sup> parturition<sup>1</sup> and fractures,<sup>3</sup> but is greatest after splenectomy.<sup>4, 5</sup> This increase has been attributed to tissue injury<sup>1</sup> and in the case of splenectomy to additional factors.<sup>6</sup> The period of maximum increase coincides with that period in which post-operative thromboses are most likely to occur.

We have repeated the above observations using the volumetric method<sup>7</sup> of platelet determination, since this has proved to be more reliable in our experience than any method of counting and in addition indicates the amount of platelet substance present, rather than simply the number of platelets irrespective of their size. In normal subjects the platelets form from 0.4 to 0.6% of the whole blood volume.

<sup>1</sup> Dawbarn, R. Y., Earlham, F., Evan, W. H., *J. Path. and Bact.*, 1928, **31**, 833.

<sup>2</sup> Cramer, W., Bannerman, R. G., *Lancet*, 1921, **1**, 1048.

<sup>3</sup> Galloway, J. F., *Lancet*, 1931, **1**, 1082.

<sup>4</sup> Evans, W. H., *J. Path. and Bact.*, 1928, **31**, 815.

<sup>5</sup> Shore, B. R., and Kreidel, K. V., *Ann. Surg.*, 1934, **99**, 307.

<sup>6</sup> Krumbhaar, E. B., *Am. J. Med. Sc.*, 1932, **184**, 215.

<sup>7</sup> Van Allen, C. M., *J. Lab. Clin. Med.*, 1926, **12**, 282.