



Vitamina D e mitocôndria – *Journal of Clinical Endocrinology and Metabolism* – Março 2013

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Improving the vitamin D status of vitamin D deficient adults is associated with improved mitochondrial oxidative function in skeletal muscle.

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Abstract

Objective: Suboptimal mitochondrial function has been implicated in several disorders in which fatigue is a prominent feature. Vitamin D deficiency is a well-recognized cause of fatigue and myopathy. The aim of this study was to examine the effects of cholecalciferol therapy on skeletal mitochondrial oxidative function in symptomatic, vitamin D-deficient individuals. **Design:** This longitudinal study assessed mitochondrial oxidative phosphorylation in the gastrosoleus compartment using phosphorus-31 magnetic resonance spectroscopy measurements of phosphocreatine recovery kinetics in 12 symptomatic, severely vitamin D-deficient subjects before and after treatment with cholecalciferol. All subjects had serum assays before and after cholecalciferol therapy to document serum 25-hydroxyvitamin D (25OHD) and bone profiles. Fifteen healthy controls also underwent P-magnetic resonance spectroscopy and serum 25OHD assessment. **Results:** **The phosphocreatine recovery half-time (τ PCr) was significantly reduced after cholecalciferol therapy in the subjects indicating an improvement in maximal oxidative phosphorylation (34.44 ± 8.18 sec to 27.84 ± 9.54 sec, $P < .001$).** This was associated with an improvement in mean serum 25OHD levels (8.8 ± 4.2 nmol/L to 113.8 ± 51.5 nmol/L, $P < .001$). There was no difference in phosphate metabolites at rest. A linear regression model showed that decreasing serum 25OHD levels was associated with increasing τ PCr ($r = -0.41$, $P = .009$). All patients reported an improvement in fatigue after cholecalciferol therapy. **Conclusions:** **Cholecalciferol therapy augments muscle mitochondrial maximal oxidative phosphorylation after exercise in symptomatic, vitamin D-deficient individuals. This finding suggests that changes in mitochondrial oxidative phosphorylation in skeletal muscle could at least be partly responsible for the fatigue experienced by these patients.** For the first time, we demonstrate a link between vitamin D and the mitochondria in human skeletal muscle.