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Peculiarities of the Prolan-like Substance in Urine in a Case of Embryonal Carcinoma of the Testis.

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Extensive biological study has been made of the gonadotropic substance, prolan, which occurs in the urine of pregnant women. Unlike the gonadotropic hormone occurring in the anterior hypophysis itself, prolan even when concentrated, is sharply limited[1] in its capacity to cause development of the ovaries in immature rats. When combined with a special synergic principle of the anterior hypophysis,[2, 3] a marked augmentation of the ovary weights occurs. The gonadotropic effects are then fully equal to those produced by the most potent extracts of the gland itself.

In the study of the synergism phenomenon with prolan-like substances from sources other than pregnancy, the urines of several types of malignancy were investigated. Among these cases was an individual suffering from embryonal carcinoma of the testis with generalized metastases. Ferguson[4] has shown the remarkably high prolan unitage in the urine of such cases.

The urine in question had an extraordinarily high unitage (50,000 mouse units per liter). In addition, the prolan-like substance from this patient possessed other unusual characteristics. It gave a remarkable stimulation to ovarian development with *no* demonstration of the limited effect characteristic of pregnancy-prolan. Indeed, this urinary product could be classified (in ability to give ovarian stimulation) with the most potent gonadotropic substances known, but like pregnancy prolan, the substance retained its ability to give augmentation of ovary weights when combined with the hypophyseal synergic principle. When the urinary product in question was tested in males there was a tremendous development of the seminal vesicles —much greater than shown by pregnancy-prolan. Table I summarizes the properties of this unusual urinary product as tested in

[1] Evans, H. M., Meyer, K., and Simpson, M. E., *Am. J. Physiol.*, 1932, **100**, 141.

[2] Evans, H. M., Simpson, M. E., and Austin, P. R., *J. Exp. Med.*, 1933, **57**, 897.

[3] Evans, H. M., Simpson, M. E., and Austin, P. R., *J. Exp. Med.*, 1933, in press.

[4] Ferguson, R. S., *Am. J. Cancer*, 1933, **18**, 269.

immature male and female rats and compares its potency with pregnancy-prolan.

TABLE I
Comparison of Pregnancy Prolan with the Urinary Product from a Case of Embryonal Carcinoma of the Testes

Gonadotropic substance			Combination with synergic factor* (*in vitro*)		Male rats		
Source	Total Dose	Wt. ovaries	Wt. ovaries	Activation	Total dose	Wt. seminal vesicles	Wt. testes
	mg.	mg.	mg.	%	mg.	mg.	mg.
Urine of pregnancy	0.14 (Infantile)	16	32	45	109 (12 days)	85	610
	0.54	26	33	10			
	2.73	26	108	260			
	13.6	38	130	210	(Controls)	(6)	(492)
	27.3	38	187	345			
	81.8	49	209	294			
Urine from case of embryonal carcinoma of testes with generalized metastases	0.14	30	93	173	45 (10 days)	185	861
	0.54	47	167	227			
	2.73	60	186	190	(Controls)	(9)	(446)
	13.6	68	176	144			
	54.4	220	192	0			

*Aqueous alcohol extract of pig anterior hypophysis: dose 1.36 mg.; weight of ovaries, 22 mg. The given weights of prolan and synergic factor were mixed *in vitro* and injected subcutaneously, daily, on 3 successive days with autopsy after 96 hours [2, 3]. Three rats were used at each dilution.

Riddle and co-workers have shown convincingly that the bird testis is peculiarly insensitive to prolan.[5] Some of this special urinary material was sent to Dr. Oscar Riddle for assay and he has reported this to be the first urinary product tested by him that stimulated development of the bird's testis. Sacrifice of the 2 doves employed by him after 8 days of treatment showed increases of 400 and 800% respectively in the weight of the testes. (Table II.)

TABLE II
Assay in Immature Ring Doves of Gonadotropic Hormone in Urine from the Case of Embryonal Carcinoma of the Testis.

Bird No.	Age	Body Wt.	Total Dose	Treatment	Wt. of Testes Exper.	Wt. of Testes Control
	mo.	gm.	mg.	days	mg.	mg.
1	2.3	155	60	8	79.3	6.8*
2	2.3	132	60	8	46.6	6.8

*Average of testes of 10 controls with a range of 4.0 to 10.0 mg.

[5] Riddle, O., and Polhemus, I., *Am. J. Physiol.*, 1931, **88**, 121.

We are exploring other cases of high unitage of urinary prolan (*e. g.,* chorioepithelioma) to see if they also are characterized by the excretion of this peculiar type of gonadotropic substance.

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Effect of Radiant Energy With and Without Iron Upon Nutritional Anemia in the Rat.

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The effect of radiant energy upon the metabolism of small doses of Fe in the nutritional anemia of the rat seems to have been little studied. Foster[1] produced anemia in rats by milk feeding and observed the effect of radiant energy in preventing and curing this type of anemia. There was a slight but definite effect in increasing the hemoglobin and the number, size and saturation of the red cells.

We have made the following studies upon the effect of radiant energy upon both the prevention and cure of nutritional anemia in the rat.

Preventive Studies. Young rats at weaning were fed upon whole milk. Daily doses of pure Fe from 0.05 to 0.30 mg. were given, with and without ¾ hour ultraviolet irradiation of the rat daily, with the General Electric Sunlight Mazda Lamp, Type S-I, at a distance of 4 feet. This lamp has recently been described by Carter.[2] Weekly estimations of hemoglobin and red cell counts were made by the technique described by Beard and Myers.[3]

With milk alone, milk plus irradiation, irradiated milk, and milk plus 0.05 mg. Fe daily the anemia became progressively worse. There was a striking effect of irradiation on red cell recovery with both 0.05 and 0.10 mg. Fe daily, namely, a drop of 41 and 0.6% on these doses of iron may be compared to an *increase* of 33 and 50% when ¾ hour irradiation was given. The anemia was prevented by daily doses of Fe from 0.15 to 0.30 mg. These doses with irradiation were also much more effective in preventing the anemia than

[1] Foster, P. C., *J. Nutr.*, 1932, **4**, 517.

[2] Carter, H. A., *J. Am. Med. Assn.*, 1932, **99**, 31.

[3] Beard, H. H., and Myers, V. C., *J. Biol. Chem.*, 1931, **94**, 71.