In the 4 mice examined 15 minutes after instillation of pigment the picture again differs only slightly from that seen in the untreated group. Only in the olfactory mucosa itself is there a difference and here again it is found that three of the 4 mice show no granules in the olfactory cells and one mouse shows considerably less than do the normal mice.

A correlation appears between the degree of inflammation of the mucosa and the passage of the Prussian blue into the olfactory cells. In those 6 mice in which pigment is seen in none or very few of these cells, the inflammation is intense and the exudate heavy. In the other 3 mice the inflammation is comparatively less and there is some, albeit slight, passage of granules into the olfactory cells. It appears that both departures from normal resulting from the tannic-acid treatment run parallel in the mouse. We have not investigated whether the inflammation is causally related to the decreased passage of pigment into the olfactory sensory cells.

8766 P

Effect of Progestin upon the Mammary Glands of the Mouse.*

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The growth of the mammary glands of males bearing ovarian grafts or receiving extracts of estrogenic hormones has been observed by many investigators. Several pure estrogenic chemicals, theelin, theelol,[1] dihydroestrin and equilin,[2, 3] induced the growth of the mammary glands of male mice and of males of other species. The male hormone, testosterone, also induced a limited mammary gland proliferation in rats.[4]

Progestin had no effect upon the mammary glands of rabbits when injected as a rather crude extract,[5, 6] but when progestin and

* This investigation has been supported in part by the Fluid Research Funds of Yale University School of Medicine and the Committee for Research in Problems of Sex of the National Research Council through grants administered by Professor Edgar Allen.

1 Turner, C. W., *et al.*, *Anat. Rec.*, 1932, **63**, 227.

2 Burrows, H., *Brit. J. Surg.*, 1935, **23**, 191.

3 Gardner, W. U., *et al.*, unpublished.

4 Selye, S., McEuen, C. S., and Collip, J. B., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 201.

theelin were administered simultaneously a complete development of the mammary glands occurred.[7] The mammary ducts developed in rabbits receiving estrin, while simultaneous injections of progestin and estrin induced the development of the lobules of alveolar tissue as observed during pregnancy or pseudo-pregnancy. In some strains of mice scattered lobules of alveoli developed in males receiving large amounts of estrogenic hormone[8] while a complete development of the lobules occurred in injected males from other strains.[9]

The mice used in this investigation were supplied by Dr. L. C. Strong. Two highly purified extracts of progestin obtained from corpora lutea† ‡ and one crystalline preparation of progesterone (Proluton)§ were used. All of the preparations were dissolved in oil and were injected subcutaneously.

Seven castrated male mice were given from 0.35 to 1.6 units of progestin† over periods of from 14 to 16 days. Two of these mice were given in addition 5 rat units of theelin daily. The mammary rudiments of all of these mice had developed into extensive systems of branching ducts, similar to those of mice receiving theelin for approximately 30 days. One castrated male receiving 5 r.u. of theelin daily showed but a slight growth of the mammary glands. One of two non-castrate male mice receiving 0.1 unit of progestin daily for 14 days showed extensive development of the mammary ducts.

Three virgin female mice were given 0.15 unit‡ of progestin weekly in 3 injections. After periods of treatment ranging from 22 to 70 days the mammary glands consisted of branching ducts as in normal virgin females. Two normal male mice receiving similar treatment for periods of 22 and 39 days, and a total of 0.5 and 0.8 units showed a definite growth of the mammary rudiments. Six male mice were given 7.5 r.u. of theelin weekly for 3 weeks, and

5 Corner, G. W., *Am. J. Physiol.*, 1930, **95**, 43.

6 Turner, C. W., and Frank, A. H., *Science*, 1931, **73**, 295.

7 Turner, C. W., and Frank, A. H., *Mo. Agr. Exp. Sta. Res. Bull.*, 1932, 174.

8 Gardner, W. U., Smith, G. M., and Strong, L. C., PROC. SOC. EXP. BIOL. AND MED., 1935, **33**, 148.

9 Unpublished observations of the authors.

† Progestin, containing 1 Corner-Allen unit per cc., was supplied by Upjohn Co. through the courtesy of Dr. G. F. Cartland.

‡ The progestin and theelin in aqueous solution were supplied through the courtesy of Dr. O. Kamm of Parke-Davis Co. The progestin contained 1 rabbit unit (Clauberg) per cc.

§ The Proluton ("pure crystalline corpus luteum hormone") (Progesterone) was supplied by the Schering Corp. through the courtesy of Dr. Gregory Stragnell. The solution used contained 1 i.u. per cc. (1 mg.).

then supplemented by 0.15 unit of progestin weekly in 3 injections for periods up to 110 days. Total doses of from 1.75 to 2.4 units of progestin were given. The mammary rudiments of all the mice had developed into moderately extensive duct systems.

Fourteen male mice were given Proluton§ in daily doses of 0.05 to 0.1 i.u. for periods of from 15 to 26 days. A definite growth of the mammary ducts was observed in 8 non-castrate and in 1 castrate animal. The rudimentary mammary glands of three mature mice receiving 0.05 i.u. and of 2 receiving 0.1 i.u. had failed to grow. Two non-castrate males and one castrated male were given 5 r.u. of theelin and 0.1 i.u. of Proluton daily. All of these animals showed definite growth of the mammary gland.

Two of the above preparations were assayed for the presence of estrogenic hormone. Two-tenths of a unit failed to give vaginal cornification or mucification in castrated female mice. The minimum amount of estrogenic hormone in oil solution which will give mammary growth has not been determined, but 1 r.u. of theelin in aqueous solution daily, when given in sufficient dilution in two injections, is sufficient. It has also been indicated that old male mice require larger amounts of estrogenic hormone to induce the growth of the mammary glands than younger mice. This might account for the failure of response in 5 of the animals receiving Proluton.

8767 C

Does Magnesium Sulphate Cause Catharsis by Being Absorbed and then Excreted into the Colon?

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There are numerous reports in the literature dealing with the mode of action of the saline purgatives. Invariably, 2 main theories are advanced. The first, favored by Meltzer and Auer,[1] Auer,[2, 3] Frankl,[4] Mendel and Benedict,[5] and Cohen,[6] suggests that the action

1 Meltzer, S. J., and Auer, J., *Am. J. Physiol.*, 1905, **14**, 366.

2 Auer, J., *Am. J. Physiol.*, 1906-7, **17**, 15.

3 Auer, J., *J. Biol. Chem.*, 1908, **4**, 197.

4 Frankl, T., *Arch. f. exper. Path. u. Pharmakol.*, 1907, **57**, 386.

5 Mendel, L. B., and Benedict, S. R., *Am. J. Physiol.*, 1908-09, **23** (Proc. 18).

6 Cohen, H., *Quart. J. Med.*, 1925-26, **19**, 249.