namely, that the physiological effects of the crustacean pigmentary hormone and those of the chromatophorotropic hormone of the intermediate lobe of the pituitary of vertebrates are identical with respect to the activity of the black pigment cells. This opinion, however, does not imply that the hormones, which at the present time have been obtained only in extract form, are chemically identical. Nevertheless, a comparison of the chemical properties of the eye-stalk hormone (or hormones) described in the papers of Kropp and his associates (including some additional data on the solubility of the active material in various organic solvents made by the writer) with those listed by Zondek[8] for intermedin reveals several interesting similarities.

8765 P

## Absorption through the Nasal Mucosa of Tannic-Acid Treated Mice.

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Reports have been given of the absorption of Prussian blue through the nasal mucosa of rabbits[1] and mice.[2, 3] A study by Olitsky and Cox[2] of the absorption of the pigment 1 to 3 hours after its instillation in mice previously treated intranasally with tannic-acid shows that absorption at this time is less evident than in untreated mice. Subsequently Rake[3] demonstrated that absorption through the nasal mucosa, chiefly the olfactory, is very rapid and has reached its maximum in mice killed at 2 minutes; furthermore, that much of the absorption occurs by way of the olfactory sensory cells. It seemed advisable to study the absorption of Prussian blue from the nasal cavities of tannic-acid treated mice during these early periods.

Nine Swiss mice each received eight preliminary intranasal instillations over 3 days. Each dose, consisting of 0.03 cc. of 0.8 percent tannic-acid in 1% glycerine, was dropped on the outside of

8 Zondek, B., *J. Am. Med. Assn.*, 1935, **104**, 637.

1 Clark, W. E. le G., *Great Britain Rep. Pub. Health and Med. Subj.*, Ministry of Health, 1929, No. 54.

2 Olitsky, P. K., and Cox, H. R., *Science*, 1934, **80**, 566.

3 Rake, G., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 369.

the nostrils from whence it was gradually breathed into the nose. Four hours after the last dose each mouse received 0.02 cc. of a mixture of equal parts of 10% iron ammonium citrate and 10% potassium ferrocyanide intranasally by the same technique. Two minutes after commencement of intranasal inoculation 5 mice were sacrificed by decapitation and 13 minutes later the other 4 were so sacrificed. Fixation, sectioning, and staining with Mayer's carmine were carried out as indicated elsewhere.[3] A few sections were stained with hematoxylin and eosin to facilitate study of the inflammation.

Following intranasal treatment with tannic-acid as given above, it is very rarely that any mouse shows exudate from the nostrils. Nevertheless, it was found in the present study that there is to be observed, microscopically, marked exudate into the nasal cavity, especially over the olfactory mucosa and around the turbinates. This exudate is composed of mucus, leucocytes—chiefly polymorphonuclears—and some red cells. The olfactory mucosa and submucosa show swelling and infiltration with oedema fluid and leucocytes. The capillaries of the submucosa are dilated and contain many polymorphonuclear leucocytes. Changes in the respiratory mucosa are slight. Six mice show intense inflammation. In 3 the inflammation is less. Preliminary treatment with 1% tannic acid in normal saline, instead of 0.8% in 1% glycerine, is found to produce similar inflammatory changes.

At first sight the absorption of Prussian blue in these mice sacrificed 2 minutes after instillation does not appear to differ markedly from the absorption seen in untreated mice.[3] The granules have penetrated the mucosa, lie in the tissues and within lymphatics and capillaries, and are also found in the perineural spaces of the olfactory nerves, within the subarachnoid space and inside cells of the pia mater over the olfactory bulb. It is true that there is quantitatively less pigment in the perineural spaces or within the cranial cavity in these treated mice as compared to the normal, and that nerves so full of the granules as to appear as blue bands are very unusual, but the difference is one only of degree. However, when attention is turned to the method by which the pigment is passing through the olfactory mucosa a qualitative difference is found.

In 3 of the 5 mice examined at 2 minutes, careful search reveals Prussian blue inside at most 2 or 3 olfactory sensory cells. In the other two mice one can find a few areas in which as many as 8 or 10 olfactory sensory cells may contain pigment. The greater part of the absorption in all of these treated mice does not involve the olfactory sensory cells, as it does in the untreated group. It occurs between the cells of both olfactory and respiratory mucosa.

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

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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.