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Renal Damage Following the Administration of Inorganic Phosphate.

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In an earlier communication[1] it was reported that the addition of acid or basic sodium phosphate was followed by a remarkable increase in the size and weight of the kidneys. Further experiments have demonstrated that these changes take place with the addition of an adequate quantity of inorganic phosphate in many forms to the diet of young albino rats. These include the sodium and potassium salts, either primary, secondary, tertiary, or neutral mixtures and phosphoric acid itself. The phosphate concentration used in most of the experiments was essentially the same as that which was used in the earlier experiments[1] with a 4 calorie per gram diet, although a quarter of this concentration was found to produce abnormal kidney changes. An examination of the histological structure of these kidneys, 250 in all, has made us aware of interesting pathological changes.

The lesions noted in the kidneys of all the animals irrespective of variation in the nature of the salt fed, was essentially similar and consisted of epithelial destruction with later reparative processes. Cloudy swelling and necrosis of the cells of the convoluted tubules followed by regeneration were noted in all of the various experiments, including those of from 3 days' duration to the longest period used (44 days). Associated with these processes there occurred calcification of the necrotic debris which accumulated as a result of them so that calcified tubular casts filled the tubule lumen. In those animals that had been fed the phosphate diets for considerable periods of time, proliferative processes were also noted in the interstitial connective tissue about those tubules which had suffered most severely.

All these changes were localized to a very definite portion of the kidney, namely the outer zone of the medulla where the terminal portions of the proximal convoluted tubule dip into the substance of the medulla. The cortical tissue remained normal, except in the longest experiments where secondary changes of tubular collapse

[1] MacKay, L. L., MacKay, E. M., and Addis, T., PROC. SOC. EXP. BIOL. AND MED., 1926, **24**, 130.

were noted. Further experiments are being designed to study the exact relations of these lesions to the feeding of phosphate salts.

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The Innervation of the Human Suprarenal Glands.

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In the course of a study of the intraglandular innervation of the suprarenal glands in man, the following observations were made. By the Spielmeyer technique, it was found that the nerves approaching the glands were myelinated, and many continued so through the cortex, but no myelinated nerves were observed in the medullary portion of the glands. The finer nerve fibers, which came into intimate relation with the cells of the glands, were found to be unmyelinated. By the original Nissl technique, numerous ganglion cells were found, both on the surface of the glands, and within the medulla, especially in the region of the hilum; none, however, were observed in any of the cortical layers. The Bielschowsky technique was employed in the study of the finer distribution of the nerve fibers. The cells of the *zona glomerulosa* were seen to be supplied by short fibrils directly from the nerves in the capsule. Longer fibers passed down between the columns of the fascicular zone, anastomosing abundantly, and forming networks which enclosed the cells and sent tiny branches to end within them. These fibers supplied the cells of the *zona reticularis* in a similar manner. To the medulla, the large nerve bundles described as myelinated were observed to pass directly, with no evidence of branching within the cortex. The ganglion cells described under the Nissl technique were seen to possess intracellular fibrils, while the medullary cells themselves were enclosed in basket-like networks of fibrils, from which tiny fibrillae were seen to enter the cells.