PHOSPHATIDIC ACID SUPPLEMENTATION DOES NOT ALTER BODY COMPOSITION OR STRENGTH IN SEDENTARY, MIDDLE AGED INDIVIDUALS

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Introduction

Sarcopenia can begin as early as the fourth decade of life, and effective treatment is necessary to maintain independence, mobility, and quality of life in old age. Although larger quantities are often required, maximal stimulation of muscle protein synthesis in the elderly is possible with dietary supplementation, such as supplementation with branched chain amino acids. Phosphatidic Acid (PA) has recently emerged as a potent signaling molecule in the mammalian target of rapamycin (mTOR) anabolic pathway. Via mTOR, PA increases protein synthesis in a dose dependent manner. Current data indicate that PA levels increase in response to eccentric loading, possibly in response to muscle damaging exercise. PA consumed as an ergogenic aid coupled with resistance training has shown to be beneficial in increasing muscle hypertrophy, lean body mass, and strength in younger individuals. However, the effects of PA in a sedentary, middle-aged model are yet to be investigated.

Purpose

Thus, the purpose of this investigation was to examine the effects of PA on muscle size and strength in aging individuals in the absence of an exercise or diet intervention.

Methods

Thirty male (n=15) and female (n=15) participants aged 43.5 ± 3.8 years participated in this study. Subjects were given either 750mg daily of PA (ChemiNutra, White Bear Lake, MN) or an equal volume, visually identical placebo in a double blind manner for 8 weeks. A known number of capsules were given to participants, and participants were required to return with leftover capsules, which were counted again to ensure compliance. During participation, participants were instructed not to alter their diets or activity levels. However, they were required to record each of these variables. Body composition was analyzed by DEXA along with ultrasound determined cross sectional area (CSA) of the rectus femoris. Muscular performance was assessed via handgrip and knee extensor isometric dynamometer tests. All measures were taken prior to and at the conclusion of the supplementation period.

	PA pre	PA post	Placebo pre	Placebo post
Weight (kg)	91.6 ± 12.0	91.2 ± 9.6	93.3 ± 12.8	94.2 ± 11.5
Steps	4407.1 ± 2087.7	5158.8 ± 2102.9	5086.9 ± 2283.6	5036.1 ± 2556.3
Calories	1905.0 ± 424.3	1834.5 ± 314.1	1925.7 ± 599.5	1784.6 ± 380.3
Carbohydrates / day (g)	212.2 ± 74.2	211.6 ± 61.7	195.7 ± 81.3	207.7 ± 69.6
Fat / day (g)	68.0 ± 18.8	67.4 ± 11.0	93.3 ± 72.3	70.8 ± 26.6
Protein / day (g)	71.7 ± 16.8	71.9 ± 11.3	78.8 ± 23.7	78.0 ± 11.3
Body Fat (%)	38.6 ± 8.3	38.9 ± 8.1	38.9 ± 7.6	39.1 ± 7.7
Fat Mass (kg)	35.0 ± 10.0	35.3 ± 9.9	36.0 ± 8.7	36.4 ± 8.5
Lean Body Mass (kg)	52.6 ± 9.6	52.5 ± 9.3	54.4 ± 9.7	54.7 ± 10.0
Cross sectional area (cm^2)	3.2 ± 1.6	3.3 ± 1.6	3.2 ± 1.5	3.3 ± 1.5
Hand grip strength (lbs)	100.3 ± 35.5	103.0 ± 39.1	100.8 ± 33.9	102.4 ± 36.3
Knee extensor strength (lbs)	1244.0 ± 204.7	1223.9 ± 234.2	1158.3 ± 1148.5	1148.5 ± 296.9

Results

No differences existed at baseline for diet, activity, or any dependent or descriptive variables. Diet and activity levels remained consistent throughout the study. No group x time interactions were present for body fat percentage, fat mass, lean body mass, CSA, handgrip strength, or knee extensor strength for men or women ($p < 0.05$).

Conclusions

Phosphatidic Acid dosed at 750 mg daily does not appear to be a potent stimulus for lean mass accretion in sedentary, ageing populations. Future research in this population should investigate larger doses, PA coupled with an exercise and/or diet intervention, and a more significant atrophic stimulus, such as muscle wasting due to malnutrition.

References

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