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Effects of Phosphatidylserine on Mental States in Elite Shooters

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Objective The purpose of this study was to examine effects of a short-term oral supplementation of PS on biochemical stress indicators, whole brain neurotransmitters, mood states, and sleep quality in elite shooters.
Methods Eighteen shooters including 9 males and 9 females participated in the study. They were randomly assigned into either of the three groups: 1) those who ingested PS at 400 mg·day^{-1} (n=6) (PS-400); 2) those who ingested PS at 800 mg·day^{-1} (n=6) (PS-800); 3) those who with no supplement (n=6) (CON). PS supplementation lasted for 14 days and was administered in a double-blinded fashion. Within a week prior to the supplementation, serial venous blood samples were taken for measuring serum levels testosterone (T), cortisol (C), blood urea nitrogen (BUN), and creatine kinase (CK). Subjects also completed the Profile of Mood States (POMS) scale and the Pittsburgh Sleep Quality Index (PSQI) questionnaire and undertook electroencephalogram that determined activation values of six neurotransmitters in whole brain, including inhibition of medium (INH), five hydroxy-tryptamine (5-HT), acetylcholine (ACH), dopamine (DA), norepinephrine (NE), and excited medium (EXC). Subjects repeated the same testing protocols and all variables were measured again after 14 days of supplementation.
Results No between-group differences in all variables were observed at the baseline prior to the start of supplementation. After supplementation, both C and C increase were lower (P=0.025, P=0.016, respectively) in PS 800 than CON, while no significant differences in C and C increase were seen between PS-400 and CON and between PS-800 and PS-400. 5-HT and DA were higher (P=0.049, P=0.019, respectively) in PS-800 than CON, while no differences in 5-HT and DA were observed between PS-400 and CON and between PS-800 and PS-400. All neurotransmitters were increased by supplementation in PS-800, with ACH and DA reaching statistical significance (P=0.050,P=0.029, respectively). A synchronized trend of INH, 5-HT, ACH, DA， NE, and EXC were observed in a few brain regions (P<0.05). PS Supplementation decreased panic score of POMS following both PS-400 and PS-800, with a greater decrease seen in PS-800. The panic score post-supplementation was lower in PS-800 than PS-400 (P=0.016) or CON (P=0.027). Although results of PSQI indicated an improved sleep quality following supplementation in both PS-400 and PS-800, these improvements did not reach statistical significance and no differences in PSQI were seen across the three groups.
Conclusions It appears that supplementation with phosphatidylserine at 800 mg·day^{-1} for 14 days can reduce stress hormones, modulate central neurotransmitters, and mitigate negative emotions, thereby alleviating stress levels among elite shooters.