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VP2 Whey Isolate and Micronized Creatine Improve Muscle Energy Production

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INTRODUCTION: Muscle oxidative capacity is the largest source of energy (ATP) production. This process occurs in the mitochondria in cells. Mitochondrial ATP production rates (MAPR) are a very reliable index of muscle energy production it measures the direct production of ATP from the mitochondria in muscle cells. The aim of this study was to examine possible nutritional interventions that may enhance MAPR and therefore, skeletal muscle energy production.

METHODS: Female Sprague Dawley rats were supplemented with creatine (Cr, $n=8$) or VP2 Whey Isolate (WI, $n=8$) for 6 weeks, while control rats ($n=10$) received a standard diet. Mitochondrial ATP production rate (MAPR), citrate synthase (CS) activity and fibre type proportions were evaluated in oxidative (slow twitch) and glycolytic (fast twitch) muscle fibers. Oxidative, slow-twitch muscle was taken from the soleus, glycolytic, fast-twitch muscle was taken from the extensor digitorum longus (EDL) muscle.

RESULTS: Compared to control animals, MAPR was significantly higher ($P<0.05$) in soleus muscle, but not EDL muscle after Micronized creatine supplementation. In contrast, MAPR was significantly higher ($P<0.05$) in the EDL muscle after supplementation with VP2 Whey Isolate compared to control animals.

These changes were not caused by fibre transitions, as muscle fibre type proportions were shown not to be different between control and supplemented groups. Similarly, it is unlikely that there were any increases in mitochondrial volume or density, as CS activity was also unaltered after supplementation.

CONCLUSIONS: These results suggest that Micronized creatine enhance energy production in oxidative, slow-twitch muscle. While VP2 Whey Isolate increases energy production in glycolytic, fast-twitch muscle. It is important to note that these improvements occurred without the addition of exercise training. While further work is required to fully elucidate the mechanisms, these results clearly demonstrate that Micronized creatine and VP2 Whey Isolate can increase oxidative capacity (energy production) in oxidative and glycolytic muscles, respectively. Therefore, potentially, these supplements may enhance athletic performance in events that require strength, explosive power and endurance.

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