examined for the amount of edema in the tissue, the amount of red-cell infiltration into alveoli, the number of alveoli completely filled with cellular exudate, necrosis of pulmonary parenchyma, and the severity of bronchitis. No significant differences could be attributed to the type of pneumococcus producing the experimental lesion. It is not advisable to place too much emphasis on the histopathology because of the limited number of infected lungs studied.

There was complete lack of agreement in the titer of "toxins" as prepared by Burde, Barret and Glassen[3] and the severity of the experimental lesions. For example, in the third group of rats, seen in Table I, the mortality of those inoculated with pneumococci which yielded a stronger than average "toxin" was 0%; for the strains producing a weaker than average "toxin", 16%; and the mortality produced by organisms with toxins having mld's equal to the average mld was 83%.

13411

Influence of Lactogenic Preparations on Mammary Glands and Time of Vaginal Opening in Young Rats.*

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In studying the cycle-inhibiting action of lactogenic hormone in the rat, it has been of interest also to observe changes brought about indirectly by this hormone on the mammary apparatus. Previously, it had been shown[1] that crude anterior lobe extracts (now known to have a high lactogenic hormone content) caused lobular mammary development in normal but not oöphorectomized rats. This suggested an indirect stimulation of the mammary gland by a pituitary factor acting possibly through the luteal tissue often induced in excess by such extracts. More recent work[2] on the hypophysectomized rat has indicated that whereas the follicle-stimulating and luteinizing

* Aided by grants from the Research Board of the University of California and from the Rockefeller Foundation. Assistance was rendered by the Works Projects Administration, Official Project No. 65-1-08-62, Unit A-5.

1 Evans, H. M., and Simpson, M. E., *Am. J. Physiol.*, 1931, **98**, 511.

2 Evans, H. M., Simpson, M. E., Lyons, W. R., and Turpeinen, K., *Endocrinol.*, 1941, **28**, 933.

(I.C.S.H.) fractions are essential for the production of corpora, these structures are activated and secrete progestin under the influence of lactogenic hormone. Astwood[3] has found corpus-luteum-activating substances in the rat placenta (cyonin) as well as in the anterior pituitary (luteotrophin). He has shown that lactogenic preparations made according to the method used in this laboratory did activate the corpora lutea, but did not maintain or produce lobule growth in the mammary gland of the hypophysectomized rat. On the other hand, crude rat placental extracts, whole pituitary powders, or crude luteotrophin did produce extensive lobular proliferation.

In the experiment reported herein, 3 daily levels of lactogenic hormone (0.5, 1.0, and 2.0 mg) were given subcutaneously from day 21 to day 50 to 3 groups of 6 rats. Six saline-injected rats served as controls. Animals of this age were used in order to determine whether lactogenic hormone injected into prepuberal rats would inhibit the pituitary gonadotrophins and thus delay the time of vaginal opening.

The data in Table I show that little difference in the time of vaginal opening was observed between the control group and the groups injected with hormone. The average time for 5 of the control rats was 43 days and for the injected groups, 38, 39 and 35 days respectively for the animals receiving 0.5, 1.0, and 2.0 mg levels of lactogenic hormone. Thus it might be said that the time of first vaginal opening was slightly advanced in the lactogenic groups and certainly was not delayed. This finding indicates that lactogenic hormone does not inhibit the output of F S H by the immature rat's pituitary. It should be emphasized, however, that although sexual maturation was not delayed, the oestrous cycles thereafter, especially in the higher dose groups (Table I), were definitely inhibited. The initial crop of corpora lutea had persisted in most of the animals for the duration of the experiment and no new follicular maturation had taken place. This finding, combined with the double evidence for progestin secretion, namely, elaborate vaginal mucification and lobular mammary growth suggests that the inhibition of pituitary F S H secretion may depend upon a certain level of progestin in the blood stream.

Mammary spreads were taken from each rat, fixed in formol and stained *in toto* with alum-carmine. The glands of the control rats as well as those from animals in which the cycle was not inhibited showed little more than a duct system with occasional alveolar-bud formation (Fig. 1). Glands from all of the animals in which the

[3] Astwood, E. B., *Endocrinology*, 1941, **28**, 309.

TABLE I.
Influence of Lactogenic Hormone on Time of Vaginal Opening and on Mammary Gland of Normal Young Rats.

Rat	Treatment	Day of vaginal opening	Vaginal cycle	Mammary gland
W 27	.5 cc saline daily	42	Regular	D*
W 29	30 days, subc.	44	"	D
BH 37	closed	51	None	D
BH 44		39	Regular	D
BH 76		46	"	D
B 91		45	"	D
	Avg (5)	43		
GH 03	.5 cc (.5 mg) lactogenic	42	Not inhibited	D
G 12	hormone daily, 30 days,	34	Second oestrus on day 47	LA†
GH 39	subc.	38	Inhibited after open.	LA
GH 56	25-30 I.U./mg	37	" " "	LA
B 78		38	Regular	D
B 89		37	Inhibited after open.	LA
	Avg	38		
GH 02	.5 cc (1 mg) of same	37	Inhibited after open.	LA
W 10	lactogenic hormone	44	Opened too late	D
BH 36		40	Inhibited after open.	LA
B 82		38	" " "	LA
BH 93		40	" " "	LA
BH 97		34	Regular	D
	Avg	39		
W 14	.5 cc (2 mg) of same	34	Inhibited after open.	LA
BH 43	lactogenic hormone	33	" " "	LA
B 80		38	" " "	LA
B 88		39	" " "	LA
W 94		34	" " "	LA
BH 96		33	Second oestrus on day 47	LA
	Avg	35		

*D—Duct development with sparse alveolar budding (Fig. 1 left).
†LA—Lobule-alveolar development (Fig. 1 right).
Note: Where the vaginal cycle was inhibited a mucified smear was found and a high degree of mucification was noted in sections of vagina. In these animals only one "crop" of corpora lutea was found in the ovaries, whereas in rats showing cycles more than one crop was in evidence. As previously reported,[2,4] 0.5 mg is the border-line dose of lactogenic hormone capable of maintaining already existing corpora lutea and preventing normally recurring oestrous cycles in adult rats.

cycle was completely inhibited after the first vaginal opening showed excellent lobular development† (Fig. 1), due apparently to the combined action of estrin and progestin.

† Thus a statement made recently[4] in connection with earlier work by one of us (W.R.L.) would seem to be in error. In testing for growth hormone, 10 mg of lactogenic hormone had been given to normal rats daily for 20 days. Only gross observations were made at autopsy and the mammary development was dismissed as negligible because it did not compare with that of a rat at the end of pregnancy.

[4] Evans, H. M., Simpson, M. E., and Lyons, W. R., PROC. SOC. EXP. BIOL. AND MED., 1941, **46**, 586.

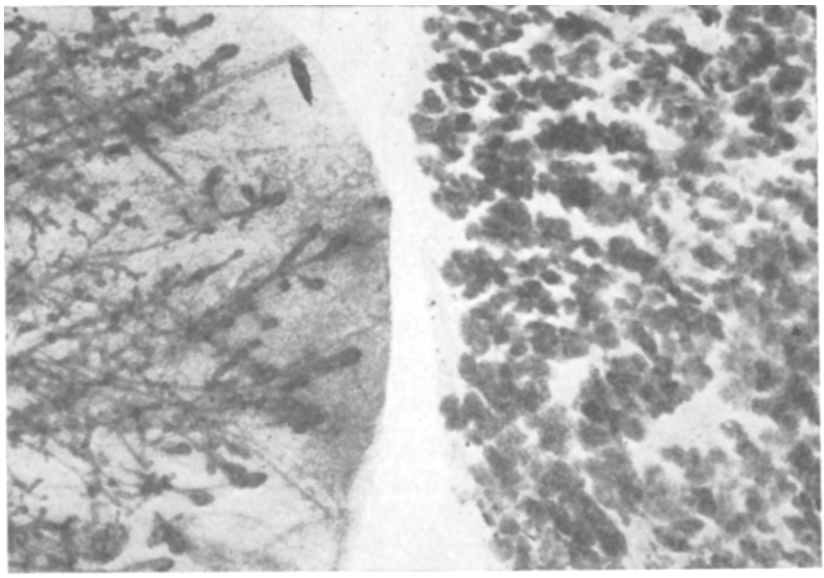

FIG. 1.
Left: Mammary gland from control rat W 27 injected daily from day 21 until day 50 with saline.
Right: Same from rat W 94 injected daily from day 21 until day 50 with 2 mg lactogenic hormone.
Note complete lobular development. Magnification × 10.

Summary. Lactogenic hormone in doses from 0.5-2.0 mg given subcutaneously daily beginning at day 21 to rats did not delay, but in some cases may have slightly advanced the day of vaginal opening. Continued injection of the same doses of hormone thereafter resulted in continuous vaginal mucification for the duration of experiment (approximately two weeks) and in lobular development of the mammary gland.

13412

Poliomyelitis Virus from Flies.*

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Flexner and Clark[1] and Howard and Clark[2] have demonstrated

* Sponsored by The National Foundation for Infantile Paralysis, Inc.

1 Flexner, S., and Clark, P. F., *J. A. M. A.*, 1911, **56**, 1717.

2 Howard, C. W., and Clark, P. F., *J. Exp. Med.*, 1912, **16**, 850.