

# The effect of L-arginine supplementation on the apoptosis of peripheral blood mononuclear cells in the military in response to sleep deprivation and acute anaerobic exercise

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## Abstract

**Objective:** Acute anaerobic exercise and sleep deprivation can cause cellular apoptosis by causing oxidative stress, so finding a way to moderate their destructive effect on apoptosis is essential. Therefore, our aim in this study was to evaluate the effect of 8 weeks of L-arginine supplementation on the expression of Bax, Bcl-2, BMAL1 and CCAR2 genes in response to sleep deprivation and acute anaerobic exercise.

**Methods:** Seventeen healthy men military with age range 26 to 35 years old participated in this study and were divided into two groups: L-arginine (n = 10) and placebo (n = 7). Subjects in the arginine group took one 1000 mg L-arginine tablet daily for 8 weeks. Real-time PCR method was used to determine the gene expression.

**Results:** We observed that acute anaerobic exercise, as well as sleep deprivation, increased the expression of Bax and CCAR2 genes, and decreased the expression Bcl-2 and BMAL1 genes. L-arginine supplementation significantly increased the expression of BMAL1 and Bcl-2 genes and significantly decreased the expression of Bax and CCAR2 genes. L-Arginine modulates the increase in expression of Bax and CCAR2 genes and the decrease in expression Bcl-2 and BMAL1 genes in response to sleep deprivation and acute anaerobic exercise deprivation. P-value considered less than 0.05.

**Conclusions:** In this study, we conclude that daily consumption of 1000 mg L-arginine tablets for 8 weeks reduces apoptosis, can also modulate apoptosis due to sleep deprivation and sleep deprivation associated with acute anaerobic exercise.

**Keywords:** L-arginine, sleep deprivation, anaerobic exercise, apoptosis, BMAL1, CCAR2