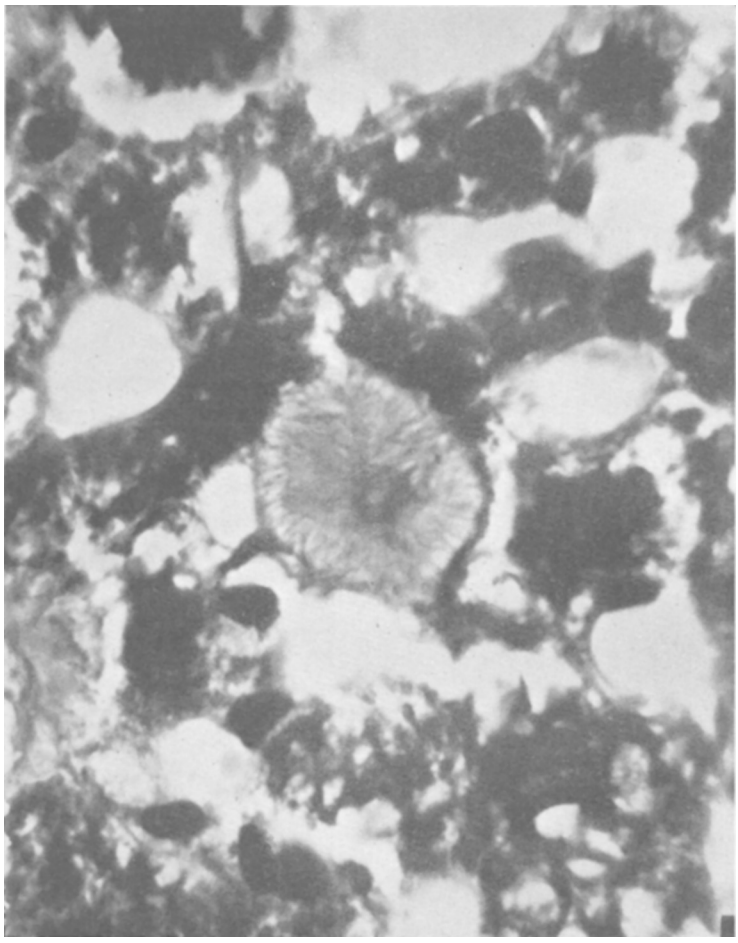

FIG. 3.
A higher magnification (X1840) of preceding photograph showing more clearly the crystalline structure of the amyloid, and the obliteration of the sinusoid.

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## Histologic Effects of a Cholesterol-Free Diet on Adult White Rats.

W. M. BALDWIN.

*From Albany Medical College.*

A series of white rats was raised upon a cholesterol-free diet over a period of 3 generations since the question had arisen as to whether or not cholesterol was synthesized in these rats in the absence of

sterols. The chemical end of the research was conducted by Knudson and Randles[1] and the experimental evidence ascertained seemed to justify their conclusion that this chemical was, to a certain extent, built up by the rat body.[2] At the conclusion of their experiments, the rats were killed and the tissues fixed in Zenker, Bouin, Meves, and formalin, and stained with a variety of the usual laboratory stains, chief among which was a combination of hematoxylin and Mercurochrome-220 Soluble (Hynson, Westcott and Dunning, Baltimore, Md.).

These rats of the third generation were weak, small, and undernourished, and lived only from 11 to 17 weeks after birth, *i. e.*, from 7 to 13 weeks after weaning. At the time of weaning they weighed from 26.0 to 30.0 gm., and at the time of death from 74.0 to 80.0 gm.

There was no evidence at the time of autopsy of either inflammation or degeneration in any of the body tissues. All of the body organs were reduced in size and in weight but preserved a fair normal proportion to the mass of the body in comparison to the controls.

All of the tissues and organs of the rats were studied in detail histologically. It was evident that the diminutive size of the various viscera had been attained less by a reduction in number of the individual functional units composing them, than by a decrease in the size of the cells forming these units. Hence, the tissues and organs presented the appearance of structural compactness, without a conspicuous absence of the characteristic cells ordinarily composing them.

An examination of the individual cells composing these organs and tissues revealed the fact that in the main the cytoplasm of the cells had suffered greater loss in size than the nucleus. There was distinctly observable an upset in the relative proportion of nuclear to cytoplasmic content of the cells with a resultant increase of the nuclear ratio. This was most conspicuous in the lining cells of the descending loop of Henle in the kidney, the secreting cells of the liver, cortical cells of the adrenal, and the cells of the chromaffin system. However, there was no alteration in the staining reactions of any of the cells or tissues.

A striking variation in the size of the nuclei of the liver cells was observable. The number of leucocytes and of red blood cells in the spleen was considerably reduced while the nodes were smaller than normal. The ovaries contained no corpora lutea and the ova were

[1] Randles and Knudson, *J. Biol. Chem.*, 1925, lxvi, 459.

[2] Gardner and Lander, *Proc. Royal Soc.*, London (B), 1913, lxxxvii, 229.

small. The follicular cells suffered, however, a marked reduction in number.

The most conspicuous and significant of the histologic changes were found, however, in the adrenal and testis. In the latter the cells lining the seminiferous tubules were remarkably reduced in number. The spermatozoa, spermatids, spermatocytes and column cells of Sertoli were absent, the cytologic lining of the tubules being reduced thus to a single layer of small cuboidal spermatogonia each possessing a relatively large centrally-placed nucleus. Tubules could be identified in which this lining stratum of spermatogonia cells was wanting in places. Occasionally, the lumen of the tubules was completely filled with exfoliated, deeply stained, atypical spherical spermatocytes of the first order and these likewise could be identified in the tubules of the epididymis. Most of the tubules were choked with a poorly stained undifferentiated mass of cellular detritus in which nuclei could not be made out. The interstitial cells were not reduced in number but were smaller than normal with a relatively large nucleus.

The zona reticularis of the adrenal was practically absent while the thickness of the zona fasciculata was considerably reduced. The thinness of the zona glomerulosa was referable chiefly to a reduction in the size of the large, clear, hexagonal cells of the intermediate layer.

The literature upon the subject of cholesterol synthesis presents many contradictory bits of evidence as to the importance of the rôle played by the various viscera in this function From the histologic evidence presented by this investigation one might fairly assume, and an interpretation might be made upon the basis, that most of the tissues and organs of the body are capable of a certain degree, at least, of this function In the adrenal the cortical cells and especially those of the zona reticularis possess this function but to a limited extent, whereas among the cells of the seminiferous tubules of the testis it is practically absent.