

probably also of other micro-organisms. This substance is apparently produced by bacterial action and its nature is being studied.

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### Influence of High Protein Diets on the Kidney.

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According to Newburgh and Curtis<sup>1</sup> the type of protein fed, with respect to its amino acid content, appeared to be the most important element in the nephropathogenic action of a high protein diet. Intestinal putrefaction, however, may also play a rôle. In attempting to study these factors 36 rats were divided into 9 groups for feeding purposes. The diets contained: Salt mixture, 4%; sucrose, 14 to 15%; agar, 2%; yeast powder, 8 to 10%; 140 mg. cod liver oil per rat per day; butter fat, 15%, except in diets VII, VIII and IX; starch to make 100 parts after protein was added. The diets contained protein as follows:

- Group I. 20% casein (control).
- Group II. 50% casein.
- Group III. 30% egg albumin and 20% casein.
- Group IV. 30% meat powder and 20% casein.
- Group V. 30% powdered horn, 10% casein and 10% meat powder.
- Group VI. 30% hydrolyzed horn, 10% casein and 10% meat powder.
- Group VII. 60% casein and 10% meat powder.
- Group VIII. 50% predigested casein, 10% casein and 10% meat powder.
- Group IX. 60% casein (Harris) and 10% meat powder.

The horn was used because it was difficult to digest and should be the source of more putrefactive substances in the intestine. The hydrolyzed horn, predigested casein and finely divided casein (Harris) were used to see whether putting the proteins in a more rapidly absorbable form might have any effect.

One rat in each group was killed by chloroform after 19, 35, 70,

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<sup>1</sup> Newburgh and Curtis, *Arch. Int. Med.*, 1928, **42**, 801.

and 135 days of feeding and the kidneys removed, weighed, sectioned, stained and examined histologically.

Although the feeding time was short the results obtained were as follows:

1. The animals in Groups VII, VIII, and IX receiving 75% protein all showed some renal hypertrophy which, however, did not exceed 40% in any case.

2. Those rats receiving the meat powder, keratin, and 60% casein components in their diets for 35 to 137 days showed histological changes of the kidneys which were essentially tubular and consisted of degeneration of the tubular epithelium, swelling and degeneration of the nuclei and many tubular casts. The changes were most marked in the group receiving the meat powder.

3. Where the indigestible protein of horn was fed with presumably a considerable increase in intestinal putrefaction, differences were not shown that would indicate a marked influence of intestinal putrefaction on the kidneys under the conditions of the experiment.

4. The feeding of predigested casein (the hydrolyzed horn was discontinued because the animals refused to eat sufficiently of it) which should facilitate the absorption of the amino acids, did not appear to play a rôle in determining the effect on the kidney.