

**Metabolic responses to high protein diet in Korean elite bodybuilders with high-intensity resistance exercise.**

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**BACKGROUND:**

High protein diet has been known to cause metabolic acidosis, which is manifested by increased urinary excretion of nitrogen and calcium. Bodybuilders habitually consumed excessive dietary protein over the amounts recommended for them to promote muscle mass accretion. This study investigated the metabolic response to high protein consumption in the elite bodybuilders.

**METHODS:**

Eight elite Korean bodybuilders within the age from 18 to 25, mean age  $21.5 \pm 2.6$ . For data collection, anthropometry, blood and urinary analysis, and dietary assessment were conducted.

**RESULTS:**

They consumed large amounts of protein ( $4.3 \pm 1.2$  g/kg BW/day) and calories ( $5,621.7 \pm 1,354.7$  kcal/day), as well as more than the recommended amounts of vitamins and minerals, including potassium and calcium. Serum creatinine ( $1.3 \pm 0.1$  mg/dl) and potassium ( $5.9 \pm 0.8$  mmol/L), and urinary urea nitrogen ( $24.7 \pm 9.5$  mg/dl) and creatinine ( $2.3 \pm 0.7$  mg/dl) were observed to be higher than the normal reference ranges. Urinary calcium ( $0.3 \pm 0.1$  mg/dl), and phosphorus ( $1.3 \pm 0.4$  mg/dl) were on the border of upper limit of the reference range and the urine pH was in normal range.

**CONCLUSIONS:**

Increased urinary excretion of urea nitrogen and creatinine might be due to the high rates of protein metabolism that follow high protein intake and muscle turnover. The obvious evidence of metabolic acidosis in response to high protein diet in the subjects with high potassium intake and intensive resistance exercise were not shown in this study results. However, this study implied that resistance exercise with adequate mineral supplementation, such as potassium and calcium, could reduce or offset the negative effects of protein-generated metabolic changes. This study provides preliminary information of metabolic response to high protein intake in bodybuilders who engaged in high-intensity resistance exercise. Further studies will be needed to determine the effects of the intensity of exercise and the level of mineral intakes, especially potassium and calcium, which have a role to maintain acid-base homeostasis, on protein metabolism in large population of bodybuilders.