along essentially typical major pathways, and to their distribution to the muscles according to typical spatial relations.

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## Reaction of Anterior Pituitaries of Immature and Mature Female Rats to Injection of Pregnancy Urine Extracts.

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It has been previously reported[1] that injections of an oestrin-free placenta extract, containing the A. P. L. factor, into immature female rats induced a marked increase in the weight of the ovaries and a moderate increase in the weight of the pituitaries. Histologically, the pituitaries of the injected rats showed a slight to moderate decrease in the level of the eosinophiles; a considerable number showed evidence of granular loss. The most evident changes were found in the basophiles, which showed marked evidence of granular depletion.

Injection of pregnancy urine extracts into immature female rats gives similar results. Thirty rats, 21 to 25 days old, were given daily injections of pregnancy urine extract† (25 to 75 R. U. daily for 6 to 15 days). Twenty-eight littermate sisters served as controls. The ovaries of the injected rats weighed from 50 to 80 mg., while those of the controls weighed from 15 to 25 mg. The pituitaries of the injected animals were usually, but not invariably, increased in weight. Complete serial sections of all pituitaries were cut, at 2 micra, in the horizontal plane. One section from each ribbon of 15 was mounted and stained. Cell counts were made on 5 sections, equidistant apart from each set of serial sections (110,039 cells were counted on the 208 sections studied). The anterior lobes of the injected animals were definitely altered from those of the

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1 Wolfe, J. M., Phelps, Doris, and Cleveland, Rucker, PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 1092.

† Follutein was furnished by E. R. Squibb & Sons through the courtesy of Dr. J. J. Durrett.

controls. The eosinophiles were almost invariably reduced in number, and many of them were swollen and showed granular loss. The most marked changes were found in the basophiles, which showed reduction of granules. There was an increase in the percentage of the chromophobes. Mitoses were found in the chromophobes and eosinophiles of both the injected and control animals; they were more abundant in the injected animals. Mitotic division has never been observed in the basophiles.

We have pointed out[2, 3] that injections of extracts of pregnancy urine into mature female rats brought about marked changes in the anterior hypophysis, as well as in the ovaries, but such injections had no effect on the pituitaries of castrated female rats. This finding has also been reported by Severinghaus.[4] In our work, carried out on 90 injected and 153 control animals, it was found that pregnancy urine extract (75 R. U. daily for 15 days) produced a marked increase in the weight of the ovaries (106 to 765 mg.) and the pituitaries (8.5 to 26 mg.) of the normal females. The pituitaries showed loss of granules from both the eosinophiles and the basophiles; this was most marked in case of the basophiles. The levels of both of these cell types was reduced, while that of the chromophobes was increased. As pointed out before, this was an exaggeration of the changes found in early pregnancy or pseudopregnancy.[5] Mitoses were abundant in the chromophobes and to a lesser extent in the eosinophiles. Colloid was found in the cleft in nearly all animals.

The ovaries and pituitaries of 6 rats, receiving 25 units of pregnancy urine extract daily, for 7 weeks, were altered from those of rats receiving injections for only 15 days. The ovaries were normal or slightly above in size, confirming Collip, Selye and Thompson.[6] The pituitaries were also normal in weight, the pituitary weight paralleled the ovary weight. Histologically, the pituitaries showed a normal level of eosinophiles. All were well packed with granular material (compare with pituitaries of animals injected for 15 days). However, the level of the basophiles was still low, those present showing extreme granular depletion. No mitoses were present.

2 Wolfe, J. M., Ellison, E. T., and Rosenfeld, Louis, *Anat. Record*, 1934, **58**, 93.

3 Wolfe, J. M., Ellison, E. T., and Rosenfeld, Louis, *Anat. Record*, 1934, **58**, 94.

4 Severinghaus, A. E., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 593.

5 Wolfe, J. M., and Cleveland, Rucker, *Anat. Record*, 1933, **56**, 33.

6 Selye, H., Collip, J. B., and Thomson, D. L., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 566.

The above studies indicate that injections of extracts of human pregnancy urine induce marked changes in the pituitaries of immature and mature female rats, if the ovaries are present. Changes occur in both the basophiles and the eosinophiles, particularly notable was a loss of granular material. This is usually extreme in the basophiles and more or less marked in the eosinophiles. (The eosinophiles show granular loss only when active corpora lutea have been stimulated in the ovaries.) The granular cells, being depleted of granules, become chromophobes. Such loss of granules from either the eosinophiles or basophiles (or both) has been considered indicative of an active secretory state.

## 7330 C

### Effects of Fat-Free Diet on Histological Fats in Various Organs of the Rat.

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It has been shown[1] that rigid exclusion of fat from the diet of the rat induces a characteristic deficiency disorder, since the animal is apparently unable to synthesize certain fats which are necessary. The present study was undertaken to determine whether the histological fat distribution in the various organs is affected in this disorder. The organs studied include the liver, kidney, trachea, lung, skin and tela subcutanea.

Through the courtesy of Doctors Burr and Brown, 26 typical test rats that had been maintained several months on the fatless diet (No. 550B, plus vitamin supplements) were available, together with 5 rats "cured" by the subsequent addition of the necessary fats to the diet. These rats were killed by chloroform and autopsied in the usual way. The fats were studied chiefly in formalin-fixed, frozen sections stained with a solution of "oil red O" in diacetin (which presumably stains all fats and lipoids), though in some cases other methods were used. The technique is explained in detail in a separate paper dealing with the normal distribution of fats at various postnatal stages in the rat.[2] Both test rats and controls were females of the Wistar strain.

[1] Burr, G. O., and Burr, M. M., *J. Biol. Chem.*, 1929, **82**, 345; 1930, **86**, 587. Burr, G. O., and Brown, W. R., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 1349.

[2] Rice, H. G., and Jackson, C. M., *Anat. Rec.*, in press.