105 (801)

Further studies on muscle creatine.

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In an earlier communication,[1] attention was called to the constancy in the content of muscle creatine for normal animals of a given species, though distinctive for different animals. It was further pointed out that during starvation in the rabbit, the percentage content of muscle creatine may show either an increase or a decrease, the latter depending in considerable part upon the rate and amount of creatine eliminated in the urine.

These observations have been extended to rabbits which have been fed for varying periods upon carbohydrate—without fat or protein. Carbohydrate feeding greatly reduces the elimination of creatine in the urine, as previously observed, though the creatine content of the muscle does not materially differ from that found during a similar length of starvation. In other words, it may be markedly decreased during a long period of carbohydrate feeding. It seems probable that the action of the carbohydrate is simply one phase of the sparing action of carbohydrate on protein metabolism, in this case allowing sufficient time for the body to handle the creatine, *i. e.*, to oxidize it, or change it to creatinine.

That creatine when fed or injected does not reappear in the urine in the form of creatinine, except in traces, or in large amount unchanged, unless given in considerable quantity, has been ascertained by a number of investigators. The possibility that this creatine, which remains unaccounted for, is stored up in the muscle has not been adequately studied. In four experiments on rabbits, the creatine content of the muscle, after repeated subcutaneous injections of creatine, has been found to be uniformly slightly above (4–7 per cent.) the normal amount. This would appear to indicate that a small amount of the injected creatine was deposited in the muscles, though insufficient to account for the creatine not eliminated in the urine either unchanged or in the form of creati-

[1] Myers and Fine, PROC. SOC. EXP. BIOL. AND MED., October, 1912, X, pp. 10 and 12.

nine. In two similar experiments with creatinine, there was apparently a slight increase in the creatine (total creatinine) concentration of the muscle, which we are not prepared to discuss at this time.

The possible influence of autolysis upon the content of muscle creatine and added creatine and creatinine is being investigated.

106 (802)

The total non-protein nitrogen of the blood in nephritis and allied conditions.

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The following summary covers the results of our study of the non-protein nitrogen of the blood by Folin's methods in a series of fifty-nine hospital patients. Our main concern has been with nephritis but we have examined the blood in many other conditions as opportunity offered.

The patients group themselves into four divisions:

I. Those showing no disturbance of renal function (17 cases).
II. Those with marked cardio-vascular disease of some type, most of which showed urinary changes the result of renal congestion (11 cases).
III. Those showing nephritis (23 cases).
IV. Those in which certain features would lead one to suspect nephritis, but in which the existence of nephritis is not borne out by other findings (8 cases).

Our patients of Group I, suffering from a variety of acute and chronic diseases, but without evidence of disturbance of renal function, showed a total non-protein nitrogen in the blood varying from 16 to 43 milligrams per 100 c.c. From 50 to 60 per cent. of this was in the ammonia-urea fraction. In the patients with cardio-vascular disease with renal congestion, but without evidence of other renal lesion there was no increase of the non-protein nitrogen in the blood, nor alteration of the ammonia-urea percentage, although albuminuria, casts and some impairment of the phenolsulphonephthalein elimination were usually present.