

## GLUCOCORTICOID EFFECTS IN PROTEIN DEFICIENT RATS

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The role of glucocorticoids in the aetiology of protein-energy malnutrition remains unclear. Lunn *et al.* (1973) have shown the degree of kwashiorkor to be inversely related to the plasma cortisol levels. Subsequent work with rats showed that administration of glucocorticoid to protein-deficient rats restored liver function and plasma albumin levels and reduced muscle weight (Lunn *et al.* 1976). The loss of muscle could result from reduced synthesis or increased degradation, or both.

In order to determine whether protein deficiency may alter the normal response to glucocorticoids the catabolic effects of administered corticosterone were examined in 2 groups of 10 rats of initial weight 120 g, held in metabolism cages and given either 22% (HP) or 5% (LP) protein diet. After 3 weeks, 5 animals from each group received subcutaneously 4.5 mg corticosterone/100 g body weight/d. Food intake was controlled to match that of the LP/corticosterone-treated group. Urinary excretion of 3-methylhistidine was determined as an estimate of myofibrillar protein degradation rate (Young and Munro 1978) and from this, the average protein fractional degradation rate (FDR) was calculated. Results are shown in Table 1.

TABLE 1. Muscle protein FDR and plasma albumin and corticosterone levels (mean±SEM)

|                       | 22% protein           |                       | 5% protein            |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                       | control               | corticosterone        | control               | corticosterone        |
| Albumin (µg/ml)*      | 35.4±0.4 <sup>a</sup> | 46.5±0.6 <sup>b</sup> | 28.1±0.5 <sup>c</sup> | 40.6±1.2 <sup>d</sup> |
| Corticosterone(ng/ml) | 283±62 <sup>a</sup>   | 591±17 <sup>b</sup>   | 427±43 <sup>a</sup>   | 612±24 <sup>b</sup>   |
| FDR (%/d)             | 2.0±0.04 <sup>a</sup> | 4.2±0.1 <sup>b</sup>  | 2.0±0.03 <sup>a</sup> | 3.1±0.06 <sup>c</sup> |

\* Different superscripts within rows indicate significant difference (P<0.01).

Protein deficiency significantly reduced plasma albumin levels and increased plasma corticosterone levels compared to HP controls. Treatment with corticosterone increased plasma albumin and muscle protein FDR in both groups. However, the increase in muscle protein FDR was significantly less in the LP group than in the HP group.

These data suggest that protein deficient animals are less able to respond to glucocorticoids by mobilising muscle tissue, possibly due to a relative depletion of more readily mobilisable proteins.

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