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Structural Changes in Adult Pituitary after Injecting Extracts of Castrate or Menopause Urine.*

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Injection of oestrin[1] or of P.U. extract[2] into adult rats has been shown to decrease the gonad-stimulating potency of their pituitaries. Marked pituitary changes, consisting primarily of degranulation and retrogressive changes in the basophiles, occur in the pituitaries of P.U. injected rats.[3] These structural findings are of such character as might be expected in cases of decreased potency.

The present paper is concerned with anterior pituitary changes in the adult female rat following prolonged injection of follicle stimulating hormone (hereafter spoken of as C.U.) from the urine of castrate or menopause women. Smith and Engle in recent and yet unpublished experiments have shown a marked decrease in the gonad-stimulating potency of the pituitary of the adult female rat when injected with C.U. Ovarian weights of immature littermate female mice which received pituitary implants from normal or injected animals were taken as the measure of potency. The potency of pituitaries from injected rats was strikingly reduced, in many instances averaging about one-half that of the normal. Equivalents of 40 cc. of urine were injected daily for from 27 to 42 days.

Cellular changes in the anterior pituitary following C.U. injections are striking. Of the 3 cell types, the basophiles are most affected. A marked degranulation occurs in many cells. With the cytological technique which we employ, the blue granules are depleted, but are frequently replaced in part by irregular cytoplasmic masses which stain yellow. This phenomenon is the same, though more accentuated, as that previously described[3] in pituitaries from P.U. injected animals. The degranulated cells, at times, have a cytoplasm free of visible structure, except for the Golgi sphere which retains its blue ground color dotted by minute acidophilic granules.

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1 Meyer, R. K., Leonard, S. L., Hisaw, F. L., and Martin, S. J., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 702; *Endocrinology*, 1932, **16**, 655.

2 Leonard, S. L., *Anat. Rec.*, 1933, **57**, 45.

3 Severinghaus, A. E., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 593; *Anat. Rec.*, 1934, **60**.

In other cells, mitochondria may be present in varying abundance although the blue granules have been depleted. These pituitaries show also the numerous small basophilic cells with prominent enlarged Golgi. They are believed to be newly formed basophiles which become active before reaching normal full size.

An additional feature of interest is the unfailing presence in our C.U. injected animals of branching areas of deeply-staining degenerate cell masses. These areas are greatest in our longest treated animals. Examination shows that these areas are made up to a large extent of angular, shrunken, basophilic cells with deep blue, pyknotic nuclei and a dense, granule-free, blue cytoplasm, against which the Golgi ring is prominently contrasted. Small branching areas of degenerating cells have been seen upon occasion in supposedly normal pituitaries, especially of older rats, but not to the extent that this condition occurs in the injected animals. The basophilic degranulation, as well as the large inclusions of degenerated basophile cells, correlates well with the greatly decreased potency of the pituitaries of C.U. injected rats and with previous potency and cytological findings on pituitaries of P.U. injected rats.

The large number of degranulated basophiles and the many small cells of definite basophilic character would, with many techniques, give the appearance of a proportional increase in chromophobes, a finding in our opinion not real, but apparent. The acidophiles are quite normal in size and character, but the impression of a reduction in their number, sometimes much more marked than at others, would doubtless be supported by a statistical study.

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Phosphatase Studies. VIII. Increase of Serum Phosphatase After Bile Duct Ligation in Dog.

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Roberts has shown increased plasma phosphatase in obstructive jaundice.[1, 2] We have demonstrated an increase of serum phosphatase in a series of cases of catarrhal jaundice, and a return to normal values after their clinical improvement.[3] We interpreted

[1] Roberts, W. M., *Brit. J. Exp. Path.*, 1930, **11**, 90.

[2] Roberts, W. M., *Brit. Med. J.*, 1933, **1**, 734.