

クレアチンの経口投与がヒトの筋および 全身運動能力に及ぼす影響

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Effects of Oral Creatine Supply on Muscle and Whole Body Work Performance in Human

by

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ABSTRACT

Effects of oral supplementation of creatine (Cr) on muscle strength and whole body exercise performance such as anaerobic power and/or sprint running were investigated in healthy male university students. The subjects were randomly separated into two groups (n=6 each). One group of subjects ingested 8 g of Cr monohydrate 3 times a day (24 g/day) for 12 days. The remaining subjects served as a placebo group. The Cr concentration in urine and serum and the high-energy phosphate contents in thigh muscle were measured by using an

enzymatic assay and ^{31}P -nuclear magnetic resonance before and after supplementation. Effects of Cr supply on isokinetic maximal force productions of knee, as well as trunk, flexion and extension at various angular velocities, maximal anaerobic power, and sprint running performance were also determined. The concentration of Cr in both serum and urine, as well as the high-energy phosphate contents in muscle, was increased by Cr loading. The maximal force production, especially in trunk muscles, and anaerobic power output during cycling exercise were improved in Cr-supplied group. No effect was induced in sprint running performance. It is suggested that the maximal force production and short-term anaerobic power may be improved by supplementation of Cr. It is also suggested that more beneficial effects may be induced if Cr supply is combined with strength training.

要 旨

クレアチン (Cr) の経口投与がヒトの筋力および無酸素パワーやスプリント走能などの運動能力にどのような影響をもたらすのか、健常な男子大学生で検討した。被検者は任意に2群に分けられ (それぞれ $n=6$), 1群は8 gのCr-水和物を1日に3回 (24 g/日), 12日間経口摂取した。他の被検者は偽薬群として参加した。酵素法および ^{31}P -核磁気共鳴装置を用いて、尿および血清中Cr, それに大腿筋中高エネルギーリン酸含有量を、投与前後に測定した。Cr投与が各角速度での膝および体幹の最大伸展・屈曲力, 最大無酸素パワー, それにスプリント走能に及ぼす影響も求めた。尿および血清中Cr, それに大腿筋中高エネルギーリン酸含有量は, Cr投与により上昇した。また, とくに体幹筋の最大筋力, および自転車エルゴメーター運動中の無酸素パワーが改善されたが, スプリント走能には効果が得られなかった。Cr投与は最大筋力および短時間無酸素パワーの改善に効果的であるということが示唆された。また, Cr投与に筋力トレーニングを併合すれば, さらに効率のよい成果があがる可能性もあろう。