

has remained free from sugar for a period of seventeen days during which the food ingested has been augmented little by little to the point where about 10 grams of carbohydrate in addition to that present in the previous strict diet are being ingested daily. Throughout the entire course of his treatment the patient has continued at his duties as an instructor in the university.

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**Possible inter-relations between acidosis and creatine elimination.**

By **FRANK P. UNDERHILL.**

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Current views associate the elimination of creatine with some perversion of carbohydrate metabolism. The probability of a close relationship of this sort is indicated by the well known fact that a deficiency of carbohydrate in the body leads to creatine elimination which may be checked promptly by ingestion of carbohydrate. There are experimental facts which the familiar hypothesis fails to explain. McCollum and Steenbock<sup>1</sup> found that in the pig a diet of corn products led to the appearance of relatively large quantities of creatine in the urine. Similar experiments of Folin (reported at the December meeting of the American Society of Biological Chemists) with oat feeding yielded comparable results. The dietaries employed can scarcely be regarded as lacking in carbohydrate.

Deficiency of carbohydrate usually means an accompanying acidosis, not necessarily caused by ketogenic substances, which presumably involve the tissues associated with creatine-creatinine metabolism. At any rate nearly every instance in which there is creatine in the urine is accompanied by an acidosis—generally a ketonuria also. These facts suggest the hypothesis that a condition of acidosis in the tissues is responsible for the appearance of creatine in the urine. To test it the following questions demand an answer.

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<sup>1</sup> *J. Biol. Chem.*, 1912-13, 13, p. 209.

1. Will creatine appear in the urine, even in the presence of an abundant carbohydrate supply, if acidosis is induced?

2. Will the elimination of creatine disappear if the acidosis is abolished, quite independently of the factor of carbohydrate supply?

Upon a diet of oats and corn, containing an adequate supply of carbohydrate, creatine promptly appears in the urine of the rabbit. A marked condition of acidosis, as measured by the hydrogen ion concentration of the urine, is always associated with this phenomenon. Oats and corn are pronounced acid-producing foods. On the other hand, if a base-producing food, such as carrots, is fed to rabbits with creatinuria this symptom rapidly disappears as the urine becomes strongly alkaline.

The protein *per se* is without special significance in the phenomenon under discussion; for upon a diet consisting of oats, corn and carrots creatine fails to appear in the urine, and the reaction of the latter remains alkaline. Equally significant is the further fact that the ingestion of HCl in addition to the mixed diet causes the appearance in the urine of significant quantities of creatine. Simultaneously the hydrogen ion concentration of the urine is markedly increased.

The conclusion seems inevitable that there is an inter-relationship between acidosis and creatine elimination. Creatine excretion may prove to be an index of a condition of acidosis in the organism.

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**On the production of soap jellies, and the physical conditions under which jelly formation takes place.**

(Preliminary communication.)

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In the course of experiments regarding the influence exerted by various electrolytes on the equilibrium of emulsions, published in the year 1913, the writer noted that NaCl, when used at a concentration in excess of .4M, caused a precipitation of some constituent