

Effects of Pyrroloquinoline Quinone (PQQ) Supplementation on Aerobic Exercise Performance and Indices of Mitochondrial Biogenesis in Untrained Men.

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Abstract

Objective: Pyrroloquinoline quinone (PQQ) is a novel supplement involved in processes such as mitochondrial biogenesis and cellular energy metabolism. Since endurance exercise and PQQ exhibit similar mechanisms for mitochondrial biogenesis, it is plausible that PQQ may have ergogenic value. Therefore, the purpose of this study was to examine the effects of a six-week endurance exercise training program on mitochondrial biogenesis and aerobic performance in non-endurance-trained males. **Methods:** Twenty-three males were randomized to consume 20 mg/day of PQQ or placebo (PLC). Both groups followed a supervised six-week endurance exercise training program. Body composition was assessed by dual-energy-x-ray-absorptiometry (DEXA). Aerobic exercise performance and peroxisome proliferator-activated receptor γ coactivator-1 α (PGC-1 α), a biochemical marker for mitochondrial biogenesis, were assessed before and after the six-week endurance training/supplementation program. **Results:** There were no significant differences between groups in aerobic performance after endurance-training ($p > 0.05$). However, there were significant improvements in peak oxygen consumption (VO_{2peak}) and total exercise test duration after endurance-training, irrespective of group ($p < 0.05$). The PQQ group had a significant increase in PGC-1 α protein levels from baseline to post endurance training compared to PLC ($p < 0.05$). Furthermore, the PQQ group had higher PGC-1 α protein levels after 6 weeks of endurance training compared to PLC ($p < 0.05$). **Conclusions:** Supplementation of PQQ does not appear to elicit any ergogenic effects regarding aerobic performance or body composition but appears to impact mitochondrial biogenesis by way of significant elevations in PGC-1 α protein content.

KEYWORDS: PGC-1a; antioxidant; endurance training; mitochondrion; skeletal muscle