

Volume 39 • Number 5 • May 2007
Supplement to

Medicine & Science IN Sports & Exercise®

MSSE® ABSTRACT ISSUE

The Official Journal of the American College of Sports Medicine
www.acsm-msse.org

Full Text
OVID

 Wolters Kluwer Health | Lippincott
Williams & Wilkins

ISSN: 0195-9131



AMERICAN COLLEGE
of SPORTS MEDICINE
www.acsm.org

Published with the
ACSM 54th Annual Meeting
Final Program

Board #142 May 31 3:30 PM - 5:00 PM
Effects Of β -Alanine Supplementation On The Onset Of Neuromuscular Fatigue And Ventilatory Threshold In Women
 Jeffrey R. Stout, FACSM¹, Joel T. Cramer¹, Robert F. Zoeller², Donald J. Torok, FACSM², Joseph O'Kroy². ¹University Of Oklahoma, Norman, OK. ²Florida Atlantic University, Davie, FL.
 Email: jrout@ou.edu

Supplementation with 3 to 6 grams per day of beta-alanine for 4 weeks has been shown to increase skeletal muscle carnosine levels by 60%. Recent studies have demonstrated that increasing muscle carnosine through beta-alanine supplementation can delay fatigue and improve exercise performance as a result of an increased hydrogen ion buffering capacity.

OBJECTIVE: This study examined the effects of 28 days of β -alanine supplementation on physical working capacity at neuromuscular fatigue threshold (PWCFT), ventilatory threshold (VT), maximal oxygen consumption (VO₂-MAX), and time-to-exhaustion (TTE) in women.

METHODS: Twenty-two women (age \pm SD = 27.4 \pm 6.1 yrs) participated and were randomly assigned to either the β -alanine (CarnoSynTM) (3.2g.d-1 during week 1 and 6.4g.d-1 for weeks 2-4) or Placebo (PL) group. Before (pre) and after (post) supplementation period, participants performed a continuous, incremental cycle ergometry test to exhaustion to determine the PWCFT, VT, VO₂-MAX, and TTE.

RESULTS: There was a 13.9%, 12.6% and 2.5% increase ($P < 0.05$) in VT, PWCFT and TTE, respectively, for the β -alanine group, with no changes in the PL group ($P > 0.05$). There were no changes for VO₂-MAX ($P > 0.05$) in either group.

CONCLUSION: β -alanine supplementation appears to improve submaximal cycle ergometry performance and TTE in young women, perhaps as a result of an increased buffering capacity due to elevated muscle carnosine concentrations.

Board #143 May 31 3:30 PM - 5:00 PM
Dietary Carnosine And Anserine Inhibits High-intensity Exercise-induced Decrease In Rat Sarcoplasmic Reticulum Ca²⁺-handling

Hirohiko Maemura¹, Takaaki Mishima², Takashi Yamada², Makoto Sakamoto², Minako Sugiyama², Satoshi Matsunaga³, Mikako Sato¹, Yoshihisa Takahata¹, Fumiki Morimatsu¹, Masanobu Wada². ¹R & D Center, Nippon Meat Packers, Inc., Tsukuba, Ibaraki, Japan. ²Hiroshima University, Hiroshima, Japan. ³Osaka City University, Osaka, Japan.
 Email: h.maemura@nipponham.co.jp

Carnosine and anserine are histidine-containing dipeptides that are present in the heart, skin, liver, kidney and skeletal muscle. Various physiological actions have been ascribed to carnosine in skeletal muscle including pH buffering, acting as an antioxidant, the regulation of Ca²⁺ sensitivity and excitation-contraction (E-C) coupling.

OBJECTIVE: The hypothesis tested in this study was that dietary chicken breast extract (CBEX), a rich source of carnosine and anserine, would attenuate deteriorations in sarcoplasmic reticulum (SR) function that occur with high-intensity exercise.

METHODS: The CBEX was prepared from the pectoralis major muscles of chicken mixed with 9 volumes of standard rat chow. Following 5 weeks of dietary CBEX, Ca²⁺-uptake rate, Ca²⁺-release rate and Ca²⁺-stimulated ATPase activity were measured in homogenates of the superficial portion of vastus lateralis muscles from subjects to high-intensity treadmill running for 2.5 min.

RESULTS: Dietary CBEX caused an approximately 15 and 45% increased ($P < 0.01$) muscle carnosine and anserine concentrations, respectively, but no changes in Ca²⁺-handling ability, i.e., Ca²⁺-uptake and release rates, in resting muscle. Data confirm that high-intensity exercise evokes depressions in SR Ca²⁺-handling. The degree of the same run time, SR Ca²⁺-handling was reduced to a lesser degree in rats from CBEX-containing chow-fed rats, compared to standard chow-fed rats. Changes in SR Ca²⁺-ATPase activity were not paralleled by those in Ca²⁺-uptake. Dietary CBEX elicited a 12.4% reduction ($P < 0.05$) in the catalytic activity of resting ATPase. After exercise, the activity was depressed to similar extents between CBEX-containing chow- and standard chow-fed rats.

CONCLUSIONS: These results implicate the modified SR Ca²⁺-handling ability as one factor contributing to inhibition of the fatigue development resulting from carnosine and anserine.

2074 Board #144 May 31 3:30 PM - 5:00 PM
Reliability Of Arm Crank Power In Response To L-Aspartate Supplementation
 W. W. Edwards¹, A. G. Nelson, FACSM², R. Day³, J. Kokkonen³, E. L. Glickman, FACSM⁴, T. C. Palfrey⁵. ¹Texas A & M University - Kingsville, Kingsville, TX. ²Louisiana State University - Baton Rouge, Baton Rouge, LA. ³Brigham Young University - Hawaii, Laie, HI. ⁴Kent State University, Kent, OH. ⁵University of New Orleans, New Orleans, LA.
 Email: william.edwards@tamuk.edu

Previous work in our laboratory (MSSE: 37(5):S45, 2005) suggests an improvement in short-term arm-crank power with L-Aspartate supplementation. However, the reproducibility of short-term arm crank power in response to L-Aspartate supplementation or placebo across high-intensity exercise sessions has not been reported.

PURPOSE: To investigate the reliability of short-term arm crank power in watts (W) in response to L-Aspartate supplementation.

METHODS: Twenty-eight upper body trained college-age males ($n = 10$) and females ($n = 18$) volunteered for the study. Each reported 1+ yr recent experience in upper-body training @ 2-3x/week (i.e. water polo, weight training, surfing, swimming). Each were tested on four occasions for one bout of arm crank power following an incremental (25W.30 second-1) 100-rpm warm-up following L-Aspartate supplementation (A) or placebo (P). The exercise sessions were double-blinded and counterbalanced, with ingestion of either 12.5g x 2 (24 hour pre and 1 hour pre) of A (i.e. A1, A2) or P (i.e. P1, P2) separated by a 48-hour washout. Following warm-up, each subject turned the crank 'as fast as possible for as long as possible' with warm-up W and performance W recorded.

RESULTS: There were no significant ($p > 0.05$) differences in warm-up W and performance W across sessions for P1 vs. P2 and A1 vs. A2. Warm-up W (mean \pm SD) were strongly associated from P1 to P2 (217.9 \pm 145.2 vs. 218.5 \pm 147.2, $r = 1.00$) and A1 to A2 (218.1 \pm 146.5 vs. 219.0 \pm 147.9, $r = 1.00$). Performance W (mean \pm SD) were reliable from P1 to P2 (210.5 \pm 112.4 vs. 216.8 \pm 117.1, $r = 0.92$) and A1 to A2 (223.1 \pm 126.4 vs. 215.8 \pm 117.8; $r = 0.87$).

CONCLUSION: Short-term continuous arm-crank power following incremental arm ergometry is reliable in response to L-Aspartate supplementation or placebo. Additional work is needed to ascertain the effect of training status (e.g. in-season, progression, and taper) and perhaps across longer periods between each test. Further work with incremental protocols of this type with set performance time limits (e.g. 30 seconds, 1 minute, 2 minutes) is warranted.

2075 Board #145 May 31 3:30 PM - 5:00 PM
Hyperimmune Egg Protein Decreases Submaximal Heart Rate and Increases Peak Power
 Timothy P. Scheett¹, Tyler D. Martin², Benjamin M. Carr², Carolyn A. Koster¹, Patricia A. Celmer¹, Jeffrey A. Whitener¹, Michael J. Webster, FACSM². ¹College of Charleston, Charleston, SC. ²University of Southern Mississippi, Hattiesburg, MS.
 Email: ScheettT@cofc.edu

Hyperimmune egg protein (HIE) is a powdered, pure egg product derived from chickens immunized with more than 26 killed pathogens (e.g., Shigella, Staphylococcus, Escherichia coli, Salmonella, and Streptococcus) of human origin. Anecdotal evidence suggests that HIE supplementation improves performance and shortens recovery time after exercise.

PURPOSE: To determine whether 10 d of oral HIE supplementation altered submaximal or maximal exercise responses.

METHODS: Twenty-four recreationally active males aged 23.6 \pm 0.8 yrs, height 176 \pm 2 cm, weight 69.2 \pm 0.6 kg and 17.1 \pm 1.5 % body fat were randomly assigned to either HIE ($n=12$) or an egg protein placebo (PLA) group. Participants abstained from their regular exercise routine for the duration of the study and were supplemented with 4.5 g.d-1 for 2 d, 9 g.d-1 for 2 d and 13.5 g.d-1 for 6 d. HIE and PLA supplements were identical in appearance and taste before and after mixing with 237 mL of low carbohydrate milk. On days 1, 8 and 10, participants performed three 5 min submaximal exercise bouts on a treadmill at 0%, 3% and 6% grade with constant speed for each subject. HR was continuously monitored. Each participant also performed a Wingate test. ANCOVA was used to determine significant differences between or within the groups during the 10 d of supplementation with initial differences between groups serving as a covariate. Significance was set at $\alpha = 0.05$.

RESULTS: Change in HR from Day 1, at all submaximal intensities, was significantly lower ($p < 0.05$) between HIE and PLA on Day 8 (0%: Δ HIE -2 \pm 3 b.m-1, Δ PLA 0 \pm 2 b.m-1; 3%: Δ HIE -3 \pm 2 b.m-1, Δ PLA -2 \pm 1 b.m-1; 6%: Δ HIE -4 \pm 2 b.m-1, Δ PLA -1 \pm 1 b.m-1) and Day 10 (0%: Δ HIE -2 \pm 3 b.m-1, Δ PLA -1 \pm 2 b.m-1; 3%: Δ HIE -6 \pm 3 b.m-1, Δ PLA -1 \pm 2 b.m-1; 6%: Δ HIE -6 \pm 2 b.m-1, Δ PLA -1 \pm 2 b.m-1). Peak power was significantly greater ($p < 0.05$) between HIE and PLA on Day 8 (Δ HIE 46 \pm 32 Watts, Δ PLA -26 \pm 26 Watts) as well as within HIE from Day 1 to Day 10 (Δ HIE 54 \pm 22 Watts, Δ PLA 8 \pm 28 Watts).

CONCLUSIONS: These data suggest that oral supplementation of hyperimmune egg for 10 d resulted in a significantly lower submaximal HR and higher peak power. However, the prospective mechanisms related to the increase in submaximal work efficiency and greater power production, in response to HIE supplementation, remain to be identified.

Supported by Legacy for Life, LLC, Melbourne, FL

Abstracts were prepared by the authors and printed as submitted.