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## POSTER PRESENTATIONS

### P1
### The effects of a nutritionally enriched coffee drink on repeated flying 40-yd sprint performance

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*Journal of the International Society of Sports Nutrition* 2008, **5(Suppl 1):**P1

**Background:** A double-blind, placebo controlled, randomized trial was performed to evaluate the effects of a nutritionally enriched coffee (NEC) drink compared to decaffeinated coffee (DC) on repeated flying 40-yard sprint performance.
**Methods:** Physically active male and female volunteers (n = 13) completed 24 × 50 yard sprints following NEC and DC (counterbalanced). Sprints were completed in 2 halves (12 sprints per half) with 2 minutes recovery between each sprint and a 10-minute recovery period between halves. Acute-RPE (A-RPE) (0–10 omni scale) was recorded after every sprint and Session RPE (S-RPE) was recorded 20 min after completing each trial. Blood lactate ([LA]) was recorded at baseline and following sprints, 6, 12, 18, and 24. Additionally, a fatigue index (FI) was calculated as a percentage difference between mean sprint time and fastest sprint time.
**Results:** A 2 (trial) × 2 (treatment) repeated measures ANOVA revealed significantly ($p = 0.03$) faster (main effect) sprint time for NEC. Post-hoc analyses revealed significantly faster times ($p \leq 0.05$) for sprints 1, 3, 4, 6, 8, and 17, while approaching significance at sprints 10 ($p = 0.07$) and 15 ($p = 0.08$). No main effect for A-RPE ($p = 0.28$) or [LA] ($p = 0.15$) was found. Results from a paired t-test revealed a significantly improved FI ($p = 0.04$) with NEC but no significant impact on S-RPE ($p = 0.72$).
**Conclusion:** Results indicate that caffeine administered in a NEC drink can enhance repeated bouts of acute sprint performance possibly through delayed fatigue as evidenced in a dampened perceived exertion response (faster sprints with similar RPE).

**Acknowledgements**
Supported by Javalution Coffee Company Ft. Lauderdale, FL, USA.

### P2
### Effects of beta-alanine supplementation on exercise performance during a competitive wrestling season: an 8-week open label pilot study

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**Background:** The goal of wrestlers during a competitive season is to maintain or lose body weight without compromising athletic performance. However, some studies have reported decrements in exercise performance associated with weight loss and/or the strain of a competitive season. The purpose of this study, therefore, was to examine the effects of 8 week beta-alanine (β-ala) supplementation on exercise performance in Division II collegiate wrestlers during a competitive season.
**Methods:** 25 college wrestlers (age 18 to 22 y) volunteered to participate in this study, and 18 subjects (mean BMI 24.7 ± 3.7) completed the study. Each participant ingested 4 g/d of β-ala in an open-label manner during the final eight weeks of their competitive season. The subjects followed a standard training protocol for collegiate wrestling as dictated by the head coach. They were also required to maintain uniform body mass during the entire eight weeks, as per weight bracket allowance during the competitive season. Before and after supplementation, subjects performed a 400 m sprint and 90 degree flexed-arm hang to exhaustion. Immediately prior to and following the pre treatment and post treatment 400 m sprint, subjects blood lactate was taken via finger stick and analyzed to determine lactate increase during the 400 m sprint.
**Results:** The subjects showed significant decrease ($p < 0.01$) in 400 m sprint time (–3.5 s ± 2.4 s, mean ± SD) and significant increase ($p < 0.01$) in 90 degree flexed-arm hang (+ 8.5 s ± 8.35 s, mean ± SD). No significant changes ($p > 0.05$) in blood lactate values were observed.

**Conclusion:** The results of our study suggest that supplementation of β-ala may improve exercise performance in wrestlers during a competitive season. Because of the design of this experiment, it is impossible to identify exactly how much of the positive effects experienced by the subjects was a direct result of the supplementation. However, due to the large increase in performance and the similarity of results in comparison to other β-ala studies, we feel our study suggests efficacy of β-ala supplementation. The ergogenic effects of β-ala supplementation during a competitive wrestling season needs to be confirmed in placebo-controlled trials.

**Acknowledgements**
Athletic Edge Nutrition donated the products and ~150 US dollars for lactate measurements. No other funding was received. The mention of any dietary supplement ingredient in this paper does not constitute an endorsement by the authors.

## P3
## Improving mental regeneration after physical exercise

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**Background:** Nutritional interventions to improve physical regeneration after exercise are usual practice among recreational and professional athletes. Frequent strategies include rehydration, in addition to supplementation with macronutrients to replenish depleted glycogen stores, or to support muscle growth and/or maintenance. Physically challenging exercise results in a significant activation of brain activity and no nutritional strategies have yet been developed to improve mental regeneration after exercise. L-Theanine, an amino acid found in green tea leaves, might be able to improve mental regeneration since it has been linked to reducing mental stress and having relaxing effects. A randomized, double-blind, placebo-controlled, crossover study was performed to evaluate the effects of 50 or 200 mg L-theanine supplementation on mental regeneration and hormonal response to physical exercise.

**Methods:** The individual working capacity of 14 healthy male subjects (age 24.5 +/– 2.4 years, height 181.2 +/– 4.9 cm, weight 78.8 +/– 9.7 kg) was evaluated in a pretest using a bicycle ergometer test. Starting at 50 Watt, the workload increased every 3 minutes until exhaustion. The maximal individual workload (mean 357 +/– 47 Watt) that could be maintained for 3 minutes in the pretest was used as the upper limited during a 16-minute exercise. One hour after a standardized breakfast (395 kcal, 50 g carbohydrates, 18.4 g fat, 7.6 protein) exercise started at 20% of the maximal individual workload. The intensity was gradually increased every 3 minutes, with the fifth interval (maximum workload) lasting 4 minutes. Thirty minutes after the start of exercise the subjects received a 330 ml beverage containing 50 or 200 mg of L-theanine or placebo. The subjects recovered passively lying in a shaded room and topographical frequency spectrum electroencephalography (EEG) mapping, heart rate, blood pressure, leukocytes, blood glucose and stress hormone levels were measured one minute after workout and 30, 45, 60 and 120 minutes after the consumption of the beverage. The three tests were separated by one week each.

**Results:** Analysis of alpha-, beta- and delta frequencies showed dominating high frequencies bands and high activity immediately after exercise. A shift to lower frequencies and a decrease in power were observed during the recovery phase. L-Theanine supplementation did not change the natural down regulation pattern; however, it resulted in an earlier onset of mental regeneration in comparison to placebo. Fifty mg L-theanine resulted in a significant reduction of alpha 2 power already 30 minutes after the consumption of the beverage (–50%, –19% with placebo), and continued to show improvements over placebo at later measurements (45 min: –49%, –39% with placebo). Supplementation with 200 mg L-theanine demonstrated no additional benefit. Exercise resulted in increased levels of leukocytes, blood glucose, catecholamines, serotonin and dopamine directly after workout, and increased concentrations of cortisol and prolactin at 44 and 59 minutes after exercise. All blood parameters returned to normal values after 2 hours of recovery. Maximal mean heart rate (186 +/– 9 bpm) and blood pressure quickly returned to resting values after exercise. MANOVA (level of significance $p < 0.05$) showed significant changes with time of any blood parameter, however, showed no differences between the different treatment groups.

**Conclusion:** It is concluded that post-workout supplementation of 50 mg L-theanine accelerates mental regeneration after physical exercise. The effect is not based on hormonal changes and higher amounts of L-theanine do not result in additional benefits.

**Acknowledgements**
The authors would like to thank Taiyo Kagaku Japan, for funding this research.

## P4
## The effect of Russian Tarragon (*artemisia dracunculus* L.) on the plasma creatine concentration with creatine monohydrate administration

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**Background:** It has previously been shown that the plasma concentration of creatine following supplementation is influenced by extracellular concentrations of insulin and glucose, the

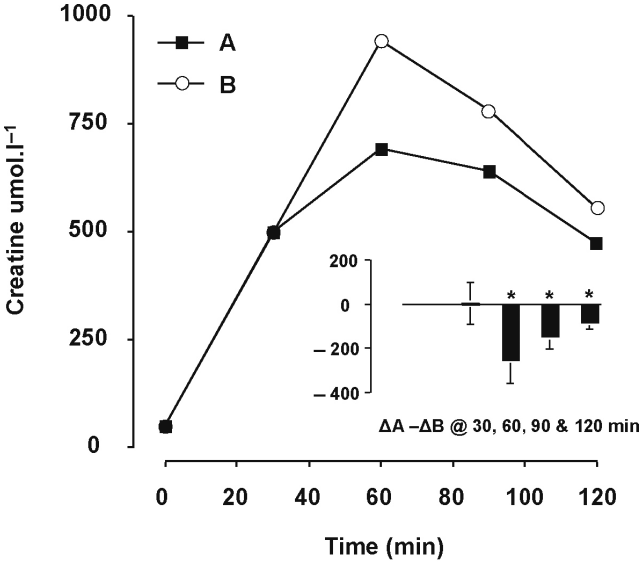
form in which creatine is administered, and also the creatine concentration in the muscle cells. The common practice of raising insulin levels to increase initial uptake into muscle, by means of high amounts of glucose and/or protein, involves a high caloric load which is not always desired by athletes. A standardized extract of Russian Tarragon (*Artemisia dracunculus* L.), which can be administered safely as an oral supplement, has been shown to have antihyperglycemic activity. This study examined whether the plasma concentration curve following administration of creatine monohydrate was affected by the co-administration of Russian Tarragon extract.

**Methods:** Eleven healthy male subjects (20.4 +/– 1.5 yrs, 180.0 +/– 7.2 cm) participated in the study. Each subject was assigned to ingest a single dose of 60 mg/kg bwt creatine monohydrate (Creapure™, AlzChem, Trostberg, Germany), preceded 15 minutes earlier by ingestion of 2 × 500 mg capsules of a standardized extract of *Artemisia dracunculus* L. (Finzelberg, Andernach, Germany) or placebo. Plasma creatine concentrations, determined over two hours following ingestion, were analyzed by repeated measures ANOVA.

**Results:** Russian tarragon administration resulted in a significant reduction of plasma creatine levels at 60, 90 and 120 min, in comparison to placebo (Figure 1), as well as a significant reduction in the area under the plasma concentration curve (AUC). The effect of Russian Tarragon is seen as comparable with that of glucose and protein.

**Conclusion:** It was concluded that Russian Tarragon influences plasma creatine levels during the ingestion of creatine monohydrate. Further research is needed to evaluate the effects of Russian Tarragon on creatine uptake and retention in muscle.

**Figure 1 (abstract P4)**




**Plasma creatine concentrations**. Mean (SD) plasma creatine concentration (micromo/L) following administration of 60 mg/kg bwt creatine monohydrate, preceded 15 minutes earlier by ingestion of 2 × 500 mg capsules of a standardized extract of Russian Tarragon **(A)** or placebo **(B)**. The inset shows the mean differences (± SD) between treatments in the change from baseline at each time point.

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## P5

## Beta-alanine supplementation and high-intensity interval training augments metabolic adaptations and endurance performance in college-aged men

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**Background:** A randomized, double-blind, placebo-controlled study was conducted to evaluate the effects β-alanine supplementation and high-intensity interval training (HIIT) on endurance performance.

**Methods:** Forty-six college-aged men (Age: 22.2 ± 3.3 yrs, $VO_2$peak: 42.6 ± 6.2 ml·kg·min$^{-1}$, 3.3 ± 0.6 l·min$^{-1}$) volunteered to participate. In a random fashion, all subjects were placed into one of three groups: placebo (PL – 16.5 g of flavored dextrose powder per packet; n = 18), β-alanine (BA – 1.5 g β-alanine plus 15 g of flavored dextrose powder per packet; n = 18) or control (n = 10) groups. Each treatment group ingested one packet 4 times per day (total of 6 g/day) for the first 21-day adaptation phase, followed by 2 times per day (3 g/day) for the subsequent 21 days. All participants performed a continuous $VO_2$peak test on a cycle ergometer (Corval Lode, Gronigen, the Netherlands) which was further used to establish ventilatory threshold (VT), and total time to exhaustion ($VO_{2TTE}$, seconds) at pre-, mid- and post-testing. Total work done (TWD) was also measured, calculated from the total time (T; seconds) completed at a workload corresponding to 110% of their maximal power output (watt, W) determined from the $VO_2$peak test [TWD (kJ) = (T × W)/1000]. Following initial testing, all participants in the BA and PL groups engaged in a 3 week supplementing and training adaptation phase. Each training session in the adaptation phase consisted of 5 bouts of a 2:1 minute cycling work to rest ratio, introduced in an undulating progression starting at 90% $VO_2$peak power output and reaching 110%. The second 3 week training phase progressed, reaching intensities up to 115% of $VO_2$peak. Body composition was assessed using air displacement plethysmography (Bod Pod®) at pre- mid- and post-testing. Separate one-way analyses of covariance were used to identify and group (BA vs. PL. vs. CON) × time (Mid- vs. Post-) interactions, adjusting mean post-test values for differences in the mid-test scores, due to the supplementing and training adaptation phase.

**Results:** There was a significant difference among all post-test GXT variables ($VO_2$peak, $VO_{2TTE}$, and VT) and TWD, after adjusting for the mid-test adaptation values ($p \leq 0.000$). However, there were no differences between treatment group means. Individual responses indicated a greater number of the BA participants improving in $VO_2$peak (83%) and $VO_{2TTE}$ (72%) performance over the PL group (61% and 56%, respectively). Furthermore, bonferroni-corrected post-hoc pairwise comparisons indicated the significant increases in TWD were greater for

the BA group than the CON ($p = 0.029$). There were no significant changes in body composition following training and supplementing.

**Conclusion:** Three weeks of combined β-alanine supplementation and HIIT, following a 21-day β-alanine loading and HIIT adaptation phase, significantly improves aerobic performance. The improvements in performance may be attributed to a greater reliance on aerobic metabolism due to chronic adaptations to HIIT, in combination with an improved muscle buffering capacity as a result of an increase in intramuscular carnosine levels.

**Acknowledgements**

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## P6
## Effects of a pre- and post-exercise whey protein supplement on recovery from an acute resistance training session

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**Background:** The purpose of this study was to examine the efficacy of pre- and post-exercise whey protein ingestion on recovery from an acute resistance training session.

**Methods:** Fifteen male strength/power athletes volunteered to participate in this study. Subjects were randomly divided into a supplement (S; n = 7, 19.7 ± 1.5 y, 185.4 ± 3.9 cm, 96.4 ± 11.9 kg) or a placebo (P; n = 8, 20.0 ± 1.1 y, 176.7 ± 8.5 cm, 85.8 ± 12.0 kg) group. Subjects reported to the Human Performance Laboratory (HPL) on four separate occasions. On the first visit subjects were tested for maximal strength (1-RM) on the squat exercise. On their second visit (T2) subjects performed a lower body resistance exercise training session that consisted of four sets of the squat, dead lift and barbell lunge exercises. The rest interval between each set was 90 seconds. Each set was performed with 80% of the subject's previously measured 1-RM. Subjects were required to perform no more than 10 repetitions for each set. The supplement (42 g of whey protein; marketed as New Whey Liquid Protein by IDS Sports, Oviedo, FL) or placebo (maltodextrin) was consumed 10 min prior to the exercise session and 15 min following the workout. Subjects then reported back to the HPL 24-(T3) and 48-hours (T4) post-exercise. During these visits subjects performed four sets of the squat exercise, using the same loading pattern and rest interval. Similar to T2, subjects consumed either the supplement or placebo before and 15 min following the exercise session. Lower body power during each squat protocol was measured with a Tendo™ Power Output unit, which consists of a transducer attached to the end of the barbell measuring linear displacement and time. Both peak and mean power was recorded for each repetition.

**Results:** No difference was seen in the 1-RM between S (153.6 ± 23.0 kg) and P (152.8 ± 22.2 kg), and no differences were seen between the groups in the number of repetitions performed in the squat exercise during T2 (33.3 ± 6.0 and 33.8 ± 7.4, respectively). During T3, subjects in P performed 9.5 ± 5.5 repetitions less than on T2, whereas subjects in S performed 3.3 ± 3.6 repetitions less than on T2. This difference was significant ($p < 0.05$). During T4, subjects in P performed 10.5 ± 8.2 repetitions less than on T2, whereas subjects in S performed 2.3 ± 2.9 repetitions less than on T2. This difference was significant ($p < 0.05$) as well. A trend ($p = 0.09$) in Δ mean power was seen between T2 and T3 between S (−47.7 ± 67.2 W) and P (−126.3 ± 167.1 W).

**Conclusion:** The results of this study indicate that subjects that consume a whey protein supplement before and after a resistance training session have a significantly greater improvement in exercise recovery 24- and 48-hours post-exercise than subjects ingesting a placebo.

**Acknowledgements**

Study was supported by IDS Sports.

## P7
## Thermogenic effect of an acute ingestion of a weight loss supplement

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**Background:** The purpose of this study was to examine the acute effect of a weight loss supplement on resting oxygen uptake ($VO_2$), respiratory quotient (RQ), caloric expenditure (kcal), heart rate (HR), and blood pressure (BP) in healthy and physically active individuals.

**Methods:** Ten subjects (5 male, 5 female; 20.2 ± 1.2 y; 172.2 ± 8.9 cm; 71.5 ± 17.2 kg; 17.3 ± 2.6% body fat) underwent two testing sessions administered in a randomized and double-blind fashion. During each session, subjects reported to the Human Performance Laboratory after at least 3-h post-absorptive state and were provided either 3 capsules of the weight loss supplement (S), commercially marketed as Meltdown® or 3 capsules of a placebo (P). Subjects then rested in a semi-recumbent position for three hours. $VO_2$ and HR were determined every 5 min during the first 30 min and every 10 min during the next 150 min. BP was determined every 15 min during the first 30 min and every 30 min thereafter. The profile of mood states was determined every 30 minutes. Area under the curve (AUC) analysis was computed for $VO_2$, whereas a 3-hour average and an average for each/hour was calculated for RQ, kcal from carbohydrate, kcal from fat, total kcal, HR and BP.

**Results:** AUC analysis revealed a significant 28.9% difference in $VO_2$ between S and P for the three-hour study period. In addition, a significant difference in energy expenditure was also seen between S (1.28 ± 0.33 kcal·min$^{-1}$) and P (1.00 ± 0.32 kcal·min$^{-1}$) during the entire three-hour study. A trend ($p = 0.06$) towards a greater utilization of stored fat as an energy source was also demonstrated (0.78 ± 0.23 kcal·min$^{-1}$ and 0.50 ± 0.38 kcal·min$^{-1}$ in S and P, respectively). Significant

elevations in heart rate were seen during hour 3 of the study, and significantly higher systolic blood pressures were observed between S (118.0 ± 7.3 mmHg) and P (111.4 ± 8.2 mmHg). No significant differences were seen in diastolic blood pressure at any time point. Analysis of mood states indicated a significant increase in tension during the supplement period compared to placebo.

**Conclusion:** Results indicate a significant increase in energy expenditure in young, healthy individuals following an acute ingestion of a weight loss supplement. In addition, ingestion of this supplement appears to stimulate increases in heart rate and blood pressure for three hours following ingestion.

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## P8
## Pre-workout consumption of Celsius® enhances the benefits of chronic exercise on body composition and cardiorespiratory fitness

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**Background:** The functional beverage Celsius®, has recently been shown, after acute and chronic (28 days) consumption, to increase resting metabolism and serum blood markers of lipolysis in healthy, college-aged men and women. The purpose of this study was to examine the combined effects of a 10-week exercise program while consuming Celsius® on body composition and cardiorespiratory fitness changes in sedentary men and women.

**Methods:** In a double-blind, placebo-controlled design, sedentary men (n = 20) and women (n = 18) were randomly assigned to identically-tasting treatment (Celsius®; age 27 ± 1.6 yrs, men n = 10; women n = 8) or placebo (PL; 24.7 ± 1.4 yrs, men n = 10; women n = 10) beverages. Both groups participated in a 10-week exercise program under the supervision of a certified trainer. The endurance and resistance training program was established using the American College of Sports Medicine guidelines for apparently healthy adults. Prior to each workout (15 min), participants consumed Celsius® or PL. Additionally, on non-training days, participants consumed the same beverage *ad libitum*. Changes in fat mass (FM), and fat-free mass (FFM) were assessed using a five-compartment model, which included body volume, bone mineral content, soft tissue mineral, and total body water measurements. Changes in cardiorespiratory fitness ($VO_{2peak}$), and time-to-exhaustion (TTE) were assessed using a metabolic cart during a graded exercise test on a calibrated, electronically-braked cycle ergometer.

**Results:** A two-way ANOVA [group (Celsius® vs. PL) × time (pre vs. post)] resulted in a significant interaction for FM ($F = 5.452$, $P < 0.05$), $VO_{2peak}$ ($F = 20.63$, $P < 0.01$), and TTE ($F = 10.453$, $P < 0.01$). Post-Hoc analysis revealed significantly ($P < 0.05$) greater changes in Celsius® versus PL for FM (–6.6% vs. –0.35%), $VO_{2peak}$ (+13.8% vs. 5.4%), and TTE (+19.7% vs. 14.0%). In addition, there was a main effect for time for FFM ($F = 12.57$, $P < 0.01$). While no significant difference resulted between the treatment groups, only the Celsius® group experienced a significant increase in FFM from pre to post (+2.0%; $P < 0.01$) versus PL group (+1.0%, $P > 0.05$).

**Conclusion:** Our data suggest that consuming a single serving of Celsius® prior to working out may enhance the positive adaptations of chronic exercise on body composition and cardiorespiratory fitness and endurance performance in sedentary men and women.

**Acknowledgements**
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## P9
## Vitamin and mineral supplements: a survey of knowledge, attitudes and behaviors among Southern Utah University students, faculty and staff

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**Background:** This study was performed to evaluate the knowledge, attitudes, and behaviors of students, faculty, and staff of Southern Utah University related to vitamin and mineral supplementation.

**Methods:** An anonymous pencil-paper survey was administered on the campus of Southern Utah University (SUU). The survey was administered to 10% of SUU students (n = 604) during general education class time and was mailed through campus mail to 33.6% of full-time staff (n = 152) and full-time faculty members (n = 81) who were selected using a table of random numbers. The survey included questions regarding knowledge about, attitudes toward, and behaviors related to the use of vitamin and/or mineral supplements. Impact of gender, body mass index (BMI), level of education, age, and physical activity were examined since previous research has shown them to be related to vitamin and mineral supplement use. Approval from the SUU Institutional Review Board was obtained prior to administration of the survey. SPSS 13.0 for Windows was used for data analysis. Pearson chi square and frequencies were computed.

**Results:** Fifty seven percent of the mailed surveys were returned which resulted in a total of 736 subjects (604 students, 85 staff, 47 faculty; 42.4% male, 57.6% female). Chi square tests revealed a significant difference between status (student, staff or faculty) and three of the four knowledge questions ($p < 0.05$); status and desire for more knowledge a propos vitamin/mineral supplements ($p = 0.029$); and status and use of calcium ($p < 0.001$), magnesium ($p = 0.003$), vitamin E ($p < 0.001$), and multivitamin ($p = 0.008$) supplements. Women were more likely to take folate supplements than men ($p = 0.002$), and women over the age of 45 were more likely to be taking a folate supplement ($p = 0.008$) and/or a multivitamin ($p = 0.001$) than women under the age of 45. Analysis revealed a significant difference between the use of vitamin/mineral supplements based

on age ($p < 0.001$) and between age and two of the four of the knowledge questions ($p < 0.05$). Women were more likely to use supplements than men ($p = 0.004$) and individuals who exercise more frequently were more likely to take vitamin/mineral supplements ($p = 0.031$). BMI and level of education were not significantly related to vitamin/mineral supplement use.
**Conclusion:** The data support conclusions of previous studies showing that age, gender, and physical activity are related to vitamin/mineral supplement use. They also indicate that there is a lack of knowledge regarding vitamin and mineral supplements, and that a desire to receive more information about vitamin/mineral supplementation exists in this population. In the future, an effort can be made to provide information to this population about vitamin/mineral supplements.

## P10
## The effects of Amped Up on hemodynamic function and energy expenditure at rest

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**Background:** The purpose of this study was to examine the effects of MET-Rx® Xtreme Amped Up on resting energy expenditure and hemodynamic variables in a randomized double blind placebo controlled study.
**Methods:** Eight male (23.0 ± 3.70 years, 210.69 ± 36.17 lbs, 71.81 ± 3.10 in) and ten female (23.6 ± 4.81 years, 147.95 ± 12.63 lbs, 67.88 ± 4.06 in) apparently healthy, physically active individuals participated in this study. Participants reported to the lab on a 10-hour fast and performed baseline testing on resting energy expenditure (REE), heart rate, and blood pressure. Subjects were then randomly assigned to ingest either Amped Up (3 capsules) or vitamin E (3 capsules). Criterion variables were then measured at 1-hour, 2-hour, and 3-hours post ingestion. Data was analyzed by two-factor (group × time point) ANOVA using SPSS version 16. Scheffe LSD post hoc was used to show differences in time points.
**Results:** Amped Up supplementation resulted in a significant interaction ($p < 0.01$) in resting energy expenditure (REE) when compared to placebo. Post Hoc analysis revealed that there was no significant difference ($p > 0.05$) between groups at baseline, but Amped Up was significantly higher ($p < 0.01$) than placebo at 1 hr post, 2 hr post, and 3 hr post, with the 2 hr post time point seeing the greatest change. Amped Up group increased energy expenditure by 326 kcal at the two-hour time point. The Amped Up group experienced an overall increase in REE by 17.3%, 19.6%, and 15.3% at the 1, 2, and 3-hour time points respectively. Conversely, the placebo group experienced a reduction in REE by 2.5%, 1.8%, and 0.3% at the same time points. There was no significant change in heart rate ($p = 0.88$), systolic blood pressure ($p = 0.73$), or diastolic blood pressure ($p = 0.44$).
**Conclusion:** It is concluded that Amped Up has a significant impact on resting energy expenditure in an acute fashion. Taken on a daily basis this could increase overall energy expenditure. Caloric expenditure significantly increased at all three time points in the Amped Up group while placebo group demonstrated decreases in energy expenditure at each time point.

**Acknowledgements**
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## P11
## Effects of Torabolic supplementation on strength and body composition during an 8-week resistance training program

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**Background:** Torabolic is a highly purified unique molecule extracted from Fenugreek (*Trigonella Foenun greacum*) seeds. Torabolic is a proprietary patent pending molecule of Indus Biotech. The purpose of this study was to evaluate the effects of Torabolic supplementation on strength and body composition.
**Methods:** 49 Resistance trained men were matched according to fat free mass and randomly assigned to ingest in a double blind manner capsules containing 500 mg of a placebo (N = 23, 20 ± 1.9 years, 178 ± 6.3 cm, 85 ± 12.7 kg, 17 ± 5.6 %BF) or TORABOLIC (N = 26, 21 ± 2.8 years, 178 ± 6 cm, 90 ± 18.2 kg, 19.3 ± 8.4 %BF). Subjects participated in a supervised 4-day per week periodized resistance-training program split into two upper and two lower extremity workouts per week for a total of 8-weeks. At 0, 4, and 8-weeks, subjects underwent hydrodensiometery body composition, 1 RM strength, muscle endurance, and anaerobic capacity determined. Data were analyzed using repeated measures ANOVA and are presented as mean ± SD changes from baseline after 60-days.
**Results:** No significant differences ($p > 0.05$) between groups were noted for training volume. Significant group × time interaction effects were observed among groups in changes in body fat (TOR: –2.3 ± 1.4%BF; PL: –0.39 ± 1.6 %BF, $p < 0.001$), leg press 1 RM (TOR: 84.6 ± 36.2 kg; PL: 48 ± 29.5 kg, $p < 0.001$), and bench press 1 RM (TOR: 9.1 ± 6.9 kg; PL: 4.3 ± 5.6 kg, $p = 0.01$). No significant interaction was observed among groups for Wingate power analysis ($p = 0.95$) or muscular endurance on bench press ($p = 0.87$) or leg press ($p = 0.61$). In addition there were no changes among groups in any clinical safety data including lipid panel, liver function, kidney function, and/or CBC panel ($p > 0.05$).
**Conclusion:** It is concluded that 500 mg of Torabolic supplementation had a significant impact on both upper- and lower body strength and body composition in comparison to placebo in a double blind controlled trial. These changes were obtained with no clinical side effects. We conclude that in

addition to a structured resistance training program, Torabolic can significantly increase strength and muscle mass.

**Acknowledgements**
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## P12
## Relationship of various body composition parameters used for predicting $VO_{2max}$

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**Background:** Forty-six male and twenty-eight female university students (n = 74), ages 18–32 (21.41 +/– 2.54) volunteered to participate in a study examining the relationship of various body parameters used for predicting aerobic power ($VO_{2max}$).
**Methods:** Participants performed a graded exercise treadmill test measuring $VO_{2max}$ as well as a 6-minute walk test within 1 week of each other. Height, weight, self-report of physical activity (PARS), body mass index (BMI), and estimated percent body fat (skinfold and bioelectrical impedance analysis) were also measured including the recording of participant demographics.
**Results:** Using multiple linear regression, a model was produced where significant predictors of $VO_{2max}$ ($p < 0.05$) included estimated body fat percentage from sum of three skinfolds ($p < .001$) and BMI ($p = .024$). The generalized equation ($R = .741$, $R^2 = .549$, *SEE* = 7.10) derived from the model to predict $VO_{2max}$ was: 72.32 + (–.949 × %fat from skinfolds) – (.392 × BMI). Variables excluded ($p > 0.05$) from the model included 6-minute walk test time, PARS, height, weight, gender, age, and percent body fat from bioelectrical impedance analysis.
**Conclusion:** It was concluded that that percent body fat and BMI are significant predictors of $VO_{2max}$. Although the relationship between $VO_{2max}$ and the other variables examined in this study were not significant, it may have been due to the homogeneity of these parameters (e.g., age and activity levels) in the participants and the lack of the 6-minute walk test to discriminate among fitness levels in university students. However, these results demonstrate the importance of the relationship between BMI and percent body fat (estimated from skinfolds) in predicting $VO_{2max}$ without maximal testing.

## P13
## Comparing two sports drinks effects on indices of aerobic performance

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**Background:** The purpose of this study was to compare the effects of a pre-exercise drink (PRX1) called EM·PACT® to Gatorade® (PRX2) on indices of aerobic performance. A previous study had indicated that ingestion of PRX1 significantly enhanced aerobic performance when compared to a water placebo.
**Methods:** Twenty-two males (n = 13) and females (n = 9) ages 20–36 years (23.68 +/– 3.91), volunteered as subjects. Each subject performed two $VO_{2max}$ treadmill tests within two weeks of each other. Administration of the trials was double-blinded and randomized with half of the participants ingesting PRX1 during the first trial and PRX2 during their second trial with the product order being reversed for the other subjects performing both exercise trials. In this crossover design, each subject ingested the PRX1 or PRX2 exactly 20 minutes before each exercise bout. $VO_{2max}$, maximal heart rate (HR), time to exhaustion (Time), respiratory exchange ratio (RER), and fat substrate utilization (%), during graded exercise testing were evaluated.
**Results:** Using repeated measures ANOVA, results indicated significant mean differences in $VO_{2max}$ (ml.kg–1.min–1) between PRX1 (50.65 +/– 8.27) and PRX2 (49.18 +/– 8.15) trials for the total group ($p = 0.036$), but not among gender ($p > .05$). No significant mean differences in maximal Time (minutes) to exhaustion or HR (beats.min–1) were found between the PRX1 (11.65 +/– 1.57; 186.41 +/– 9.03) and PRX2 (11.54 +/– 1.65; 185.36 +/– 11.03) trials respectively for all subjects as well as for gender ($p > .05$). Significant mean differences in maximal RER were found between the PRX1 (1.19 +/– .071) and PRX2 (1.21 +/– 0.053) trials for all subjects ($p = 0.026$), but not for gender ($p > 0.05$). Significant mean differences in percent fat substrate utilization were found between PRX1 (61.06 +/– 22.05) and PRX2 (54.62 +/– 22.14) in stage 1 (3 minutes) and in stage 2 (6 minutes), PRX1 (31.20 +/–17.89) and PRX2 (22.78 +/– 16.88) for all subjects ($p < 0.05$), but not for gender ($p > 0.05$) in the treadmill protocol used for this study.
**Conclusion:** Differences in overall time to exhaustion as well as gender specific values for each variable were not significantly different between the two exercise trials, however; during aerobic exercise bouts, the combined results of this investigation may provide meaningful practical applications for coaches and athletes alike regarding ergogenic hydration options.

**Acknowledgements**
The authors would like to thank Mannatech Incorporated, Coppell, TX 75019, USA, for product funding for this investigation. The researchers in this study independently collected, analyzed, and interpreted the results from this study and have no financial interests in the results of this study. Dissemination of the results in this study does not constitute endorsement by the researchers or their institutional affiliations.

## P14
## Does prior exercise affect oral glucose tolerance test results?

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**Background:** When oral glucose tolerance tests (OGTT) are repeated in individuals, relatively large variations in the magnitude of the blood glucose response often occur from one measurement occasion to another. Little is known about what causes this within-subject variability. One potential contributor may be the subject's prior extent of physical activity and/or the amount of stored glycogen present at the time of the OGTT. This research tested the effect of a bout of exercise (of the type known to significantly deplete muscle glycogen) performed within 24 hours prior to an OGTT on blood glucose and insulin responses.
**Methods:** Ten male endurance athletes underwent an OGTT without prior exercise on one occasion (no-Ex) and after a glycogen-depleting bout of exercise the day prior to testing on another occasion (post-Ex). Venous blood was sampled at standard intervals (0, 15, 30, 45, 60, 90, and 120 minutes) following consumption of an OGTT beverage containing 50 grams of glucose. Capillary blood samples also were taken at the same intervals by finger stick to simulate the standard protocol used for glycemic index (GI) measurement. Venous and capillary blood samples were analyzed for glucose. Venous samples also were analyzed for serum insulin concentration. Glucose and insulin areas under the curve (AUC) were calculated.
**Results:** Within each group, mean glucose AUC measured in capillary blood did not differ from that measured in venous blood. Also, there was no significant difference in capillary glucose AUC between the no-Ex and post-Ex conditions (mean +/– SD: 3364 +/– 1557 and 4318 +/– 1701 mg·min/dL, respectively; $P = 0.10$). However, insulin AUC values were significantly lower on post-Ex days ($P = 0.03$). When insulin levels were held constant (statistically), the mean glucose AUC levels were significantly greater the day after exercise ($P = 0.03$). The range of glycemic response among these athletes was substantial, with 2-hour capillary glucose AUC ranging from 845 to 5010 and 1348 to 6480 mg·min/dL in the no-Ex and post-Ex conditions, respectively.
**Conclusion:** Based on this evaluation of ten male endurance athletes, performing a glycogen-depleting type of endurance exercise bout the day before an OGTT results in a blunted insulin response and a tendency toward a greater glycemic response. Ideally, the extent of exercise performed the day before an OGTT should be held constant when repeated glycemic response measurements are taken for purposes such as GI testing.

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## P15
## Acute supplementation with alpha-glycerylphosphorylcholine augments growth hormone response to, and peak force production during, resistance exercise

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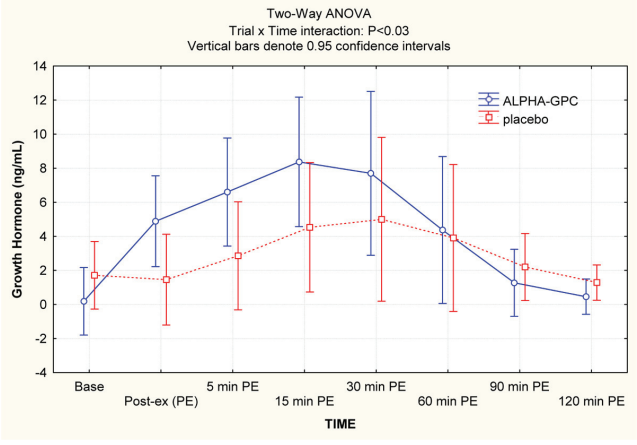
**Background:** Many of the positive adaptations resulting from resistance exercise training (i.e., increased muscle mass and strength, decreased fat mass) are thought to be mediated, in part, by exercise-induced increases in growth hormone (GH). One ingredient that has shown clinical promise in elevating GH is the acetylcholine precursor alpha-glycerylphosphorylcholine (A-GPC). The purpose of this study was to examine the effects of a supplement containing primarily A-GPC on serum GH levels, explosive performance, and post-exercise substrate oxidation.
**Methods:** Using a randomized, placebo-controlled, crossover design, seven men (mean ± SD age, height, weight, body fat: 30.1 ± 7.3 y, 179.2 ± 7.4 cm, 87.3 ± 11.6 kg, 18.1 ± 5.9%) with at least two years of resistance training experience ingested 600 mg A-GPC (as AlphaSize™) or a placebo 90-minutes prior to completing 6 sets × 10 repetitions of Smith Machine squats at 70% of their pre-determined 1-repetition maximum. At 30-minutes post-exercise, resting metabolic rate (RMR) and respiratory exchange ratio (RER) were measured with indirect calorimetry to assess post-exercise caloric expenditure and carbohydrate and fat oxidation, respectively. Immediately following RMR and RER measurements, subjects performed three sets of bench press throws at 50% of their pre-determined 1-repetition maximum to assess peak force, peak power, and rate of force development. All trials were performed after an overnight fast, a 48-hour abstention from intense exercise, and during the same time of day to minimize diurnal variation. Serum samples were obtained prior to exercise and again 0, 5, 15, 30, 60, 90 and 120 minutes post-exercise. Hormone concentrations were analyzed in duplicate by Quest Diagnostics® via immunoassay. Statistical evaluation of the data was accomplished using dependent t-tests (peak force, peak power, rate of force development) and repeated measures ANOVA (GH, RMR, RER). Differences were considered "significant" at $P \leq 0.05$.
**Results:** Compared to baseline (pre) values, peak GH increased 44-fold during A-GPC (from 0.19 ± 0.06 to 8.4 ± 2.1 ng/mL) vs. 2.6-fold during placebo (from 1.9 ± 0.8 to 5.0 ± 4.8 ng/mL, $P < 0.03$) (Figure 1). Peak bench press force was 14% greater in

**Figure 1 (abstract P15)**



A-GPC (933 ± 89 N) vs. placebo (818 ± 77 N, P < 0.02). Trends toward higher peak bench press power (P < 0.13) and lower post-exercise RER (P < 0.12) were noted in the A-GPC trial.

**Conclusion:** These data indicate that a single 600 mg dose of A-GPC (as AlphaSize™), when administered 90 minutes prior to resistance exercise, increases post-exercise serum GH and peak bench press force. In contrast, A-GPC had no statistically significant effect on peak power, rate of force development, RMR, or cardiovascular hemodynamics (i.e., heart rate and blood pressure). Future work should examine how resistance exercise + A-GPC affect the GH-IGF axis and their associated family of binding proteins.

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## P16
## Effect of a supplement containing primarily beta alanine, arginine, creatine malate, and glycerol monostearate on exercise-induced changes in lean mass of the arms

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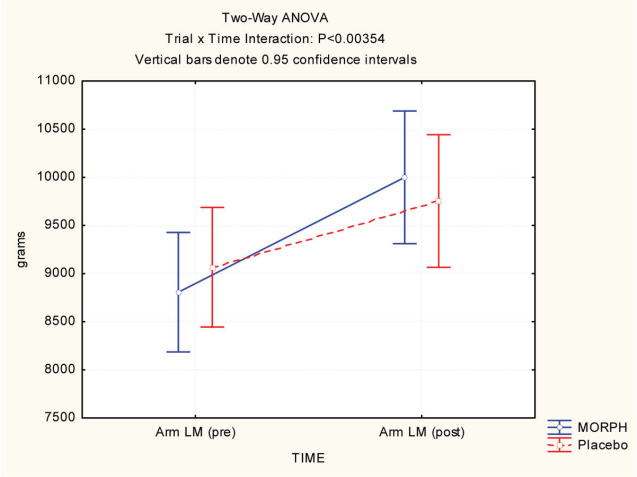
**Background:** The purpose of this study was to determine the effect of acute ingestion of a supplement containing primarily beta alanine, arginine, creatine malate, and glycerol monostearate (MORPH™) on exercise-induced changes in lean mass of the arms.

**Methods:** Using a randomized, placebo-controlled, double-blind, crossover design, eight healthy men (mean ± SD age, height, weight: 23.6 ± 3.0 y, 180.3 ± 6.9 cm, 81.8 ± 6.9 kg,) were randomly assigned to ingest one serving of MORPH™, and on a separate day placebo, along with 12 ounces of water. Verification of ingredient purity and potency by an external laboratory is pending. Thirty minutes after consumption, subjects completed a standardized workout for the elbow flexors and extensors (i.e., six sets × 12–15 reps of biceps curls alternated with six sets × 12–15 reps of lying triceps extensions). Weight loads, rest periods between sets, and tempo of execution were tightly controlled from trial to trial. Body composition was measured with dual-energy x-ray absorptiometry (DEXA) prior to supplementation and immediately following the final set of resistance exercise. Twenty-four hours before each trial, subjects were required to refrain from exercise and follow a standardized diet. Data were analyzed via ANOVA and statistical significance was accepted at P ≤ 0.05.

**Results:** Acute resistance exercise increased the lean mass (LM) of the arms in both trials (MORPH™: +13.5%; 8807 ± 824 [baseline] to 9999 ± 954 grams [post], placebo: +7.6%; 9066 ± 813 [baseline] to 9753 ± 860 grams [post], P < 0.004), but the increase was significantly greater in MORPH™ (P < 0.003) (Figure 1). In contrast, no statistically significant interactions were noted for fat mass or systemic hemodynamics (heart rate, systolic or diastolic blood pressure).

**Figure 1 (abstract P16)**




**Conclusion:** Within the framework of the current experimental design, these preliminary data indicate that acute supplementation with a product containing primarily beta alanine, arginine, creatine malate and glycerol monostearate (MORPH™) augments resistance exercise-induced increase in lean mass of the arms without negatively affecting systemic hemodynamics. Future studies should confirm and refine these results in a larger sample size, determine the effects of daily supplementation with MORPH™ on body composition and performance during prolonged (i.e., 4–8 weeks) resistance training, and clarify the mechanisms by which this multi-ingredient product exerts these effects.

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## P17
## Four weeks of supplementation with a multi-nutrient product increases lean mass and muscular performance in resistance trained men

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**Background:** The purpose of this study was to determine the effects of a multi-nutrient supplement (SuperPump 250™ [SP250]) on muscular strength, muscular endurance, and body composition during four weeks of intense resistance training.

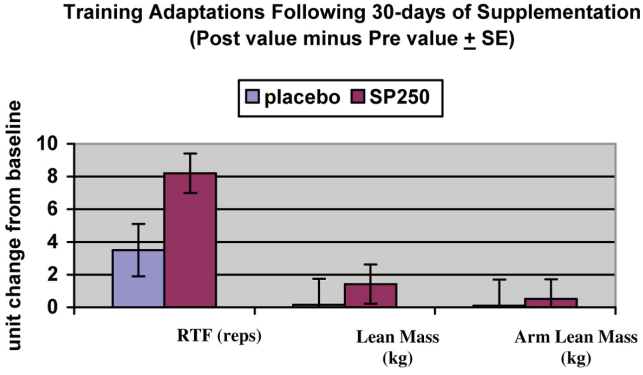
**Methods:** Using a randomized, double-blind design, 30 healthy men (mean ± SD age, height, weight, % body fat: 25.7 ± 6.7 y, 178.0 ± 6.4 cm, 84.4 ± 10.7 kg, 18.9 ± 7.0%) were matched for age, resistance training history, daily caffeine intake, weekly meat

consumption, bench press strength, bench press endurance, and percent body fat and then randomly assigned to ingest 2–3 scoops per day of SP250 or placebo for one month. Body composition (DEXA), muscular performance (1-RM bench press and repetitions to failure [RTF: 3 sets × baseline body weight, 60-sec rest between sets]), and clinical blood chemistries were measured at baseline and after four weeks of supplementation and training. Subjects were required to maintain their normal dietary habits and follow a specific, progressive overload resistance training program (4-d/wk, upper body/lower body split) during the study. Data were analyzed via repeated-measures ANOVA and (where necessary) Fisher LSD post-hoc tests. Statistical significance was set *a priori* at $p \leq 0.05$.

**Results:** Significant between group differences over time were noted in: RTF (SP250: +28.2%; 29.1 ± 15.8 [wk 0] to 37.3.0 ± 20.0 reps [wk 4] vs. placebo: +12.0%; 29.1 ± 12.1 [wk 0] to 32.6 ± 12.1 reps [wk 4], $P < 0.04$), lean mass (SP250: +2.1%; 66.58 ± 8.57 [wk 0] to 68.00 ± 9.16 kg [wk 4] vs. placebo: +0.3%; 59.93 ± 3.62 [wk 0] to 60.08 ± 3.94 kg [wk 4], $P < 0.01$), upper extremity lean mass (SP250: +5.5%; 9.27 ± 2.34 [wk 0] to 9.78 ± 2.62 kg [wk 4] vs. placebo: +0.3%; 7.88 ± 1.27 [wk 0] to 7.90 ± 1.51 kg [wk 4], $P < 0.03$), and % body fat (SP250: –0.9%; 22.8 ± 8.2 [wk 0] to 21.9 ± 8.4% [wk 4] vs. placebo: +0.9%; 20.0 ± 6.6 [wk 0] to 20.9 ± 7.7% [wk 4], $P < 0.04$) (Figure 1). Both groups had significant (~6%) increases in 1-RM bench press from wk 0 to wk 4, however, no between-group differences were noted ($P < 0.30$). No changes in systemic hemodynamics (heart rate, systolic and diastolic blood pressures) or clinical blood chemistries (glucose, blood urea nitrogen, creatinine, sodium, potassium, serum protein, albumin, globulin, A:G ratio, bilirubin, alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, total cholesterol, HDL-cholesterol, triacylglycerol, VLDL-cholesterol, LDL-cholesterol) were noted between groups over time.

**Conclusion:** These preliminary data indicate that SP250 administration enhances gains in muscular performance and lean mass, and also leads to a small, but statistically significant reduction in body fat during four weeks of intense resistance training. Future studies should confirm these results and clarify the molecular mechanisms by which SP250 exerts the observed salutary effects.

**Figure 1 (abstract P17)**

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## P18
## The effect of caffeine ingestion on perception of muscle pain during a sustained submaximal isometric contraction of the quadriceps

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**Background:** The purpose of this study was to determine the effects of an acute dose of 5 mg/kg of caffeine on perceived pain of the quadriceps during a sustained submaximal isometric contraction.

**Methods:** A total of 15 low caffeine consuming college aged women (20.5 ± 1.4 y, 66.0 ± 9.0 kg; mean ± SD) participated in this study. 2–7 d after a familiarization trial subjects ingested, in a double blind random crossover manner, either 5 mg/kg caffeine (Caf) or a placebo (P), 1 h prior to performing a 2 min isometric leg extension at 45% of peak torque using visual cues to maintain force production. Every 15 s subjects rated their level of pain using the Borg CR10 pain scale. Subjects returned to the lab 2–7 d later to repeat the testing with the other condition. Data were analyzed using a repeated measures ANOVA with a Tukey's HSD post hoc.

**Results:** Caffeine ingestion resulted in a lower pain score at all time points during the 2 min isometric contraction. This difference approached significance at 90 s (Caf = 3.2 ± 1.4, P = 4.1 ± 1.4; $p < 0.10$), and became significantly different at 105 s (Caf = 3.8 ± 1.2, P = 4.9 ± 1.5; $p < 0.05$) and at 120 s (Caf = 4.4 ± 1.5, P = 5.4 ± 1.5; $p < 0.05$).

**Conclusion:** Acute caffeine ingestion attenuates perception of muscle pain in the quadriceps during a sustained submaximal isometric contraction. This effect becomes more pronounced the longer the contraction is held.

## P19
## The effects of BCAA and leucine supplementation and lower-body resistance exercise on the ERK 1/2 MAPK pathway signal transduction

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**Background:** A randomized, double-blind, placebo-controlled study was performed to evaluate the effects of oral BCAA and leucine supplementation on the ERK1/2 MAP Kinase signal transduction pathway in conjunction with an acute bout of lower-body resistance exercise (RE).

**Methods:** 30 males (22.5 yrs; 81.1 kg) ingested either leucine (60 mg/kg/bw), BCAA (120 mg/kg/bw), or placebo. Supplementation was ingested at 3 time points (1/3 of the total dosage at each time point): 30 minutes prior to RE, and immediately pre- and post-RE. The subjects performed 4 sets of leg press and leg extension at 80% 1 RM to failure. Rest periods between sets and exercises were approx. 150 seconds. Muscle biopsies (via the Bergstrom technique) were obtained from the vastus lateralis at four time points: baseline and 30 min, 2 hrs, and 6 hrs post RE and sampled for MEK1 and ERK1/2 activation (via phosphoELISA kits). Participants were fasted for the duration of the investigational period. Other variables (serum markers and other skeletal muscle proteins) were analyzed as part of a larger investigation, but only MEK1 and ERK1/2 and their activation/phosphorylation state are presented here. Skeletal muscle variables (MEK1 and ERK1/2) were transformed to delta values and analyzed via a 3 (group) × 4 (time points) repeated measures MANOVA. Univariate ANOVAs (Bonferroni adjusted) were conducted as follow-up tests to the MANOVA. Post-hoc tests of the interaction effects demonstrated in the ANOVA were investigated via an independent samples T-test.

**Results:** There was a main effect for time for MEK1 at the 2 hr time point ($p = .005$). No main effect for group or a group × time interaction was observed for MEK1. Relative to ERK1/2, there were no main effects for time. A main effect for group revealed that the BCAA supplementation significantly elevated ERK1/2 activation as compared to the leucine ($p = .001$) and placebo groups ($p = .001$). A group × time interaction revealed that BCAA supplementation significantly elevated ERK1/2 activation at the 2 hr post and 6 hr post time points in comparison with the Leucine ($p = .045$) and placebo groups ($p < .001$).

**Conclusion:** BCAA supplementation increased the phosphorylation status of ERK1/2 in conjunction with RE at 2 and 6 hours post-exercise. Leucine supplementation did not have any effect on ERK1/2 activation.

## P20

## The effect of BCAA supplementation on serum insulin secretion before, during, and following a lower-body resistance exercise bout

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**Background:** Insulin and BCAA have been shown to be anabolic compounds via their augmentation of translation initiation when secreted or ingested before, during, or immediately after an acute resistance exercise (RE) bout. The purpose of this study was to determine the effect of BCAA supplementation on serum insulin secretion in conjunction with a lower body resistance exercise bout.

**Methods:** In a randomized, double blind, placebo controlled design, 20 recreationally active males (22.7 ± 3.9 yrs; 177.1 ± 7.3 cm; 83.9 ± 11.5 kg) ingested either 120 mg/kg of BCAA (n = 10) divided into 3 equal doses or a placebo (n = 10) in conjunction with a lower body RE bout. The RE bout consisted of 4 sets of leg press at 80% of 1 RM to failure followed by 4 sets of knee extension at 80% 1 RM to failure. Rest periods between sets and exercises were 150 seconds. Supplementation was administered 30 minutes prior, immediately before, and immediately following RE. Serum insulin was obtained at baseline, 30 minutes after the first supplementation administration, as well as immediately post, 30 min, 2 hr, and 6 hr post RE. Serum insulin was analyzed via ELISA (Alpha Diagnostic Intl.). Insulin data were analyzed using SPSS for Windows version 15.0. A 2 × 6 repeated measures ANOVA (mixed methods) with repeated measures on the second factor (time) was utilized.

**Results:** Data are reported as means ± SD. Serum insulin values at baseline, 30 minutes after the first supplementation administration, immediately post, 30 min, 2 hr, and 6 hr post RE were 19.2 ± 7.8, 23.0 ± 9.6, 25.3 ± 12.9, 24.8 ± 14.3, 19.0 ± 9.0, 15.8 ± 6.4 and 22.0 ± 11.1, 22.0 ± 11.6, 27.8 ± 9.6, 24.1 ± 9.3, 17.9 ± 9.4, 21.2 ± 13.5 for the BCAA and placebo groups, respectively. A main effect for time ($p < .001$) was observed, but no main effect was observed for group ($p = .730$). Furthermore, no statistically significant differences in insulin values between the BCAA and placebo groups was observed ($p = .211$).

**Conclusion:** At a dosage of 120 mg/kg of bodyweight, it appears that BCAA supplementation does not increase serum insulin values to a greater extent than an acute bout of resistance exercise alone.

## P21

## The effects of oral BCAAs and leucine supplementation combined with an acute lower-body resistance exercise on mTOR and 4E-BP1 activation in humans: preliminary findings

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**Background:** A randomized, double-blind, placebo-controlled study was performed to evaluate the effects of oral BCAA and leucine supplementation combined with an acute bout of lower extremity resistance exercise (RE) on the phosphorylation/activation states of mTOR and 4EBP1.

**Methods:** 30 fasted, recreationally trained males (22.5 yrs; 83.1 kg; 178.4 cm) consumed 120 mg/kg/bw of BCAA, 60 mg/kg/bw of leucine, or a placebo. The supplements were consumed in three equal doses at 30 minutes before RE, immediately prior to RE, and immediately post RE. The participants completed 4 sets of both leg press and knee extension at 80% of their 1 RM to failure (~8–12 reps). Rest periods of 2.5 minutes were given between both sets and exercises. Percutaneous muscle biopsies of the vastus lateralis were obtained at: baseline, and 30 minutes, 2 hours, and 6 hours post RE. The phosphorylated states of both mTOR and 4E-BP1 were assessed through the use of an ELISA with a primary antibody specific to phosphorylated mTOR [pS2448] and a phosphoELISA kit for phosphorylated 4E-BP1 [pT46], respectively. Other serum and muscle variables were analyzed as part of a greater, overall study, but only the phosphorylated mTOR and 4E-BP1 are reported in this abstract. Delta values of mTOR and 4E-BP1 were

analyzed using a 3 (group) × 4 (time) repeated measures MANOVA. Separate ANOVAs for each criterion variable were utilized as follow-up tests. Significant main effects were determined Bonferroni post-hoc tests. Significant interactions discovered in the ANOVAs were assessed by independent samples T-tests. SPSS version 15.0 was utilized throughout this analysis.

**Results:** There was no main effect for group, time or group × time interaction for phosphorylated mTOR. In regards to phosphorylated 4E-BP1, no main effect for time was observed. However, a significant group main effect for 4E-BP1 was observed ($p = 0.002$). Bonferroni post-hoc analysis demonstrated that both the BCAA group ($p = 0.002$) and the leucine group ($p = .037$) were significantly greater than the placebo group in regards to phosphorylated 4E-BP1. Additionally, a group × time interaction for 4E-BP1 was also observed. Activated 4E-BP1 was significantly greater in the BCAA group ($p = 0.001$) and leucine group ($p = .037$) at 2 hours post RE as compared to the placebo. At 6 hours post RE, 4E-BP1 activation was greater in the BCAA group as compared to both the placebo ($p = 0.022$) and leucine groups ($p = 0.041$).

**Conclusion:** Both leucine and BCAA supplementation, combined with an acute bout of lower extremity RE, led to greater levels of phosphorylated 4E-BP1, as compared to a placebo, 2 hours following RE. Furthermore, BCAA group led to significantly greater levels of activated 4E-BP1 when compared to both the placebo and leucine at 6 hours post RE. These findings suggest that the other two BCAAs (isoleucine and valine) may contribute to greater activation states of 4E-BP1 above and beyond that of leucine alone. Lastly, in the current study, neither BCAA nor leucine supplementation did not have a significant effect on the phosphorylation state of the cell signaling protein, mTOR.

## P22
## The effects of prophylactic protease supplementation on markers of muscle damage prior to and following intense eccentric exercise: preliminary findings

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**Background:** A randomized, placebo controlled trial was performed to examine the effectiveness of 24 days of supplementation with an oral protease supplement on indices of inflammation, muscle damage, and soreness before and after a downhill running bout in aerobically-active males between the ages of 18–35.

**Methods:** 20 aerobically-active (50.15 ± 6.16 ml/kg/min) male participants (22.05 ± 4.72 yr, 71.63 ± 2.51 in, 182.40 ± 26.89 lbs) consumed either a proteolytic enzyme combination (N = 10) or cellulose placebo (N = 10) for a total of 24 days. Supplement compliance was monitored via supplement logs indicating how many capsules were consumed each day during the period. During the supplement period, participants also agreed to limit consumption of antioxidant containing foods. Dietary compliance was monitored by the collection of food records for each day of the supplement period. After 21 days of supplementation, participants completed a 45-minute downhill run (60% VO2max, –17.5% grade). Participants donated blood prior to, and for 48 hours following the run (total of 6 samples). Inflammation and muscle damage were assessed by whole blood analysis, serum creatine kinase (CK), ratings of perceived muscle soreness, and via muscle strength testing of the quadriceps. Whole blood and muscle strength data were analyzed using multivariate analyses of variance (MANOVA) with repeated measures, while CK and muscle soreness were analyzed using separate one-way analyses of variance (ANOVA) with repeated measures. An alpha level of $\leq 0.05$ was adopted for significance throughout.

**Results:** Systemic circulation of eosinophils was significantly ($p < 0.001$) increased in the supplement group. No other significant differences were noted between groups for leukocytes or erythrocytes. For muscle strength, decrements to peak torque and average power following the eccentric bout were significantly attenuated ($p < 0.05$) in the supplement group. No significant differences were observed between groups for CK or perceived muscle soreness. In addition, no significant differences were observed between groups for average daily intake of calories, macronutrients, vitamin C, or vitamin E.

**Conclusion:** These results indicate that prophylactic protease supplementation prior to damaging eccentric exercise significantly attenuates decreases in skeletal muscle force production capability when compared to placebo. It appears that a systemic eosinophilia may be partially responsible for this effect. Further investigations on inflammatory mediators affected by eosinophils are needed to further elucidate the mechanisms underlying this effect.

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## P23
## Dietary protein, resistance training and health: a call for evidence

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**Background:** Purposeful intake of ample dietary protein remains controversial, as illustrated by uncertain and/or dissuasive material in introductory dietetics texts and statements by professional organizations (Lowery L and Huffman J, *Dietary Protein in Sport: Still Controversial*, ASEP National Meeting, 2008). Common health concerns include undue "stress" on renal function, bone loss, and deleterious effects on other dietary components such as fiber and saturated fat. Particularly dissuasive language has been targeted toward strength athletes.

**Methods:** In preparation for a series of studies, this investigation sought to ascertain the amount of readily accessible published research on these nutritional-physiological topics,

specific to the resistance trained population. Pub Med (Library of Medicine abstracts) searches were performed using combinations of search terms including exercise, resistance trainer (-ed, -ing), athlete, (dietary) protein, safety, renal, kidney, bone, fiber, fat and saturated fat.

**Results:** Results indicate a dearth of population-specific safety data, with zero to 30 exercise-related abstracts found, depending upon the combination of search terms. Nearly all abstracts (75 of 77) were focused upon anabolic efficacy or issues other than safety or chronic diseases. No abstracts specifically compared renal function, bone density or dietary parameters of resistance trainers with a multi-year history of ample/surplus protein consumption with their non-protein-seeking counterparts.

**Conclusion:** Results are in agreement with earlier safety assessments that "few studies have included considerations of energy intake or physical activity" (Institute of Medicine, *The Role of Protein and Amino Acids in Sustaining and Enhancing Performance*, National Academy Press, 1999). We conclude that existing safety and health concerns and the dissuasive education of resistance trainers who seek ample dietary protein appear to be based on populations who differ in renal function, bone health and potentially dietary patterns. Evidence-based practice requires valid, reproducible, population-specific evidence. Preliminary research investigating each of these concerns is currently underway at the University of Akron.

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## P24

## Effect of a combination dietary supplement product (Bounce-Back™) on the signs and symptoms of delayed onset muscle soreness after eccentric exercise: a randomized, double-blind, placebo-controlled, crossover pilot study

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**Background:** Delayed onset muscle soreness (DOMS) is muscle pain and discomfort experienced approximately one to three days after exercise and is believed to be a result of microscopic muscle fiber tears. The Bounce-Back™ product is a combination of several dietary supplement ingredients which have individually been shown to improve the inflammation and pain associated with DOMS (digestive enzymes, Bromelain, Curcumin, Vitamin C) in combination with an Avocado Soy extract and Resveratrol. The purpose of the study was to evaluate the ability of the Bounce-Back™ product to reduce the signs and symptoms of DOMS and increase the rate of muscle recovery following eccentric exercise.

**Methods:** A randomized, double-blind, placebo-controlled, crossover study was performed with 10 healthy, untrained subjects between the ages of 18 and 45. Subjects were screened for eligibility and then randomized to receive the active or placebo product for 33 days. Subjects wore the BodyMedia Armband Monitoring System during days 28–30 to track their pre-exercise activity level. Subjects returned on day 30 to undergo a standardized eccentric exercise protocol (isokinetic quadriceps squat contractions). Subjects underwent pain and tenderness (algometer) evaluations and blood draws just prior to exercise, immediately post-exercise, and again at 6, 24, 48, and 72 hours post-exercise. Subjects underwent a two-week washout, and were then crossed over to the other arm of the study. Mean differences between groups were assessed inferentially at each data collection time-point.

**Results:** Statistically significant differences were observed in favor of the Bounce-Back™ product for pain, tenderness, and amount of energy expended. Immediately post-exercise, two of the four Visual Analog Scale (VAS) pain assessments were significantly lower (0.35 v 1.0938, $p = 0.002$ and 0.3095 v. 0.8229, $p = 0.047$) in the active group. At 6 hours, one of the VAS pain assessments was lower (0.6905 v 1.1146, $p = 0.039$), and at 48 hours, the total VAS pain assessment was significantly lower (7.2857 v 13.9821, $p = 0.050$) in the active group. At 24 hours the tenderness after algometry was significantly lower (1.7245 v 2.3750, $p = 0.042$) in the active group.

Based on the BodyMedia armband data, the active group recorded significantly greater Total Energy Expenditure (710.60 v 459.50 METs, $p = 0.009$) and Measured Active Energy Expenditure (210.86 v 88.31 METs, $p = 0.000$). Serological markers of muscle damage (CPK and Myoglobin) were lower in the active group throughout the entire post-exercise period, but this difference did not reach statistical significance.

**Conclusion:** In this small pilot study, the Bounce-Back™ product resulted in a significant reduction in standardized measures of pain and tenderness post-eccentric exercise, even after engaging in significantly more activity in the two day period prior to the exercise protocol. The differences in the serological markers of DOMS, while not statistically significant, appear to support the clinical findings. Further study with a larger sample size is warranted based on the current results.

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## P25

## Effects of ingesting a thermogenic/ anti-inflammatory supplement while participating in a resistance training program on indices of body composition and metabolic, cardiovascular, muscular, and hemodynamic function in overweight females

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**Background:** Sedentary, healthy, overweight women (n = 40) participated in a full-body resistance training program 3 days/week. The study was performed in a randomized, double blind, placebo-controlled fashion.

**Methods:** Participants followed a structured, energy-restricted, low glycemic diet. Participants ingested either 250 mg of a thermogenic/anti-inflammatory supplement or a 250 mg placebo supplement. Body composition, performance variables, serum lipid variables, inflammation markers, obesity markers and GLUT4 values were obtained at week 0 and after weeks 4 and 8. Data were analyzed by repeated measures MANOVA and are presented as means ± SD. GLUT 4 values were analyzed by repeated measures ANOVA are presented as means ± SD.

**Results:** Body weight reduction was significant between weeks 0 and 8 for both groups (88.45 ± 19.33 vs. 86.26 ± 19.17, p = 0.000). BMI also had significant decreases in both groups between weeks 0 and 8 (33.21 ± 7.77 vs. 32.32 ± 7.76, p = 0.000). Fat mass decreased significantly for both groups between weeks 0 and 8 (37.88 ± 13.04 vs. 36.18 ± 12.47, p = 0.034). There was a significant decrease in waist measurements for both groups between weeks 0 and 8 in both groups (36.54 ± 5.86 vs. 35.44 ± 5.67, p = 0.000). Relative leg press strength increased in both groups between weeks 0 and 8 (2.22 ± 0.62, p = 0.000). In addition, relative bench press strength increased in both groups between week 0 and 8 (0.38 ± 0.10 vs. 0.435 ± 0.11, p = 0.000). For serum lipid values, there was a significant time effect for TCHOL, LDL, and HDL. TCHOL decreased between weeks 0 and 8 (187.51 ± 26.45 vs. 173.97 ± 28.60, p = 0.004). LDL decreased between weeks 0 and 8 (111.62 ± 22.18 vs. 104.95 ± 23.81, p = 0.048). HDL decreased between weeks 0 and 8 (56.46 ± 10.67 vs. 51.82 ± 11.52, p = 0.009). For insulin resistance markers there was a significant time effect for insulin and HOMA IR values. Insulin decreased between week 0 and 8 (257.1 ± 229.7 vs. 179.3 ± 127.7, p = 0.023). HOMA IR decreased between week 0 and 8 (2.9 ± 2.5 vs. 2.1 ± 1.4, p = 0.044). Ghrelin significantly increased in the experimental group between week 0 and 8 (480.61 ± 197.58 vs. 551.46 ± 224.81, p = 0.007). Overall leptin concentrations decreased significantly between week 0 and 8 in both groups (21367.6 ± 10954.7 vs. 16794.7 ± 10966.3, p = 0.019). There was a mild trend for a decrease in adiponectin concentrations between week 0 and 4 (11380.51 ± 5234.17 vs. 10370.94 ± 4803.42, p = 0.081). In terms of inflammation markers ILIβ were all below detectable levels. In addition, there were no significant effects for TNFα and IL6. GLUT4 data showed no significant effects. Caloric intake for both groups decreased significantly between week 0 and 8 (1820.73 ± 479.83 vs. 1279.45 ± 386.54, p = 0.000). Fat intake decreased significantly for both groups between weeks 0 and 8 (73.26 ± 21.19 vs. 43.69 ± 17.66, p = 0.000). Carbohydrate intake was reduced significantly in both groups between week 0 and 8 (222.92 ± 79.38 vs. 173.16 ± 58.23, p = 0.001). Sugar intake also decreased for both group significantly between week 0 and 8 (76.55 ± 44.49 vs. 53.48 ± 22.02, p = 0.004).

**Conclusion:** Results indicate that a full body resistance training program, in combination with an energy-restricted, low glycemic diet may help promote weight loss and strength gains.

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## P26

## A league of their own, too: motivational and age of onset comparisons between American male and female AAS users

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**Background:** Non-medical anabolic-androgenic steroid (NMAAS) use among athletes and risk-taking adolescents has monopolized media attention in recent years. Conversely, our large-scale study of almost 2000 American male NMAAS users revealed that the majority of adult were non-athletes who initiated use as adults and were not motivated by athletics. Notably, a small proportion of the sample that completed our Internet-based survey was females and it would be informative to describe differences in age of onset and motivations between male and female users.

**Methods:** U.S.-based NMAAS users (n = 1955 male & n = 37 female; about 1.85%) were recruited from various Internet websites dedicated to resistance training activities and use of ergogenic substances, mass emails, and print media to participate in a 291-item web-based survey. For this presentation, items assessing age of onset of NMAAS use and motivation for use are explored.

**Results:** Most NMAAS users did not initiate use during adolescence nor was their use motivated by athletics. The typical male and female user were Caucasian, highly-educated (female users evidenced a slightly higher prevalence of advanced degrees), gainfully employed professionals approximately 30 years of age, who were earning an above-average income, were not active in organized sports, and whose use was motivated by increases in skeletal muscle mass, strength, and physical attractiveness. In addition, female use was motivated by a desire to reduce body fat and amateur bodybuilding endeavors and a greater percentage of female users reported involvement in competitive bodybuilding. The average female began using AAS at age 29, 4–5 years after beginning weight training, and had used for a total of 5.1 years, while the average male initiated use at age 26, 5–6 years after they began weight training, and had been using for a total of 5.6 years.

**Conclusion:** Few notable gender differences emerged for age of initiation or motivations for NMAAS use. The typical female adult NMAAS user initiated use in her late 20s, slightly later than her typical male counterpart, after a similar number of years training. Although females shared most motivations with male users, they were also motivated by a desire to decrease body fat and competitive bodybuilding. Adult NMAAS users appeared to be a relatively homogeneous and high-functioning group. Hence, the focus on "cheating" athletes and at-risk youth may lead to ineffective policy as it relates to the predominant group of NMAAS users. The larger population of NMAAS users is likely to dismiss such concerns as irrelevant to their own use. Effective

policy, prevention or intervention should address the target population(s) and their reasons for use while utilizing their desire for responsible use and education.

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## P27
## Anthrpometric changes of a female bodybuilder on a high-protein, hypocaloric diet

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**Background:** Four different body fat (BF) measurement techniques, including DEXA, handheld BIA (HHBIA), multi-frequency BIA (MFBIA) and the Jackson Polluck 7 (JP7) caliper formula, were performed on a natural lightweight female bodybuilder as she prepared for national competition.
**Methods:** One 25 year old female participant utilized a hypocaloric diet and an exercise program for 15 weeks to lose body fat in preparation for the NPC Jr. Nationals bodybuilding competition. Furthermore, the participant underwent testing every three weeks to determine changes in body fat as measured by DEXA, HHBIA, MFBIA, and JP7.
**Results:** Analysis of four day food records following each testing session revealed average values of 1588 ± 116.7 kcal/day, 43.6 ± 7.3% protein, 35 ± 5.4% carbohydrates, 17.8 ± 7.98% fat throughout the testing period. Additionally, the participant lost 6.09 kg (13.4lb) and 2.5 BMI units. Furthermore both HHBIA (.935; p = .006) and JP7 (.954; p = 0.003) were significantly and positively correlated to DEXA (CI = 99%). Finally, only HHBIA BF% values were statistically different from DEXA BF% values (p = .001)
**Conclusion:** These data suggest that a high-protein, low-fat hypocaloric diet induces weight and BF loss over several weeks. Furthermore, JP7 may be best approximation of DXA BF% for this participant, since it is both significantly correlated to DEXA BF% and individual BF% values are not different than DEXA values.

## P28
## VPX Meltdown® significantly increases energy expenditure and fat oxidation without affecting hemodynamic variables in a randomized, double-blind, cross-over clinical research trial

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**Background:** The purpose of this study was to evaluate the effects of a thermogenic supplement, VPX Meltdown®, on energy expenditure, fat oxidation, and hemodynamics before and after maximal treadmill exercise.
**Methods:** In a double-blind, placebo-controlled, cross-over design, participants underwent two testing sessions after consuming either the VPX Meltdown® or placebo supplement. Healthy male participants (n = 12) aged 18–35 rested for one hour while energy expenditure (EE), respiratory exchange ratio (RER), heart rate (HR), and blood pressure (B) were assessed in a fasted state. Subsequently, participants orally ingested either supplement or placebo. Immediately following supplement administration, participants rested for another hour while EE, RER, HP, and BP were recorded. Thereafter, participants performed a maximal exercise test on a treadmill and then endured another hour of EE, RER, HR, and BP measurement.
**Results:** VPX Meltdown®, increased REE significantly more than placebo at 45 minutes (2,079 ± 373 vs. 1,847 ± 340 kcal/day; p = 0.003) and 60 minutes (2,153 ± 403 vs. 1877 ± 314 kcal/day; p = 0.025) post-ingestion. Furthermore, REE 60 minutes post-exercise (two to three hours following supplement administration) was higher in the Meltdown® group (2,179 ± 386 vs. 1,913 ± 400; p = 0.1440). Moreover, over the course of the three hour evaluation period, area under the curve assessment demonstrated that EE was significantly increased with VPX Meltdown® compared to placebo (area: 9,925 ± 1,331 vs. 8,951 ± 2,961; p = 0.043) while RER was significantly less than placebo (area: 5.55 ± 0.61 vs. 5.89 ± 0.44; p = 0.002) following ingestion. HR and BP were not significantly affected prior to exercise with either supplement (p > 0.05) and the exercise-induced increases observed in HR and BP that decreased into recovery were not different between supplements (p > 0.05).
**Conclusion:** These data suggest that VPX Meltdown® enhances EE and fat oxidation more than placebo for several hours after ingestion in fully rested and post-exercise states without any adverse hemodynamic responses.

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## P29
## Examination of a pre-exercise high energy drink on exercise performance

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**Background:** The purpose of this study was to examine the effect of a pre-exercise high energy drink on reaction time and anaerobic power in competitive strength/power athletes. In addition, the effect of the pre-exercise drink on subjective feelings of energy, fatigue, alertness and focus was also explored.
**Methods:** Twelve male strength/power athletes (21.1 ± 1.3 y; 179.8 ± 7.1 cm; 88.6 ± 12.1 kg; 17.6 ± 3.3% body fat) underwent two testing sessions administered in a randomized and double-blind fashion. During each session, subjects reported to the Human Performance Laboratory and were provided either 120 ml of a high energy drink (S), commercially marketed as Redline® or 120 ml of a placebo (P). The placebo was similar in

taste and appearance but contained no active ingredients. Following consumption of the supplement or placebo subjects rested quietly for 10-minutes prior to completing a 4-question survey and commencing exercise. The survey consisted of 4 questions asking each subject to describe their feelings of energy, fatigue, alertness and focus at that moment. Following the completion of the questionnaire subjects performed a 2-minute quickness and reaction test on the Makoto testing device (Makoto USA, Centennial CO) and a 20-second Wingate Anaerobic Power test. Following a 10-minute rest subjects repeated the testing sequence and after a similar rest period a third and final testing sequence was performed. The Makoto testing device consisted of subjects reacting to both a visual and auditory stimulus and striking one out of 30 potential targets on three towers.

**Results:** Significant difference in reaction performance was seen between S and P in both average number of targets struck (55.8 ± 7.4 versus 51.9 ± 7.4, respectively) and percent of targets struck (71.9 ± 10.5% versus 66.8 ± 10.9%, respectively). No significant differences between trials were seen in any anaerobic power measure. Subjective feelings of energy (3.5 ± 0.5 versus 3.1 ± 0.5) and focus (3.8 ± 0.5 versus 3.3 ± 0.7) were significantly higher during S compared to P, respectively. In addition, trends towards an increased alertness ($p = 0.088$) and a decreased fatigue ($p = 0.091$) were also seen in S compared to P.

**Conclusion:** Results indicate a significant increase in reaction performance during exercise, with no effect on anaerobic power performance. In addition, ingestion of this supplement significantly improves subjective feelings of focus and energy.

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