(phosphatidic acid) could produce similar effects. Preliminary studies with phosphatidic acid reveal that this non-nitrogen containing phospholipid has marked miotic properties in the cat.

The parasympathomimetic effects obtained with lecithin and cephalin, especially the miosis described, are almost identical with those produced by laked red blood cells of man, monkey, cat, rabbit, guinea pig and rat. As with phospholipids, the miosis elicited by hemolyzed erythrocytes can be demonstrated in the cat but not in other species (monkey, dog, rabbit), nor is the erythrocyte-miosis blocked by atropine. These data strongly suggest that the miotic property possessed by erythrocytes may actually be due to the phospholipid contents.

Summary. 1. Intravenous injections of emulsions of lecithins extracted from soy bean, corn, vegetable, cod testicle and erythrocytes of man and cephalin of soy bean produce a marked miosis in the completely denervated iris of the cat but not in that of the monkey, dog or rabbit. 2. Synthetic lecithin in much smaller concentrations yields identical results. 3. None of the phospholipid miotic effects is blocked by atropine or potentiated by eserine.

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Comparative Antitumoral Action of Desoxycorticosterone Acetate and Testosterone Propionate.*

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Uterine and other abdominal subserous fibroids which can be elicited by prolonged subcutaneous injections of estrogens fail to appear if testosterone propionate[1, 2] or progesterone[2, 3] is injected simultaneously with the tumorigenic estrogen. This preventive

* This work has been aided by grants from the Jane Coffin Childs Memorial Fund for Medical Research, the Rockefeller Foundation, and Chilean friends by courtesy of Mr. Adolfo Eastman of Limache (Chile). Grants administered by Prof. A. Lipschütz. All hormones were generously supplied by Dr. Carl Miescher of Ciba Pharmaceutical Co., Basel.

1 Lipschütz, A., Vargas, L., Jr., and Ruz, O., *Lancet*, 1939, **2**, 867.

2 Lipschütz, A., and Vargas, L., Jr., *Endocrinology*, 1941, in press.

3 Lipschütz, A., Murillo, R., and Vargas, L., Jr., *Lancet*, 1939, **2**, 420; Murillo, R., *Public Med. Exp.* (Chile), 1940.

antitumoral action of hormones has also been demonstrated in experiments with the simultaneous implantation of tablets of estradiol and progesterone or desoxycorticosterone acetate.[4] Experiments with tumorigenic tablets[5] also offer a good opportunity to study the question of the preventive antitumoral action of hormones from a *quantitative* point of view since knowledge of the absorbed quantities can easily be obtained by weighing the tablets.[6] The relative amount of each of the *antitumorigens* compared with that of the *tumorigens* necessary to prevent uterine and extragenital peritoneal fibroids can now be investigated. Further progress in this field has been achieved in our work with synthetic testosterone propionate and definite statements can now be made on its preventive antitumoral action compared with that of synthetic desoxycorticosterone acetate.

Tablets of estradiol (7.5 to 27.0 mg) were implanted under the skin of 18 castrate female guinea pigs (320 to 250 g). Simultaneously tablets of testosterone propionate (17.0 to 32.0 mg) were implanted on the opposite side of the same animals. They were sacrificed 55 and 56 days later. Five animals out of 18 showed uterine tumors of considerable size and 6 animals also had extragenital tumors. The total tumoral effect, according to our classification[7] varied between 0 and 6.5; the average total tumoral effect was 1.8. The tablets were cleaned from their fibrous enclosure and maintained for 20 hours at 60°C and weighed. The average absorption of estradiol was 2.5 mg, that of testosterone propionate 11.9 mg, which is equivalent to 10.0 mg of testosterone. The results are summarized in Table I and can be compared with our former findings with subcutaneous injections of testosterone propionate and with tablets of desoxycorticosterone acetate.

Table I presents evidence that conjunctive tumorigenesis is less pronounced in the present series with tablets of estradiol and testosterone propionate (series XXVI), than in experiments with tablets of estradiol alone (series XXVII). However, the preventive action of a quantity of testosterone 4 times by weight that of estradiol is not as complete as the preventive action of a quantity of desoxycorticosterone 3 times by weight that of estradiol (series XXIII). The incomplete preventive action of testosterone in the

[4] Lipschütz, A., and Vargas, L., Jr., *Lancet*, 1941, in press.

[5] Lipschütz, A., and Vargas, L., Jr., *Lancet*, 1939, **1**, 1313.

[6] Deanesly, R., and Parkes, A. S., *Proc. Roy. Soc. B.*, 1937, **124**, 297; *Lancet*, 1938, **2**, 606; Warwick, M. H., and Parkes, A. S., *Lancet*, 1940, **1**, 406.

[7] Lipschütz, A., Vargas, L., fils, *C. R. Soc. Biol.* (Paris), 1939, **131**, 27; see also PROC. SOC. EXP. BIOL. AND MED., 1941, **46**, 164.

TABLE I.
Comparative Preventive Effect of Desoxycorticosterone Acetate and Testosterone Propionate Against Experimental Fibroids Induced with Estrogens.

No. of series	Hormones used	Duration of experiment days	Relation: Estradiol-anti-tumorigenic hormone	No. of animals			Avg. "total tumoral effect"
				Total	With uterine tumor	With uterine or extra-genital tumors, size, class 1	
	Injections:						
XIII*	Estradiol benz.	30-90	1:0	20	14	17	4.1
XIII*	Estradiol benz. and testoster. prop.	54-91	1:50	24	0	0	0.6
	Tablets:						
XXVII†	Estradiol	54-62	1:0	20	15	14	3.0
XXIII‡	Estradiol and desoxycorticost. acet.	55-63	1:3	17	0	0	0.5
XXVI	Estradiol and testoster. prop.	55-56	1:4	18	5	7	1.8

*For details see 2. 120 to 240 γ of estradiol and 6 to 12 mg of testosterone weekly.
†For details see 4. Tablets of 8.5 to 24.0 mg of estradiol; average absorption of estradiol—3.0 mg.
‡For details see 4. Tablets of 8.5 to 24.0 mg of estradiol; average absorption of estradiol—2.5 mg. Tablets of 13.0 to 21.5 mg of desoxycorticosterone acet.; average absorption of desoxycorticosterone—7.7.

present series with tablets must be explained on quantitative lines; this is shown by the fact that the preventive action of testosterone is complete if greater quantities are administered by injection (series XIII). Since our experiments have been made in *castrate* females. the comparative antitumoral action of the different hormones can be considered as an exteriorization of their comparative antagonistic or antiestrogenic effect on the reacting tissues as recognized in former work with gonadal grafts.[8] This is also shown by the fact that the greater preventive antitumoral action of desoxycorticosterone compared with testosterone is coincident with 2 other striking antiestrogenic effects: *First,* the increase of the uterine weight is more effectively counteracted by desoxycorticosterone than by testosterone (average uterine wt. in estradiol series, 3.4 g; in estradiol + desoxycorticosterone series, 1.9 g; in estradiol + testosterone series, 2.6 g); and *secondly,* the vagina closed in 15 out of 17 animals of the desoxycorticosterone group whereas it remained open in all 18 animals of the testosterone group.

Summary. The preventive action of tablets of different hormones against uterine and extragenital peritoneal fibroids elicited

[8] Lipschütz, A., and Voss, H. E., *Pflügers Arch. ges. Physiol.*, 1925, **207**, 563; Lipschütz, A., and others, *Pflügers Arch. ges. Physiol.*, 1925, **208**, 293.

by estradiol in the guinea pig has been compared. Desoxycorticosterone acetate is quantitatively more efficient than testosterone propionate. Desoxycorticosterone is also more efficient than testosterone in antagonizing other effects of estradiol such as opening of the vagina and increase of the uterine weight.

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Effect of Vitamin D on Binucleated Cells of the Liver.*

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It has long been known that among the cells of the mammalian liver, there are some which have more than one nucleus. Most of such multinucleated cells contain two nuclei and are thus called binucleated hepatic cells. During fetal life only small numbers of binucleated cells are found, but after birth the number gradually increases until adolescence, after which time, under normal conditions, the number of cells remains constant. Each animal species has a definite percentage of binucleated cells which is equal in the various lobes of the liver and is more or less characteristic of the species.[1] Several investigators have shown that there are more binucleated cells at the periphery of the lobules than at the center.[2, 3] Although there is no conclusive evidence to support the idea, these cells are supposed to result either from hyperactivity and incomplete karyokinesis or from fusion accompanying degeneration.[4]

Szittay[3] reported that the daily administration of 3 cc of Vigantol over a period of 8 days to young rabbits led to an increase in the number of binucleated cells in the periphery of the lobule, although no changes were found in the central zone. The number of cells with 3 and 4 nuclei was slightly increased in the same region, but there was no increase in the number of mitoses. Szittay thought

* Presented before the American Association of Pathologists and Bacteriologists, Pittsburgh, Pa., May 22, 1940.

1 Münzer, F. T., *Arch. f. mikr.-anat. u. Entwcklngsmechn.*, 1923, **98**, 249.

2 Noel, R., *Compt. rend. Soc. de biol.*, 1923, **88**, 212.

3 Szittay, Z., *Compt. rend. Soc. de biol.*, 1937, **124**, 296.

4 Mann, F. C., in Cowdry, E. V., *Special Cytology*, Paul B. Hoeber, Inc., New York, 1932, **1**, 341.