

their action was direct. When these hormones were found to be ineffective in hypophysectomized animals,¹ it appeared that the pituitary must play a more important rôle in the growth of the gland than had previously been suspected. Gomez, Turner, and Reece² presented the first evidence for the presence in the pituitary of a mammary gland growth-promoting factor not associated with the lactogenic hormone. This new pituitary principle will be called the "mammo-genic hormone". There are probably 2 mammo-genic factors,³ the duct growth factor being stimulated by estrogen and the lobule-alveolar growth factor by estrogen and progestin. As the growth of the udder is very rapid, especially during the first half of pregnancy, the effectiveness of the pituitaries of such animals in stimulating the growth of the mammary gland was determined.

Studies with Rabbits. Four sexually immature female rabbits were castrated 4 weeks prior to the initiation of the experiment. A control gland removed from each of these animals showed only a rudimentary duct system. The first rabbit was injected for 25 days with 50 mg. daily of fresh anterior pituitary from pregnant cattle. At autopsy the mammary glands showed growth and development comparable with that observed at a late stage of pregnancy.

The second rabbit received 20 mg. daily for 30 days of acetone dried anterior pituitary powder‡ from heifers pregnant not more than 140 days (pregnancy in cattle being 280 days). The mammary glands at that time were comparable to those at the end of pseudopregnancy, being fully grown but not showing signs of lactation. The third rabbit received daily for 30 days 20 mg. of acetone-dried powder from heifers pregnant over 140 days. The glands showed only an extensive growth of the duct system. Assay of these preparations for lactogenic and thyrotropic hormones has been reported.⁴ It should be pointed out that while the pituitary powder from the non-pregnant heifers contained considerable lactogenic hormone, it failed to stimulate the growth of the mammary gland.

The nipples of all experimental rabbits remained infantile, which confirms our previous observations on the hypophysectomized guinea

¹ Gomez, E. T., and Turner, C. W., *PROC. SOC. EXP. BIOL. AND MED.*, 1937, **34**, 320; **36**, 287.

² Gomez, E. T., Turner, C. W., and Reece, R. P., *PROC. SOC. EXP. BIOL. AND MED.*, 1937, **36**, 286.

³ Gomez, E. T., and Turner, C. W., *Mo. Agr. Exp. Sta. Res. Bul.*, 259, 1937.

‡ We are indebted to Dr. R. P. Reece for the acetone dried cattle pituitary powders used in this study.

⁴ Reece, R. P., and Turner, C. W., *Mo. Agr. Exp. Sta. Res. Bul.* 266, 1937.

fig.² It appears that estrogen stimulates the growth of the nipple directly while the mammogenic hormone stimulates the growth of the gland.

Studies with Rats. Eight sexually immature female rats were castrated not less than 4 weeks preceding the beginning of the experiment. Control mammary glands removed immediately preceding the initial injection consisted of short slender ducts which had a few almost naked twig-like branches projecting from them. Six of these rats were given daily injections of 10 mg. of fresh anterior pituitary from pregnant cattle and the remaining 2 with 10 mg. of fresh pituitary from non-pregnant heifers. Three of the rats which received pregnant cattle pituitaries were sacrificed after 10 days. Examination of the mammary glands of these animals showed extensive arborization of the duct system with characteristic enlargement or budding of the peripheral ends. Lobules were observed in the region of the older ducts in the proximity of the nipples. The remaining animals were sacrificed after 25 days. The mammary glands of these animals showed an extensive arborization of ducts and proliferation of the lobule-alveolar system comparable to that observed in rats pregnant about 18 days. Milk secretion was evident in the lumina of the large ducts. The 2 rats which received pituitaries from non-pregnant heifers showed no additional growth of the duct system of the mammary gland.

Summary. Further evidence is presented indicating that the pituitary gland is the seat of production of a factor or factors which stimulate the growth of the duct and lobule-alveolar systems of the mammary gland. This principle, called the "mammogenic hormone," is present in the pituitaries of cattle when pregnant. The growth of the mammary glands of castrated female rabbits and rats was stimulated by the daily injection of such pituitaries. That this principle is not identical with the lactogenic hormone is indicated by the lack of response with non-pregnant cattle pituitaries containing considerable amounts of the lactogenic hormone.