UBIQUINOL REDUCES FAST MUSCLE DAMAGE AND MITIGATES FATIGUE IN LONG DISTANCE RUNNING

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Background: Coenzyme Q10 (CoQ10) is the electron transporter in oxidative phosphorylation and an endogenous antioxidant. Recent research has indicated that doses of 200–300 mg/day are needed to recognize effects to prevent oxidative damage in athletes, and the reduced form of CoQ10 (ubiquinol-10) is more bioavailable than its oxidized form.
Objective: To investigate whether higher dose of ubiquinol-10 could elevate plasma CoQ10 levels rapidly and exert physiological benefits in athletes, a placebo controlled, double blinded test was carried out to determine the effects of ubiquinol-10 on the extravasate enzymes and fatigue levels of distance runners.
Methods: Sixteen male collegiate distance runners were allocated to two groups receiving 300 mg/day of ubiquinol-10 or placebo during summer training (Figure 1). We measured the plasma CoQ10 levels, the activities of the serum extravasate enzymes (CK, AST, ALT and LDH), and we also evaluated subjective fatigue.
Results: Ubiquinol-10 elevated plasma CoQ10 concentration to 5.62 μg/mL (Figure 2), significantly decreased activities of the serum extravasate enzymes, CK, ALT, LDH ($p<0.01$), and AST ($p<0.05$) on day 6 (Figure 3). Subjective fatigue status was significantly elevated on day 10 (the day after the 45km-run) in the placebo group ($p<0.001$), but did not significantly change in the group given ubiquinol-10 (Figure 4). Taken together, ubiquinol-10 could mitigate tissue damage and alleviate fatigue status in distance runners during summer training.
Conclusion: Ubiquinol-10 (300 mg/day) supplementation elevated plasma CoQ10 levels almost to plateau levels, decreased extravasate enzymes within six days, and suppressed the subjective fatigue in male distance runners.

Note: This poster was created by Kaneka Corporation with kind permission of Dr. Suzuki (Juntendo University, Japan) based on recently published research (Suzuki et al. Int J Vitam Nutr Res 2020 Jan 31:1-10. doi: 10.1024/0300-9831/a000627. PMID: 32003645).

Figure 1 Study design

Test design: A placebo controlled, double blinded test
Subjects: Sixteen male distance runners* from the Juntendo University Athletics Club
*Sprint average time (5000 m): 14 min 27.40 sec (± 13.00 sec)
Supplementation: QH2 group (19.8 ± 1.7 years old, N=8), **ubiquinol 300 mg/day**
2x 100 mg/cap in morning + 1x 100 mg/cap in evening with meal for 10 days during attending summer training camp
Placebo group (20.1 ± 1.6 years old, N=8), **ubiquinol 0 mg/day**
in a same manner as the QH2 group
Physical training: Regular sport training everyday,
but rest on Day 6 and Day 10,
25km-run on Day 7, 45-km run on Day 9

Blood sampling: Day 0 (before intervention), Day 6 and Day 11
Subjective fatigue assessment: before training on Day 6, Day 8, Day 10 and Day 11

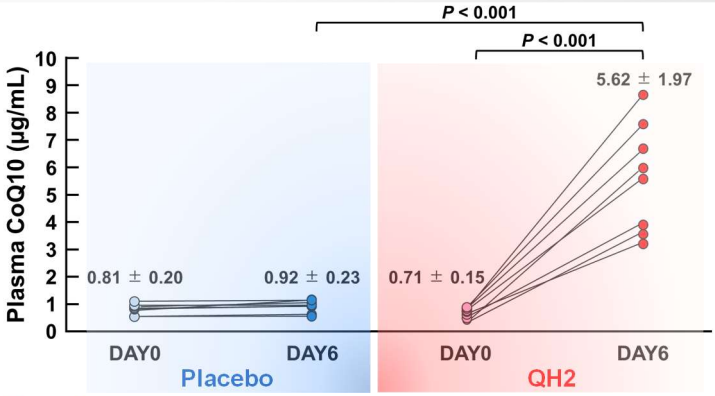

Figure 2 Changes in plasma CoQ10 level *between DAY0 and DAY6*.
Ubiquinol-10 supplementation (300 mg/day) elevated plasma CoQ10 levels in all participants, whereas the placebo had no effect.

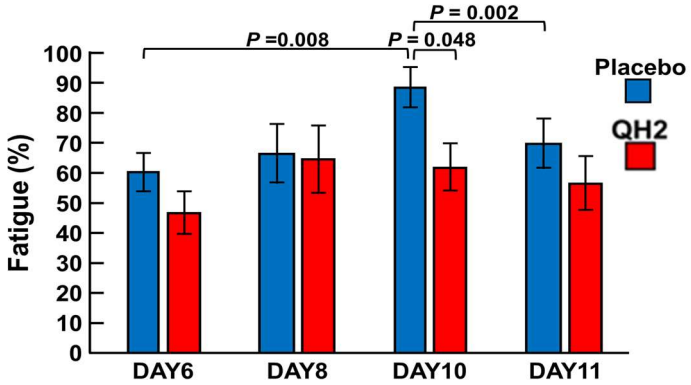

Figure 4 Pairwise comparison of subjective fatigue during the intervention.
Subjective fatigue status in the placebo group significantly increased on DAY10 (the day of the 45-km run), then returned on DAY11 to levels similar to those on DAY0 and DAY6. In contrast, the status did not significantly change throughout the study in the QH2 group, which had significantly lower levels of fatigue than the placebo group on DAY10.

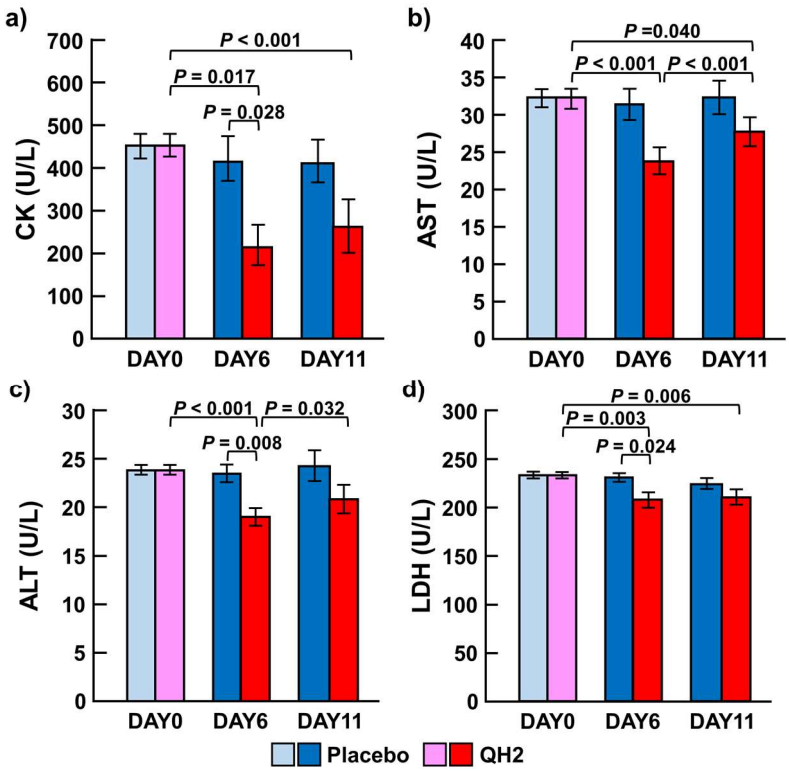

Figure 3 Changes in serum extravasate enzymes during the intervention.
Ubiquinol-10 supplementation could suppress some physical damages induced by consecutive strenuous training.
(a) creatine kinase (CK) is a damage maker of myocardial and skeletal muscle; (b) aspartate aminotransferase (AST) and (c) alanine aminotransferase (ALT) are indicators of liver injury; (d) lactate dehydrogenase (LDH) is an indicator of kidney injury.

DISCUSSION

- Daily supplementation of ubiquinol-10 may prevent physical damages and subjective fatigue in athletes who practice intense training habitually, e.g. long-distance runners and cyclists.
- The striking elevation on plasma CoQ10 levels also raises possible beneficial effects of low dose (100 mg/day) in not professional athletes' health condition.

CONFLICT OF INTEREST AND FINANCIAL DISCLOSURE None to declare.

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