This study was supported by an ISSN Educational Research Grant.

Conclusions: The dietary supplement treatment (FitMiss Burn™) experienced greater elevations in RMR values as compared to the placebo treatment. These elevations came with no adverse effects relative to resting heart rate and blood pressure values. Taken on a daily basis, FitMiss Burn™ supplementation may increase overall energy expenditure possibly leading to reductions in fat mass over time.

Acknowledgement: This study was supported by an ISSN Educational Research Grant.

Background: Blackcurrant intake has been reported to increase peripheral blood flow in humans [1], potentially by anthocyanin-induced vasorelaxation and vasodilation [2]. Increased peripheral blood flow may affect the exercise intensity at lactate indicators (e.g. onset of blood lactate accumulation (OBLA) at 4 mmol L⁻¹) and maximum oxygen uptake. We examined the effect of 1-week Sujon blackcurrant powder supplementation on the blood lactate curve and aerobic capacity of trained triathletes.

Methods: Healthy male (n = 8) and female (n = 5) triathletes with >3 yrs experience (age: 38±8 yrs, height: 174±5 cm, body mass: 71±9 kg, BMI: 23±2, BF%: 19±5%, mean±SD) performed cycling tests for lactate responses (4 min stages with 2 min recovery, start power 50 W with 30 W increments) at self-selected pedal cadence (SRM ergometer, SRM International, Germany). Familiarized participants were tested following 7 days of Sujon blackcurrant powder (S, 6g/day) or placebo (P) intake. Experimental design was double-blind and randomized with a wash-out period of 4 weeks. Oxygen consumption (Douglas bag technique) and heart rate were recorded during the cycling tests. Intensity, oxygen uptake and heart rate at 4 mmol L⁻¹ OBLA were calculated using lactate analysis software (Newell et al., 2007). Lactate responses were calculated at relative intensities with individual lactate curves. Paired t-tests were used for analysis with significance accepted at p<0.05. Consent to publish the results was obtained from all participants.

Results: The intensity at 4 mmol L⁻¹ OBLA was 6% higher with Sujon (P: 223±57, S: 236±60 W, range -5 to 22%, 11 participants showed an increase and 1 no change). In both conditions at 4 mmol L⁻¹ OBLA, there were no differences in heart rate (P: 159±7, S: 164±10 b min⁻¹, p=.13) or oxygen uptake (P: 2.91±0.73, S: 2.96±0.71 L min⁻¹, p=.31). Blood lactate was lower at
Table 1(abstract P1) RMR (mean ± SD kcal/day) and (% increase in RMR as compared to baseline values) for each supplement group

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>60-minute</th>
<th>120-minute</th>
<th>180-minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>FitMiss BurnTM</td>
<td>1,422 ± 221</td>
<td>1,495 ± 182 (5.1%)</td>
<td>1,524 ± 171 (7.2%)</td>
<td>1,526 ± 189 (7.3%)</td>
</tr>
<tr>
<td>Placebo</td>
<td>1,425 ± 196</td>
<td>1,464 ± 173 (2.7%)</td>
<td>1,475 ± 173 (3.5%)</td>
<td>1,512 ± 198 (6.1%)</td>
</tr>
</tbody>
</table>

* - Post-hoc statistical trend compared to baseline values (p ≤ 0.10)
# - Post-hoc statistical difference compared to baseline values (p ≤ 0.05)
Blood flow was significantly augmented 30 PI of PE in comparison to PL (p=0.033). Vessel diameter was significantly larger following 30 minutes post exercise with PE (p=0.036). Ingestion of the PE was found to significantly augment TTE at 90% PV (p=0.009) and 100% PV (p=0.027). On the vitality scale, the following statement, “At this moment I feel alive and vital” was found to be significantly greater 30PI of PE compared to PL (p=0.037).

Conclusions: Acute ingestion of PE 30 minutes prior to exercise may enhance vessel diameter, blood flow, and improve exercise tolerance. Results of the current study indicate that PE is an ergogenic aid for submaximal running, eliciting beneficial effects on blood flow.

Acknowledgement: This study was supported by Dymatize Enterprises LLC, Bedford, TX, USA and Stiebs Nature Elevated, Madera, CA, Madera, CA, USA.

P5
The acute effect of exercise and nutrition on respiratory exchange ratio in women
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Background: Few studies exist evaluating metabolic responses to exercise and nutrition in women. Understanding sex-specific fuel differences may improve exercise prescription. PURPOSE: To examine the effect of exercise modality and pre-exercise carbohydrate (CHO) or protein (PRO) ingestion on respiratory exchange ratio (RER) in women.

Methods: Twenty recreationally active women ( Mean ± SD; age 24.6 ± 3.9 yrs; height 164.4 ± 6.6 cm; weight 62.7 ± 6.6 kg; %fat 28.2 ± 4.8 %) participated in this randomized crossover, double-blind study. After a 2 week washout period, participants repeated the same procedures, ingesting the results was obtained from all participants.

Results: Blood flow was significantly augmented 30 PI of PE in comparison to PL (p=0.033).

Conclusions: Acute ingestion of PE 30 minutes prior to exercise may enhance vessel diameter, blood flow, and improve exercise tolerance. Results of the current study indicate that PE is an ergogenic aid for submaximal running, eliciting beneficial effects on blood flow.

Acknowledgement: This study was supported by Dymatize Enterprises LLC, Bedford, TX, USA and Stiebs Nature Elevated, Madera, CA, Madera, CA, USA.

P6
Effects of dietary macronutrient distribution on resting and post-exercise metabolism
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Background: Previous research has demonstrated that habitual dietary macronutrient distribution affects energy substrate utilization at rest and during exercise. The primary purpose of the current study was to examine the relationships between habitual baseline macronutrient intakes, expressed relative to bodyweight and percentage of total energy intake, and metabolism at rest and after exercise in women.

Methods: Twenty recreationally active women (Mean ± SD; Age 24.6 ± 3.9 yrs; Height 164.4 ± 6.6 cm; Weight 62.7 ± 6.6 kg; %Fat 28.2 ± 4.8%) volunteered for the current study. Prior to metabolic testing, participants completed strength testing to determine their 1RM for six resistance exercises and completed a 3-day dietary log. Participants were provided with detailed instructions for accurately logging food intake and portion sizes, and instructed to record their regular food intake on two week days and one weekend day. Logs were analyzed using The Food Processor software (ESHA Research, Salem, OR, USA). Body composition was determined using dual-energy X-ray absorptiometry (DXA). Exercise was prescribed using baseline strength data and heart rate reserve calculations. Respiratory exchange ratio (RER) and resting energy expenditure (REE) were analyzed by indirect calorimetry (Parvomedics TrueOne 2400) before exercise (PRE), and during minutes 0-10 (IP), 25-35 (30min), and 50-60 (60min) post-exercise. Bivariate correlations and independent samples t-tests were completed using SPSS software (Version 19.0; IBM, Somers, NY, USA). Participants were stratified based on fat intake as a percentage of total caloric intake (high fat > 35% of total kcals, n=11; low fat < 35% of total kcals, n=9) and relative to bodyweight (high fat > 1.3 g/kg, n=11; low fat < 1.3 g/kg, n=9). Consent to publish the results was obtained from all participants.

Results: A significant inverse relationship between carbohydrate (CHO) intake (g/kg) and REE was observed at IP (r=-0.539, p=0.014), 30min (r=-0.569, p=0.009), and 60min (r=-0.577, p=0.008), with a trend toward significance at PRE (r=0.413, p=0.07). Participants consuming > 35% of kilocalories from fat had a significantly greater bench press 1RM (p=0.048) and lower RER at 30min (p=0.033) and 60min (p=0.033). Participants consuming > 1.3 g/kg of fat per day trended toward lower fat mass (p=0.09) and BF% (p=0.07).

Conclusions: Results indicate that baseline macronutrient distribution impacts post-exercise energy metabolism in women. Higher fat and lower CHO intake was associated with greater post-exercise REE and lower post-exercise RER, indicating greater fat utilization. Higher fat intakes may also influence resistance exercise performance and body composition; participants with higher fat intake had a greater bench press 1RM and trended towards lower indices of adiposity. These results suggest that the relative contributions of CHO and fat to total caloric intake may have significant implications for metabolism and body composition in women. Future research should evaluate the effects of modulating habitual macronutrient distribution to impart favorable effects on energy metabolism, body composition, and resistance exercise performance in women.

Acknowledgement: This study was supported by the National Strength and Conditioning Association Foundation, CHO and PRO were blinded and donated by Dymatize Nutrition (Farmers Branch, TX, USA)
P7
The effect of moderate- and high-intensity interval training on substrate oxidation and nutrient preferences in obese men
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Background: This study compared the influence of 12 sessions of moderate- and high-intensity interval training on substrate oxidation and nutrient preferences.

Methods: Ten obese men participated in cross-over 4-week moderate- (MIIT) and high- (HIIT) intensity interval cycling. MIIT consisted of 5-min stages at ≥20% of mechanical work at 45 %\textit{VO}_{peak} and HIIT consisted of 30-sec work at 90 %\textit{VO}_{peak} and 30-sec rests for 30-45 min. The assessments included a constant-load test consisted of 5-min rest, 45-min cycling at 45 %\textit{VO}_{peak} followed by 60-min recovery. Intermittent measures of gas exchange using indirect calorimetry were undertaken, and \textit{ad libitum} meal was provided after the test. Consent to publish the results was obtained from all participants.

Results: Changes in fat oxidation were +19% at rest, +96% during exercise and +59% during recovery in MIIT, and were -7% at rest, +43% during exercise and +13% during recovery in HIIT. Changes in CHO oxidation were +6% at rest, -13% during exercise and -2% during recovery in MIIT, and were +46% at rest, -7% during exercise and +32% during recovery in HIIT. The amount of meal, fat and CHO eaten decreased by 24, 16 and 13% respectively after HIIT, and increased by 3, 38 and 14% respectively after MIIT. The intervention explained 12.4% of the changes in fat intake (p = 0.07). The interaction of fat oxidation-intervention did not significantly explain the change in fat eaten (p>0.05).

Conclusion: The change in fat oxidation did not explain the change in fat eaten after interval training.

P8
Effect of a multi-ingredient supplement on intermittent sprint performance, fatigue perception, muscle damage and immunosuppression in recreational athletes
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Background: It has been suggested that carbohydrate-protein based multi-ingredient supplements may attenuate exercise induced muscle damage (EIMD) and immunosuppression. This study investigates the effects of a commercially available carbohydrate-protein supplement (MTN) enriched with L-glutamine, L-carnitine-L-tartrate compared to carbohydrate alone (CHO) or placebo (PL), on sprint performance, muscle damage, immunosuppression markers and recovery from an intermittent exercise bout.

Methods: On three occasions, in a counterbalanced order, 16 recreationally trained males volunteered to ingest a multi-ingredient supplement, a carbohydrate supplement or placebo before, during and immediately after a 90min intermittent repeated sprint test (IRS). Measurements included total sprint time and the rate of perceived exertion (RPE) expressed along the IRS. In addition 15m sprint, creatine kinase, myoglobin, interleukine-6, Salivary α amylase; Neutrophil; Lymphocytes and Monocyte were assessed pre, immediately post, 1h and 24h after exercise. Consent to publish the results was obtained from all participants.

Results: Total sprint times were not different between conditions. RPE increased during the IRS for all conditions, however MTN showed a significant (p<0.001) lower value at the end (15.9±1.4) compared to PL (17.8±1.4) but not with respect to CHO (17.0±1.9). 15min sprint time was reduced (p<0.05) at post, 1hr and 24hr compared to pre with no differences between conditions (p>0.05). Myoglobin increased (p<0.05) in all three conditions at post, and 1hr compared to pre, showing lower values at 1hr (p<0.05) for the CHO and MTN compared to PL (241.8±142.6 ng\textsuperscript{mL}\textsuperscript{-1} and 265.4±187.8 ng\textsuperscript{mL}\textsuperscript{-1} vs. 518.6 ± 255.2 ng\textsuperscript{mL}\textsuperscript{-1} respectively). Interleukin-6 was significantly increased at post and 1h compared to pre (p<0.05) being significantly higher for MTN at post (5.2pg.ml\textsuperscript{-1}) and 24hr (2.4pg.ml\textsuperscript{-1}) respect to CHO (4.5±2.1 and 1.9±2.5 pg.ml\textsuperscript{-1}) but not respect to PL (4.9±2.4 and 1.8±2.4 pg.ml\textsuperscript{-1}). Creatine kinase peaks at 24hr for the three conditions with no differences in between them. MTN showed a significant higher Neutrophil concentration (4.9±1.8 10\textsuperscript{9}L\textsuperscript{-1}) at 1hr compared to CHO (3.9±1.5 10\textsuperscript{9}L\textsuperscript{-1}) but not to PL (4.5±1.6 10\textsuperscript{9}L\textsuperscript{-1}).

Conclusion: Ingesting a multi-ingredient supplement during and immediately after a 90min intermittent repeated sprint test resulted in no effects on performance and higher Neutrophil counts. However, fatigue perception and the accumulation of some muscle damage markers (Mb) could be attenuated.

P9
Acute effects of a multinutrient supplement on performance, rate of perceived exertion and markers of catabolism in young resistance trainers practitioners
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Background: The ingestion of a multi-nutrient containing proteins, carbohydrate and creatine has been shown to enhance acute and chronic responses to resistance training, attenuating fatigue and markers of catabolism training after resistance training workouts. The purpose of this study was to investigate the acute effects of a commercially available multinutrient supplement on neuromuscular fatigue, performance, perception of effort and salivary markers of catabolism, during a bout of resistance circuit training session.

Methods: Twelve recreationally resistance trained young males (age 22±1.5 years, body weight 79.4±10.2 kg, height 181±0.07 cm), volunteered to participate in the study, completing 2 randomised controlled circuit resistance training sessions (CT). Immediately before and after the workload, participants consumed 500ml of water mixed with 60g of a multinutrient supplement (MTN) containing whey proteins, carbohydrate, creatine, HMB and sodium bicarbonate, or maltodextrin (PL). CT involved three rounds of 7 resistance exercises (CMJs, Bench Press, Parallel-Squat, Upright row, Alternate Lunges, Dead Lift, Push-press, Abdominals) followed by 1 min rest. Participants performed 12 repetitions at 70% 1RM in each of the exercises with no rest in between (only the time to change from one exercise to the next). Measurements included total kg lifted per exercise and in the overall workout, the rate of perceived exertion (RPE) determined at the end of each circuit, pre and post blood lactate and markers of neuromuscular fatigue, including Countermovement Jump (CMJ), 1RM Bench Press (1RMBP) and the maximal velocity at 50% of 1RM Bench Press (V50%BP). In addition, salivary markers of catabolism: Free Testosterone (T) and Cortisol (C) were assessed pre, 30min and 60min post CT. Consent to publish the results was obtained from all participants.

Results: No significant differences were observed between the total weight (kg) lifted for the entire CT or exercise (P>0.05). RPE increased significantly during CT (p<0.05), but without differences between conditions. Lactate increased significantly from pre to post in both conditions (p<0.05), but without differences between them. Markers of neuromuscular fatigue (CMJ; 1RMBP and V50%BP) significantly decreased from pre to post but without difference between conditions. Salivary C showed a trend, increasing from pre (7.9±6.2 mmol/L) to 30min post (18.8 mmol/L).
Ingesting a MTN supplement immediately before and after a Funding for this study and conference attendance. The treatment group regained strength as measured by peak Effects of dietary antioxidants on placebo (P) intake, administered AP. As expected, serum cortisol was shown to reduce CK levels returned to pre-exercise values at 96 hours in the PPCT groups while levels in the placebos at both time points (p < 0.05). Additionally, participants in the PPCT group reported decreased whole body and hamstring DOMS compared to placebo at both time points (p < 0.05). Additionally, participants in the PPCT group reported decreased whole body and hamstring DOMS (DOMS), muscle damage via creatine kinase (CK), oxidative stress via ferric reducing antioxidant power (FRAP), and a stress hormone (cortisol) were also examined at these timepoints. Consent to publish the results was obtained from all participants.

Results: The treatment group regained strength as measured by peak torque at 96% and 101% of pre-exercise levels at 48 and 96 hours post-exercise, respectively. In comparison the placebo group’s peak torque levels remained at 92 % and 93% of pre-exercise levels at the same time points post-exercise. These improvements were significant compared to placebo at both time points (p < 0.05). Additionally, participants in the PPCT group reported decreased whole body and hamstring DOMS compared to placebo at 48 hours (p = 0.029 for both). These enhancements in strength and DOMS were also supported by improvements in serum markers of oxidative stress, muscle damage and inflammation. Chronic consumption of PPCT improved serum antioxidant status (p=0.039) as measured by FRAP. As expected, serum cortisol increased in all groups compared to pre-exercise levels; however by 96 hours, serum cortisol levels had returned to pre-exercise levels in the PPCT group while the placebo remained 20% above pre-exercise levels (p < 0.05). Creatine kinase (CK) increased in both groups peaking at 24 hours post-exercise. CK levels returned to pre-exercise values at 96 hours in the PPCT groups while levels in the placebo group remained significantly elevated 50% over pre-exercise levels (p < 0.05) at the same time point. These reductions in cortisol and CPK levels occur simultaneously to the recovery in pre-exercise strength observed at 96 hours.

Conclusions: Daily supplementation with PPCT was shown to reduce DOMS and promote recovery of muscle strength by reducing the oxidative stress and markers of muscle damage that occurs post-exercise.

P11  
Effect of New Zealand Sujon blackcurrant on cardiovascular responses during cycling in triathletes
Mark ET Willems*, Stephen D Myles, Matthew D Cook, Mandy L Gault, Tatania Emmick and Kelli Herrlinger are employed by Kemin Foods, L.C., the sponsor of the aforementioned study.

Background: Anthocyanin is a component known to induce performance-enhancing effects resulting from high-intensity training [3] and is present in high amounts in New Zealand Sujon blackcurrant. During typing work in humans, an activity of low intensity, peripheral blood flow was increased by blackcurrant intake [2]. It is not known whether anthocyanin would affect the cardiovascular responses at different exercise intensities. We examined the effect of 1-week Sujon blackcurrant powder supplementation on cardiovascular responses at low, moderate and high intensities of trained triathletes.

Methods: Ten healthy triathletes with >3 years experience (5 men and 5 women; mean±SD: age: 40±5 years, height: 173±6 cm, body mass: 69±9 kg, BMI: 23±2, BF%: 19±4%, VO2max: 49±7 mL kg⁻¹ min⁻¹, maximum power: 293 ±68 W) volunteered. Participants were tested following 7 days of Sujon blackcurrant powder (5 g/day) or placebo (P) intake, administered following a double-blind, crossover, randomized design with a wash-out period of 4 weeks. Cardiovascular function (Portapres® Model 2, Finapres Medical Systems BV, Amsterdam, The Netherlands) was recorded during an incremental cycling protocol (4 min stages with 2 min recovery, start power 50 W with 30 W increments). Stages representing low (i.e. 40%) VO2max, moderate (i.e. 60%) and high (i.e. 80%) intensity were analysed for the last minute. Paired two-tailed t-tests were used for analysis with significance accepted at p<0.05. Consent to publish the results was obtained from all participants.

Results: At each intensity, there were no differences in systolic BP (40% - P: 183±29, S: 195±31, p=13; 60% - P: 196±35, S: 195±31, p=40; 80% - P: 215±33, S: 220±33 mmHg, p=50), diastolic BP (40% - P: 82±14, S: 88±17, p=09; 60% - P: 87±14, S: 88±17, p=39; 80% - P: 97±14, S: 101±19 mmHg, p=36), heart rate (40% - P: 100±9, S: 101±10, p=62; 60% - P: 126±12, S: 125±11, p=85; 80% - P: 152±13, S: 154±11 beats min⁻¹, p=56), stroke volume (40% - P: 100±17, S: 96±24, p=47; 60% - P: 94±20, S: 88±26, p=53; 80% - P: 88±18, S: 80±28 mL, and GlbHab cardiac output (40% - P: 10±0.8, S: 9±2±2, p=78; 60% - P: 11±2±2, S: 11±2±3, p=90; 80% - P: 13±2±2, S: 13±4±4,1 mL min⁻¹, p=73), and total peripheral resistance (40% - P: 11±6±3, S: 13±2±5, p=28; 60% - P: 10±7±3, S: 11±7±6, p=60; 80% - P: 10±2±3, S: 11±3±5 mmHg L⁻¹ min⁻¹, p=34).

Conclusion: Previous studies indicated that anthocyanin intake may have performance-enhancing effects resulting from high-intensity training [3] and increases peripheral blood flow at low intensity [2]. The cardiovascular responses at low, moderate and high intensity cycling in trained triathletes were unaffected by one week intake of New Zealand Sujon blackcurrant powder. It is concluded that New Zealand Sujon blackcurrant does not have adverse cardiovascular effects during exercise in trained triathletes.

Acknowledgement: Funding for this study and conference attendance was provided by the University of Chichester, Health Currancy Ltd (UK) and Glb Holdings (Nelson) Ltd (NZ).
After 24 hours of dietary control and caffeine abstinence, peripheral blood flow is increased by blackcurrant intake in Delphinidin-3-rutinoside if the acute consumption of iFocus enhanced absolute POW for men (VIA 674.9 ±167.2 W vs. DCF 622.9±154.1 W; p=0.039) and for women (VIA 1.16±0.09 m/s vs. DCF 1.05 ±0.06 m/s; p=0.001); and RFD for men (VIA 1974.2±657.6 N/s vs. DCF 1788.6±529.4 N/s; p=0.001) but not for women (VIA 746.3±205.5 N/s vs. DCF 701.4±193.6 N/s; p=0.729). Further, absolute enhancement was greater for men in POW (p=0.037) and in RFD (p=0.028). No gender differences persisted when enhancement was expressed as percent increases over baseline (DCF) or after statistically adjusting for body mass. Conclusions: These data support the hypothesis that men and women benefit similarly (7-10%) after ingesting two servings of Via instant coffee approximately one hour before Smith bench press exercise.

The effects of a multi-ingredient, caffeine-containing supplement (iFocus*) on simple reaction time Jessica Evans, Jose Antonio Exercise and Sports Sciences, Nova Southeastern University, Davie, Florida, USA E-mail: jae83@nova.edu Journal of the International Society of Sports Nutrition 2014, 11(Suppl 1):P12

Background: The purpose of this investigation was to determine the effects of a supplement (iFocus) that contained several ingredients including but not limited to caffeine, GABA, 5 HTP, DMAE and Beta-PEA. To date, there have been no studies on this supplement as it relates to reaction time. Thus, we determined if the acute consumption of iFocus affected simple reaction time. Methods: Seven (5 male, 2 female) physically active college students (Mean±SD: Age = 22.86±1.68 yr, Ht cm 174.33±10.44, Wt kg 74.51±13.50, years of training 5.50±2.14, hours of training per week, 8.21±2.23) volunteered for this investigation. In a double-blind, placebo-controlled, cross-over trial, subjects consumed one serving of iFocus 30-45 minutes prior to performance of a simple reaction time test (SRT). The primary ingredients in iFocus include but is not limited to: caffeine, GABA, 5 HTP, and R-Beta-Methylphenylethylamine http://www.prosupps.com/products/i-focus/. In a SRT test, subjects placed a finger on a reaction time board and responded to a visual cue to raise (or not) their index finger of their dominant hand. If a green light was observed, the subject would raise their finger as quickly as possible. If a red light appeared, the subject was instructed to keep the finger pressed on the reaction time board. Each trial consisted of 20 tests. The average of 20 tests constituted their mean reaction time. A paired t-test was used to determine if there were statistically significant differences between the placebo and iFocus. Consent to publish the results was obtained from all participants. Results: The reaction time of the iFocus and placebo conditions were 0.275±0.028 and 0.307±0.034 seconds, respectively. Thus, the iFocus condition demonstrated a significantly faster reaction time (-10.4%) than the placebo (p<0.005). Conclusions: These results suggest that this multi-ingredient supplement (iFocus) can acutely improve reaction time. This has implications in sports where reaction time is a critical performance factor. Acknowledgement: JA serves on the Advisory Board of ProSupps Inc


Background: An abundance of research is available concerning exercise and caffeine with men, but among women resistance trainers, it is scarce. We tested a high-affinity caffeine product, VIA* instant coffee (VIA) vs. its decaffeinated version (DCF) on men and women. We hypothesized that VIA consumption would not benefit men greater than women (p>0.05) when comparing muscle explosiveness among resistance-trained (6.4±3.7 yr) college students (N=23; 21.2+3.7 y). Methods: After 24 hours of dietary control and caffeine abstinence, fasted subjects volunteered to perform three separate repetitions of strict Smith bench press (30% 1RM) under two conditions (VIA, DCF), with conditions separated by 48-72 hours. The peak force (FOR), peak power (POW), peak velocity (VEL), and maximum rate of force development (RFD) of the VIA trial were compared to DCF. FOR, POW, VEL, and RFD were measured via Ballistic Measurement System (BMS) linear displacement (XPS6+, Inervations, Inc., South Australia, Australia). The interaction of coffee and gender were analyzed in both absolute and relative terms via 2x2 ANOVA with repeated measures (covariance as necessary) and Tukey HSD post hoc (Statistica 12, Statsoft, Inc., Tulsa, OK). Consent to publish the results was obtained from all participants. Results: VIA enhanced absolute POW for men (VIA 1.22±0.15 m/s vs. DCF 1.14±0.15 m/s; p=0.002) and for women (VIA 1.16±0.09 m/s vs. DCF 1.05 ±0.06 m/s; p<0.001); and RFD for men (VIA 1974.2±657.6 N/s vs. DCF 1788.6±529.4 N/s; p=0.001) but not for women (VIA 746.3±205.5 N/s vs. DCF 701.4±193.6 N/s; p=0.729). Further, absolute enhancement was greater for men in POW (p=0.037) and in RFD (p=0.028). No gender differences persisted when enhancement was expressed as percent increases over baseline (DCF) or after statistically adjusting for body mass. Conclusions: These data support the hypothesis that men and women benefit similarly (7-10%) after ingesting two servings of Via instant coffee approximately one hour before Smith bench press exercise.

P15 Effect of acute green tea extract ingestion on fat oxidation during exercise in women
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Background: Green tea and green tea extract (GTE) consumption is associated with health, exercise performance, fat oxidation and weight loss owing to studies reporting positive effects accompanying chronic supplementation (>30 d). While the overall literature surrounding GTE is equivocal, little data exists examining the effects of acute supplementation prior to exercise (<24 hr). The primary aim of our current study was to investigate the effects of acute decaffeinated GTE ingestion on fat oxidation rates during moderate-intensity exercise in physically active females.

Methods: We randomized 10 physically active females (mean ± SD: age: 20.2 ± 2.2 years; height: 1.67 ± 0.06 m; weight: 65.7 ± 6.1 kg; body mass index: 23.8 ± 2.2 kg/m2; VO2max: 51.4 ± 6.2 ml kg-1 min-1) to participate in our study. Prior to treatment, the participants volunteered to perform a VO2max test in order to establish their exercise testing intensity. Subsequently, we randomly assigned to the double-blind, counter-balanced, cross-over treatments of encapsulated, decaffeinated, GTE or a colour matched corn flour placebo (PLA) in two doses; 2 capsules with dinner the night before, 2 capsules with breakfast the morning of testing. Treatment capsules contained 340 mg polyphenols and 85 mg EGCG. Testing consisted of having participants initiate riding on bicycle ergometer for 45 min at a workload associated with 65% VO2max. Respiratory gas measurements were collected at rest and in 3 min epochs, 5 min after starting exercise and every 15 min during exercise, in order to calculate fat and carbohydrate oxidation and total energy expenditure. Secondary measures included heart rate (HR) and ratings of perceived exertion (RPE) during exercise testing. Overall carbohydrate and fat oxidation were analysed using an integrated area-under-the-curve (AUC) from rest through the completion of exercise. A paired-sample t-test compared AUC for fat oxidation and the total, and relative substrate contribution to, energy expenditure at rest and during exercise. Potential differences in fat oxidation, carbohydrate oxidation, RER, HR and RPE between treatment groups were examined at each time point including 0 (rest), 5, 15, 30 and 45 minutes into steady-state cycling using a 2-factor (treatment x time) repeated measures analysis of variance (ANOVA). Data are presented as mean ± SD or 95% confidence intervals (CI) when appropriate. Significance was set at P < 0.05. Consent to publish the results was obtained from all participants.

Results: Overall, the acute ingestion of each respective supplement had no significant effect for GTE (20.8 g/m, 95% CI, 12.2, 24.0) or PLA and 18.19 g/m, 95% CI, 12.2, 24.0). Moreover, the relative contribution of fat to total energy expenditure at rest (42% PLA; 36% GTE) and during exercise (28% PLA; 33% GTE) was not significantly different between trials. No further effects were noted for total energy expenditure, and carbohydrate and fat oxidation, RER, HR and RPE at each respective time point.

Conclusions: In contrast to previous reports, the acute ingestion of decaffeinated GTE did not significantly alter whole-body fat oxidation rates during exercise in physically active females. However, the response to GTE was highly variable between individuals; thus, more research is required to investigate potential moderators of the effects of GTE.

P16 Acute anabolic response to β-hydroxy-β-methylbutyrate (HMB)-free acid supplementation following heavy resistance exercise
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Background: β-hydroxy-β-methylbutyrate (HMB), a metabolite of the amino acid leucine, has been shown to promote strength and lean muscle mass when supplemented in conjunction with resistance training. Recently, a new free-acid form of HMB has been shown to reach higher plasma concentrations in a shorter amount of time compared to the calcium-salt form. This higher bioavailability may rationalize acute supplementation with HMB-FA as a means to enhance the anabolic response resulting from heavy resistance training. The purpose of this study was to examine the effect of acute β-hydroxy-β-methylbutyrate-free acid (HMB-FA) on circulating concentrations of anabolic hormones following a heavy resistance exercise protocol.

Methods: Twenty resistance-trained men (22.8 ± 2.5 yrs, 177.6 ± 6.6cm, 83.4 ± 9.8kg) volunteered to participate in this study and were randomized into two groups (HMB-FA and placebo (PL)) and performed an acute, heavy resistance exercise protocol (four sets of up to 10 repetitions of the squat, dead lift, and split squat exercises). Supplementation included 1 g of HMB-FA or PL consumed 30min prior to exercise. Blood was sampled before (PRE), immediately post (IP), and 30 min post-exercise (30P). Circulating levels of testosterone (TEST), growth hormone (GH) and Insulin (INS) were assessed. A 2 x 3 repeated measures ANOVA was used to analyze the data. Consent to publish the results was obtained from all participants.

Results: The resistance exercise protocol produced a significant time effect for an elevation in TEST (p<0.01), GH (p<0.01) and INS (p = 0.05) at IP with GH (p<0.01) and INS (p<0.01) remaining elevated at 30P. A group by time interaction was observed (p=0.05) with plasma GH elevated in HMB-FA compared to PRE values (p < 0.01) at IP and 30P. There were no differences at any other time point with TEST or INS concentrations.

Conclusion: These data indicate that HMB-FA supplementation may augment and prolong the growth hormone elevation associated with heavy resistance exercise.

Acknowledgement: This study was supported by Metabolic Technologies Inc.
P18
The effects of practical vascular blood flow restriction training on skeletal muscle hypertrophy
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Background: Practical blood flow restriction training is a novel training method that has the potential to increase muscular hypertrophy and muscular strength while allowing individuals to train with lighter loads (20-30% of 1-RM). Through the use of elastic knee wraps, the limbs can be restricted using a perceived pressure scale. The comparison of practical blood flow resistance training with traditional, non-occluded resistance training and its effects on muscle hypertrophy has yet to be investigated. The purpose of this study was to compare the effects of practical vascular blood flow restriction training vs. traditional resistance training (non-blood flow restricted) on skeletal muscle cross sectional area during a 4-week period in trained, college-age males.

Methods: Twenty-one resistance-trained males volunteered to participate in a 4-week training program and were randomly assigned to one of two groups: Practical vascular blood flow restriction training (BFR; n = 10) and Resistance training (RT; n = 11). The primary difference between the groups was the BFR group performed approximately 60% of all sets blood flow restricted at 20-30% of 1-RM while the RT group performed all sets at an intensity of >70% 1-RM in a traditional manner (non-blood flow restricted). Perceived pressure for blood flow restriction in the BFR group for the arms and legs was 7 out of 10. Workouts for both groups were similar and consisted of whole body routines. Over the 4-week study period, each participant conducted a total of 11 workouts. Biceps and vastus lateralis muscle cross-sectional area was measured using a portable ultrasound device (Bodymetrix Pro, IntelMetrix). A 2x2 repeated measures ANOVA was used to assess group, time, and group by time interactions for muscle cross-sectional area of the biceps brachii and the vastus lateralis. Statistical significance was set at p < 0.05. Consent to publish the results was obtained from all participants.

Results: No significant differences were observed between groups in biceps muscle cross-sectional area (BFR-Pre: 33.2 ± 3.6 mm, BFR-Post: 34.5 ± 4.5 mm, RT-Pre: 31.9 ± 3.3 mm, RT-Post: 33.5 ± 3.7 mm, p = 0.779). However, a significant main effect for time in relation to skeletal muscle hypertrophy for the biceps muscle cross-sectional area was observed (p = 0.004). Similarly, no significant differences were observed between groups in vastus lateralis muscle cross-sectional area hypertrophy (BFR-Pre: 38.1 ± 9.3 mm, BFR-Post: 37.5 ± 9.0 mm, RT-Pre: 36.5 ± 6.8 mm, RT-Post: 35.3 ± 6.1 mm; p = 0.721).

Conclusion: There were no differences observed between the two training groups in measures of skeletal muscle hypertrophy. However, it is likely that the length of the training program (4 weeks in duration encompassing 11 workouts) was not long enough for differences to emerge in the training techniques, if a difference exists. Future investigations into this area of comparing practical vascular blood flow restriction training to traditional resistance training should utilize a longer period of training.

Acknowledgement: This investigation was supported by Dymatize Nutrition Sport Performance Institute.

P19
A comparison of the effects of ursolic acid and l-leucine supplementation on IGF-1 receptor and AKT-mTOR signaling in response to resistance exercise in trained men
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Background: Resistance exercise stimulates skeletal muscle protein synthesis (MPS) during post-exercise recovery due to up-regulation of the mammalian target of rapamycin (mTOR) signaling pathway. L-leucine supplementation is also known to stimulate MPS by activating mTOR signaling. However, recent research has discovered a natural compound called ursolic acid which also appears to stimulate MPS by activating the mTOR signaling pathway, and has been presumed to occur due to IGF-1 receptor (IGF-1R) up-regulation. Ursolic acid is a natural pentacyclic triterpenoid carboxylic acid that is widely found in apple skin and other fruits such as cranberries. The main purpose of this study was to compare the effects of a single dose of ursolic acid or L-leucine supplementation given immediately after resistance exercise on IGF-1 (a serum regulator of mTOR) and the subsequent effects of IGF-1 on phosphorylating/activating its receptor (IGF-1R) up-regulation. Furthermore, the purpose was to also determine the effects of signaling intermediates of MPS contained within the Akt/mTOR pathway (phosphorylated levels of AktThr308, mTORSer2448, p70S6KThr389).

Methods: In a randomized, cross-over design, 9 apparently healthy, resistance-trained (regular, consistent resistance training (i.e. thrice weekly) for at least 1 year prior to the onset of the study), men between the ages of 18-30 volunteered to participate in this study and performed three separate testing sessions of lower-body resistance exercise involving 4 sets of 8-10 repetitions at 75-80% 1-RM on the angled leg press and knee extension exercises. Immediately after each resistance exercise session, participants orally ingested 3 grams (0.043 g/kg equivalent) of cellulose placebo (PLC), L-leucine (LEU), or ursolic acid (UA). A venous blood sample was obtained before, and 0.5, 2, and 6 hr post-exercise, whereas a vastus lateralis muscle biopsy was obtained before and 2 and 6 hr post-exercise. Each testing session was separated by 7 days to allow full recovery between sessions. Statistical analyses were performed utilizing separate two-way ANOVA for each criterion variable employing a probability level of ≤0.05. Consent to publish the results was obtained from all participants.

Results: Using ELISA, no significant differences were observed among the three supplements for serum IGF-1 (p > 0.05). Also using ELISA, for skeletal muscle phosphoproteins, no significant differences existed among the three supplements for phosphorylated IGF-1R, Akt, and p70S6K (p > 0.05). However, the LEU supplement significantly increased phosphorylated mTOR compared to UA and PLC (p = 0.001).

Conclusion: At the 3 g dose provided, ursolic acid was unable to increase IGF-1R signaling and, unlike L-leucine, ursolic acid had no positive effect on mTOR signaling activity. Therefore, ursolic acid appears to have no effect on mTOR activity when ingested immediately following resistance exercise.
**P20**
The effects of Fastin®-RR, a commercial weight loss product, on body weight and composition, resting hemodynamics and psychological mood in overweight and obese persons participating in an eight week weight loss program

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**Background:** Over 69% of all Americans are classified as either overweight or obese. This epidemic has fueled the growth of over the counter weight loss products into one of the largest categories of nutritional supplements. However, few of these products have undergone controlled clinical trials to substantiate the respective advertising claims. Furthermore, few weight loss products have been properly examined with a placebocontrolled design in persons that are overweight or obese. The purpose of the present investigation was to examine the effects of the commercial weight loss/energy product, Fastin®-RR (HighTech Pharmaceuticals, Inc., Norcross, GA) in overweight and obese men and women participating in a weight loss program.

**Methods:** This study was carried out with seventy-two men (n=36) and women (n=36) that voluntarily participated. Inclusion criteria included classification as either overweight or obese based on testing with BodPod. All research participants participated in the same eight week weight loss program including general recommendations for exercise and dietary modifications. Subjects were randomly assigned to receive one of three supplement conditions for the study period including Fastin®RR (FAS), 300 mg caffeine anhydrous (CAF), and cellulose placebo condition (PL) and were instructed to take one serving in the morning and one serving at midday. Study outcomes were determined at baseline and after 4wks and 8wks of study. Body weight and composition were determined using BodPod. Resting hemodynamic activity (HR, BP) was examined using an automated system (Dynamap 1846SX; Critikon Company LLC, Tampa, Fla). The profile of mood states (POMS-SF) was used to determine psychological measures. Only the 59 participants that completed all testing sessions were included in the statistical analyses (FAS, n=20; CAF, n=19; PL=20). Primary analyses of outcome variables were performed using changes scores from baseline to 8wks. Statistical analyses were conducted using one-way ANOVA with the accepted level of significance set at p<0.05. Consent to publish the results was obtained from all participants.

**Results:** Analyses indicated that total weight loss over the 8wk period was significantly greater with FAS (-8.0±6.5 lbs) compared with PL (-2.6±4.8 lbs) and compared with CAF (-3.0±5.5 lbs) (p's < 0.05). The FAS group also displayed statistically greater reduction in body fat (-6.3±7.3 lbs) compared with PL (-1.3±6.7 lbs) p<0.05. There were no statistically significant changes in resting HR or BPs in any of the three study groups (FAS, CAF, PL) over the 8wk study period. Analyses showed a significant main effect of time (baseline to 8wks) in values of Total Mood Disorder indicating an overall reduction across the three study groups. There were no other significant changes detected in POMS measures over the 8wk study period in any of the three study groups.

**Conclusion:** These findings indicate that total body weight and body fat weight are significantly reduced with Fastin®-RR (p's<0.05). The changes in body weight and body fat with FAS were significantly greater than those observed with either CAF or PL. These findings showed these beneficial changes in body composition occurred without negative effects on resting hemodynamics or psychological mood.

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**P22**
Effects of a dietary supplement on golf drive distance and functional indices of golf performance

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**Background:** CrossFit is a form of structured circuit exercise with tens of thousands of participants worldwide. However, little is known regarding nutritional strategies that may enhance CrossFit performances and/or recovery. Few, if any, pre-workout products have been properly examined in regards to CrossFit using double blinded, placebocontrolled research designs. The primary purpose of this study was to determine the acute effects of wodFuel® (wodFuel, Inc; Coral Springs, FL) on performance of the CrossFit exercise series, the Cindy. A secondary purpose of the study was to examine the acute effects of wodFuel® on resting hemodynamics.

**Methods:** Nineteen recreationally active men (n=10) and women (n=9) with at least six months experience with CrossFit training voluntarily participated in this study. All study participants completed two test sessions of the Cindy exercise routine with one week between sessions. Each test session was performed with one of two supplement conditions applied in randomized order in a double blind fashion. One supplement condition was wodFuel®, a preworkout product specifically designed for the CrossFit setting, with ingredients including beta alanine, grape seed extract, brown rice extract, natural caffeine, minerals and vitamins. The second study condition was a look-alike, taste-alike placebo condition consisting of cellulose. Study participants were directed to report to the training facility in the morning after a 12 hour fast. Following a 30 minute rest period, baseline values of heart rate, blood pressures and psychological mood were assessed using an automated system (Dynamap 1846SX; Critikon Company LLC, Tampa, Fla). Study participants were then provided the respective supplement in powdered form mixed in eight ounces of water and directed to sit quietly in the active training environment. The hemodynamic measures (HR, BPs) were repeated twenty minutes following ingestion of the supplement. Participants then completed the Cindy exercise routine which involves the performance of as many exercise rounds of 5 pullups, 10 pushups and 15 bodyweight squats, as possible. The study participants completed as many rounds of Cindy as possible in a 20 minute period. The number of total repetitions completed in each study condition served as the primary study outcome. One way ANOVA for repeated measures was used to compare the total repetitions completed between testing conditions. Two-way ANOVAs for repeated measures was used to examine the pre- and post-supplementation values of HR and BPs. The accepted level of statistical significance was set at p < 0.05for all analyses. Consent to publish the results was obtained from all participants.

**Results:** Analysis indicated that the wodFuel® test condition produced a statistically greater number of repetitions of Cindy (503.5±83.9 repetitions) compared with PL (477.5±75.6 repetitions) p < 0.05. There were no significant differences detected between pre- and post-supplementation values of HR or BPs for either wodFuel® or placebo, nor between study conditions at any time point.

**Conclusions:** These findings indicate performance of the common CrossFit exercise routine is significantly enhanced with the commercial pre-workout product, wodFuel®. These results also suggest that wodFuel® may allow superior training and competitive performance without additional hemodynamic stresses.

**Acknowledgement:** This study was supported by funding from wodFuel, Inc; Coral Springs, FL.
dietary supplement on golf drive distance and functional indices of golf performance.

**Methods:** Twenty-seven healthy men (30.3 ± 6.9 y, 183.1 ± 5.6 cm, 86.7 ± 11.9 kg), with a handicap index of 5-15 volunteered to participate in this study and were assigned in a double-blind, placebo-controlled manner over a 30-day period to ingest either a placebo ("PLA") or a dietary supplement containing creatine monohydrate, coffea arabica extract, calcium fructoborate and vitamin D (StrongDrive™, "SD"). All participants were assigned to ingest two doses per day of their assigned supplement for the first two weeks and one dose per day for the remaining two weeks. No exercise training or alterations in their normal physical activity habits were required/allowed and all participants were instructed to follow their normal dietary patterns. At the beginning and end of the four-week supplementation period, participants completed two identical testing sessions consisting of a fasting blood sample, anthropometric measurements, 1RM bench press, upper body power (via 3 sets of bench press throws) and a series of 10 successive golf swings (using their driver and 7-iron) that were analyzed three-dimensionally for changes in indices of golf performance. Diet records, quality of life, pain inventories and adverse events were also collected at the beginning and end of the study. Data were analyzed using separate ANOVA and ANCOVA with respective baseline scores as the covariate, respectively. Within-group changes were also probed with paired samples t-tests and effect size (ES) calculations. Statistical significance was established a priori at p<0.05. Consent to publish the results was obtained from all participants.

**Results:** ANCOVA revealed a significantly greater (post-test) best drive distance for SD (+5.0% [+13.6 yards], p=0.04, ES = 0.75) as well as a tendency for average drive distance to increase (+8.4% [+19.6 yards], p=0.07, ES = 0.65), while no such changes were found with the PLA group (+0.5% [-1.2 yards], p=0.82, ES = 0.04 and +1.3% [+2.8 yards], p=0.70, ES = 0.08, respectively). Both groups experienced significant increases in body mass and 1RM bench press (p<0.001). A significant group x time interaction was found for average upper body velocity during the 1st set of bench throws (p=0.02) while peak velocity tended to change (p=0.07). Within-group analysis confirmed significant improvements in average velocity (+8.9%, p=0.001) and peak velocity (+6.8%, p=0.005) for SD only. No changes were noted for reported adverse events, pain inventories, quality of life or any components of the complete blood count, comprehensive metabolic panels, c-reactive protein or vitamin D (p=0.05).

**Conclusion:** The use of SD for 30 days appears to favorably impact upper body power/performance.

**Acknowledgements:** Funding for this study was provided by WaterPure Inc (Plainview, NY).

**P24**
Comparison of serum fatty acid content and caloric expenditure after a single bout of moderate-intensity and high-intensity treadmill exercise in young females
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**Background:** The idea behind high-intensity interval training (HIIT) is that an individual will burn a greater amount of calories and fat in a shorter period of time than moderate-intensity exercise. While beneficial changes have been seen when HIIT is incorporated into training programs, there is still information about HIIT that is unknown. At moderate intensities, triacylglycerol is the predominant fuel source based on percentage while carbohydrates are the predominant fuel during high-intensity exercise. Serum fatty acid (FFA) can be used as marker of fat utilization during and after exercise. The purpose of this investigation was to determine the amount of FFA released during moderate-intensity and high-intensity treadmill running in endurance trained females.

**Methods:** Seven female runners (VO2MAX ≥42.0 ml/kg/min) volunteered to participate in this study and completed a baseline VO2MAX treadmill test and a dual-energy x-ray absorptiometry scan (DEXA) to determine fitness level and body composition. Participants then completed either a 45-minute run at 6mph or 10 30-second sprints with 30 seconds of rest between each sprint. After seven days, the participants returned to perform the other running protocol, in a crossover manner. While performing both protocols, participants were connected to the TrueOne ParvoMedics metabolic cart to determine macronutrient utilization (protein) and caloric expenditure. Blood was drawn immediately before (0min), 30-minutes post (30min), and 60-minutes (60min) post-exercise and analyzed for serum free fatty acids. Data were analyzed using a repeated measures ANOVA [2 (group) x 3 (time)] and [2 (group) x 2 (time)], and one-way ANOVA for calorie expenditure. Significance was set at p ≤ 0.05. Consent to publish the results was obtained from all participants.
Results: Both groups had a significant linear increase in FFA from 0min to 30min (p = 0.028), 30min to 60min (p = 0.05), and 0min to 60min (p = 0.014). There was a significant difference between groups from 0min to 60min (p = 0.005) with the run having a greater amount of FFA in the blood compared to the sprints. There was a significantly greater increase in FFA for the run for 0min to 30min (p = 0.003) but no difference from 30min to 60min (p = 0.507) compared to the sprints. RER was significantly greater for sprinting (p = 0.014) compared to running. The percent carbohydrate usage was significantly greater for sprinting (p = 0.007) and percent fat usage significantly greater for running (p = 0.007) when comparing running and sprinting. There was no significant difference between protocols for caloric expenditure per minute (p = 0.515).

Conclusion: The results from this investigation indicate that both moderate- and high-intensity running result in significant increases in FFA with moderate-intensity running having a significantly greater increase in FFA from immediately before to 30 minutes post-exercise.

P25
Effects of intermittent fasting on markers of body composition and mood state
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Background: Optimal athletic performance is often linked to body composition, therefore depending on sport and position, a decrease in body fat would lead toward an increase in athletic fitness. A recent trend in decreasing body fat while maintaining muscle has emerged, called intermittent fasting. Some research has suggested that ingesting calories only in a certain time frame during the day (8 hour, 10-hour window) would put the body into fat metabolism while avoiding muscle catabolism during the remaining fasting hours. The purpose of this study is to investigate the effects of intermittent fasting and resistance training on body composition, mood state, and resting energy expenditure.

Methods: Twenty-four participants (males n= 8 and females n= 16) volunteered to participate in this study and were randomly assigned to one of three groups: Resistance training only (RT), where they performed 4 upper and lower body split workouts a week, Intermittent Fasting only (IMF), this group consumed calories in an 8 hour window while maintaining normal free living activity, and Intermittent Fasting plus Resistance Training (IMFRT), this group participated in 4 workouts per week as well as only ingesting calories within the 8 hour window. Participants completed baseline testing consisting of Resting Energy Expenditure on a TrueOne ParvoMedics metabolic cart to determine caloric need, as well as measuring body composition using dual energy x-ray absorptiometry scan (DEXA). For the next 30 days the participants followed their group protocol, while coming in at day 15 for a weigh-in and x-ray absorptiometry scan (DEXA). The final testing session occurred at the end of the 30-day workout and/or dietary intervention. Data analysis was performed using a MANCOVA [3(group)x2(time) gender as a covariate], as well as Independent Samples T-Test to determine individual group differences, post hoc test were set at p<0.05.

Consent to publish the results was obtained from all participants.

Results: There was a significant linear interaction shown for lean mass from Day 1 to Day 30 (p=0.002). A significant difference in Resting Energy Expenditure was also found for the groups (p=0.010). Independent samples t-tests found a significant difference in weight (p=0.037) as well as fat mass (p=0.036) between the Intermittent Fasting plus Resistance Training group compared to the Resistance training only group. There were no significant differences shown between the Intermittent Fasting plus Resistance Training and Intermittent Fasting only. Also when compared, the Intermittent Fasting and Resistance Training only group had no significant differences. A Nonparametric tests reviled no significant differences between mood states for the groups.

Conclusion: An 8-hour eating and 16-hour fasting day resulted in a decrease in fat mass as well as weight for the Intermittent Fasting plus Resistance Training group when compared to the Resistance Training only group. On the other hand no differences were found between the Resistance Training only group and Intermittent Fasting group, hinting to that intermittent fasting alone may not be affective in decreasing body fat percent. However, when paired with resistance training, lean mass can be retained and/or enhanced while decreasing body fat, thus enhancing body composition.

P26
Bio-active peptides (Biogro™) supplementation improves work capacity during short-term resistance exercise in men
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Background: Inadequate recovery between training sessions leads to fatigue and imposes a hindrance on exercise performance. Bio-Active Peptides (BAPs) supplementation has been shown to reduce recovery time between strenuous exercise bouts and improve work capacity during subsequent bouts in athletes. However, few investigations have explored the efficacy of BAP supplementation on early performance adaptations in previously untrained men.

Methods: Maximal dynamic strength (kg) of leg press (LP), leg extension (LE), chest press (CP), and low row (LR) exercises was assessed of eighteen untrained men (22.3 ± 2.8y; 25.3 ± 5.5kg-m2) who volunteered to participate in this study. Lower body strength was assessed via one-repetition maximum (1RM) testing; upper body strength was estimated as [repetition weight]1/0.278[0.278][reps]. Participants were randomized into either a training only group (RT) or training + BAP supplementation (COL) (3g/day for 28 days). All participants completed four weeks of training (3 days/week; 12 total sessions) wherein each exercise was performed at 80% 1RM for 3 x 8-10 reps. Daily training volume was calculated as weight x reps. Changes in daily training volume were analyzed using magnitude-based inferences, calculated from 90% confidence intervals. Consent to publish the results was obtained from all participants.

Results: Analyses revealed that BAP supplementation provided an 80.8% chance of increasing total training volume from Week 1 to Week 2 compared to the RT group. From Week 1 to Week 3, BAP supplementation had a 50.9% chance of increasing total training volume compared to the RT group. BAP supplementation provided a 60.7% and 34.0% chance of increasing total training volume from Week 1 to Week 4 and Week 2 to Week 3, respectively. From the first to last training sessions, BAP supplementation displayed a 90.9% chance of increasing total training volume compared to the RT group. Conclusions: Untrained individuals are especially susceptible to fatigue and soreness following exercise and often warrant extended recovery time at the onset of a training program. The current results suggest that supplementing with BAPs during the early phase of a training program may aid in reducing the recovery time between bouts of strenuous exercise. By encouraging faster recovery, BAP supplementation may promote earlier adaptations to training (i.e., increased strength and training volume) as compared to training without supplementation.

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P27
Frequency of eating occasions and dietary supplement use in competitive brazilian jiu-jitsu athletes: preliminary results of an ongoing study
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Background: Brazilian jiu-jitsu (BJJ) is a dynamic martial art that can potentially tax both the anaerobic and aerobic metabolic systems of the body. Although BJJ has been practiced for decades in Brazil, it has only been practiced in the United States for ~ 20 years and has steadily increased in popularity since that time. There is a lack of research describing the physiological profiles and nutritional habits of advanced BJJ practitioners.
Methods: Apparently healthy, males between the ages of 18-44, who are currently training in Brazilian jiu-jitsu were recruited and volunteered to participate in this ongoing study. Along with assessing various measures of physical fitness, 24-hour dietary records were obtained to assess basic nutritional parameters including eating occasions and recent dietary supplement usage in advanced [purple belt or higher] Brazilian jiu-jitsu practitioners. Consent to publish the results was obtained from all participants.

Results: Results are presented as means ± standard deviations. The average age of the subjects was 31 ± 7.3 years. The average height was 175.7 ± 7.2 cm, average weight was 78.7 ± 7.9 kg, and body fat percentage was 9.5 ± 1.9%. The average duration of BJJ experience was 8.4 ± 4.6 years. Based on the self-reported dietary record, the frequency of eating occasions was 4.8 ± 0.4 occasions per day. 80% of the participants reported consuming some form of dietary supplement in the previous 24 hours. Dietary supplements consumed included vitamin supplements, protein shakes, meal replacement products, and pre-workout energy drinks.

Conclusion: This limited preliminary data provides insight into basic patterns of eating frequency and dietary supplement use in advanced Brazilian jiu-jitsu practitioners. However, more research is needed to make more conclusive statements regarding the profiles of this demographic.

P28 Correlation between body composition and biomechanical measurements of performance for mixed martial arts athletes – a pilot study
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Background: Mixed Martial Arts is a weight-category dependent sport, and its athletes often attempt to maintain a body weight that is relatively close to their fighting class. However, they frequently experience moderate to high levels of training intensity, long term lack of recovery, and a habitual state of nutritional deficit as part of their training. Front, prep, and competition. As a result, their body fat percentages remain relatively low (6-13%); however, they must also be able to retain a relatively high level of certain biomechanical capacities in order to maintain their competitiveness in the sport. If they are not capable of accomplishing both variables successfully, a marked decrease in their performance is likely.

Methods: This pilot study examined how two biomechanical measurements of performance (Force Production and Anaerobic Tolerance) correlated to Body Composition in experienced male MMA athletes that volunteered to participate in this study. The athletes’ training regimens consisted on average of two hours per day, five days per week of moderate to high intensity exercise, and included the following sport-specific related skills: Muai Thai; Brazilian Ju Jitsu; MMA sparring; strength and conditioning training. Nutrition protocol included the following general parameters: 50-60% of calories from CHO; 0.75-1 gram protein per lb of body weight; 20-25% of calories from lipid; adequate hydration of at least 1 gallon of water per day. Tests conducted consisted of a deadlift until failure, a 300 yard shuttle run, and Caliper/circumference measurements. A force plate was employed during the deadlift to measure Force Production; the shuttle run was timed to account for Anaerobic Tolerance; and the measurements determined Body Composition using the Jackson / Pollock seven site method. Consent to publish the results was obtained from all participants.

Results: A correlation analysis, assessing the relationship between two biomechanical Measures and Body Fat Percentage, determined a positive correlation (R2 = 0.65) between Force Production and Body Fat Percentage. In addition, an even stronger positive correlation (R2 = 0.77) existed between Anaerobic Tolerance and Body Fat percentage.

Conclusion: This pilot study found that certain biomechanical measures for performance, in particular, Force Production and Anaerobic Tolerance, are consistently correlated with a body fat between 6 and 13 percent for experienced, male MMA athletes. As these variables are closely related to the performance of these athletes, the results of this pilot study demonstrate the need for a study that investigates how these biomechanical measures, and others, may be improved upon, while at the same time, maintaining a body fat percentage advantageous to the athletes.

P29 Sport-specific reaction time after dehydration varies between sexes
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Background: Dehydration has been shown to decrease sports performance. However, the exact cause of the decreased performance due to dehydration is still unclear. PURPOSE: To compare sport-specific reaction time values between men and women at different quartiles after a dehydrating protocol to approximately 2% body mass loss.

Methods: Ten women and eleven men between the ages of eighteen and thirty-five volunteered to participate in the study (27 +/- 4yr, 78.7 +/- 14.8 kg, 174.0 +/- 7.5 cm). Subjects reported to the lab in a fasted and normally hydrated state and completed a two-minute, multi-directional sport-specific reaction time test. Subjects then ran on a treadmill at 80% estimated max HR for 30 minutes, followed by multiple 15 minute sessions in a dry sauna at approximately 150 degrees F. After reaching a 2% (+/- 0.4%) reduction in dry body weight subjects completed the same procedures as pre-dehydration. Reaction times were separated into quartiles (each quartile being a 30-second interval of the two minutes) and averaged to examine the data within each test. Consent to publish the results was obtained from all participants.

Results: The average total (Q1-Q4) reaction time for men and women combined after dehydration (1375 +/- 210 milliseconds (ms)) was significantly higher than before dehydration (1305 +/- 178 ms; p = 0.0040). The average total reaction time for women after dehydration (1366 +/- 400 ms) was significantly higher than before dehydration (1304 +/- 380 ms; p = 0.0048). However, men did not demonstrate a significant change in reaction time from pre (1305 +/- 300 ms) to post-dehydration (1383 +/- 0.0516 ms; p = 0.066). When quartiles were compared, the average reaction time for women was significantly higher in the third quartile of post-dehydration (1404 +/- 245 ms; p = 0.022) and the fourth quartile of post-dehydration (1412 +/- 263 ms; p = 0.019) than the first quartile of pre-dehydration (1272 +/- 198 ms). Regarding men, the average reaction time was significantly higher in the first quartile of post-dehydration (1427 +/- 220 ms) than the first quartile of pre-dehydration (1285 +/- 149 ms; p = 0.040), the second quartile of pre-dehydration (1285 +/- 189 ms; p = 0.012), the third quartile of pre-dehydration (1338 +/- 200 ms; p = 0.018), and the fourth quartile of pre-dehydration (1312 +/- 236 ms; p = 0.013). Additionally, the average reaction time was significantly higher in the second quartile of post-dehydration (1353 +/- 211 ms) than the first quartile of pre-dehydration (1285 +/- 149 ms; p = 0.046).

Conclusions: Dehydration appears to affect the sport-specific, total body reaction time performance of athletic men and women differently. Overall, average reaction time was significantly greater after dehydration for the combined group of men and women; however, women’s average reaction time was significantly greater after dehydration, and men’s reaction time trended upward, but did not reach significance. When divided into quartiles, the data suggest that women slowed down (i.e., higher reaction time) within each test and between the pre and posttests, though significance was only observed when comparing the beginning of pre-dehydration and the end of post-dehydration. Regarding quartiles with men, the highest time point was the beginning of the post-dehydration test, and their subsequent reaction times trended lower from quartile to quartile, suggesting improvement. Future studies
could include more subjects or a longer test in order to elucidate the discrepancy of these data. Nevertheless, this study suggests that sex differences exist regarding effects of dehydration, such that women’s reaction time performance was significantly affected, whereas men’s performance did not change significantly, due to a possible recovery of performance during the test.

**P30**

**Safety of 28 days consumption of a pre-workout supplement**

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**Background:** In recent years, the consumption of multi-ingredient supplements in the pre-exercise time period in order to obtain ergogenic benefits has become increasingly popular. Ingesting pre-workout supplement(s) (PWS) is one approach used by athletes and recreational populations to aid performance and maximize training adaptations. Purposed benefits include increases in strength, improved focus, and sustained energy during exercise. While research exists on the ergogenic benefits of PWS, less is known regarding the safety and potential side effects of chronic consumption. Therefore, the purpose of this study was to examine the safety of consuming a PWS containing caffeine, nitrates, and amino acids over a 28 day period.

**Methods:** Forty-nine recreationally active males and females (27 ± 5 y, 172 ± 10 cm, 75.12 ± 16.06 kg) volunteered to participate in this study and were randomly divided into three groups. A control group received no PWS. The remaining two groups were instructed to ingest either one (G1) or two (G2) servings of the PWS containing caffeine, nitrates, and amino acids (Iron Pump®, MusclePharm Corp., Denver, CO) every day for 28 days. All groups were instructed to maintain normal dietary and exercise habits for the 28 days. Fasting blood and urine samples and hemodynamics were taken before and after the supplementation period. A repeated measures ANCOVA was used to analyze all data. Consent to publish the results was obtained from all participants.

**Results:** Group by time interactions existed for carbon dioxide (CO2). Wherein, the control decreased from pre to post and G2 increased from pre to post and to a greater extent than control and G1. Group by time interactions existed for red blood cell distribution width (RDW). Wherein, G1 decreased relative to control, and G2 increased relative to G1. Group by time interactions existed for globulin. Wherein, G1 increased relative to control, and G2 increased relative to G1. Group by time interactions were present for sodium. Wherein, G1 increased from pre to post and relative to control. Group by time interactions existed for aspartate aminotransferase (AST). Wherein, G1 decreased from pre to post and relative to control, and G2 decreased relative to control and G1. Group by time interactions were present for alanine aminotransferase (ALT). Wherein, G1 decreased from pre to post and relative to control, and G2 decreased relative to control and G1. No other differences were observed, and all values remained within the normal clinical reference ranges.

**Conclusions:** PWS containing similar ingredients appear to be safe for chronic consumption in recreationally active male and female populations when taken within recommended dosage guidelines. However, it may be contraindicated to consume a PWS on a daily basis for those with a predisposition to illnesses related to CO2, RDW, globulin, or sodium. Although, some variables displayed inconsistent results, such as RDW, which decreased in G1 and increased in G2. Additionally, AST and ALT decreased in the PWS groups, which is not a cause for concern.

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**P31**

**Powdered tart cherry supplementation demonstrates benefit on markers of catabolism and muscle soreness following an acute bout of intense lower body resistance exercise**


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**Background:** Consumption of tart cherry juice has been reported to effectively reduce inflammation, muscle damage, and muscle soreness following bouts of exercise. The purpose of this study was to determine if consumption of a powdered form of tart cherries derived from tart cherry skins prior to and following intense resistance exercise promotes similar positive results as seen with tart cherry juice consumption.

**Methods:** 23 resistance trained men (20.9±2.6 yr, 14.2±5.4 kg body fat, 63.9±8.6 kg FFM) volunteered to participate in this study and were matched based on relative maximal back squat strength, age, body weight, and fat free mass. Subjects were randomly assigned to ingest, in a double blind manner, capsules containing a placebo (P, n=12) or powdered tart cherries (CherryPURE® Freeze Dried Tart Cherry Powder [TC, n=11]). Participants ingested the supplements one time daily (480 mg/d) for 10-d including day of exercise up to 48-hr post-exercise. Participants performed 10 sets of 10 repetitions at 70% of 1RM barbell back squat with 3 minutes recovery between sets, maintaining equivalent average work values between groups throughout the protocol (p=0.24). Participants rated perceptions to a standardized application of pressure via an algometer on the dominant thigh at 3 designated locations using a 10-point visual analogue scale to assess muscle soreness/tenderness over the course of the testing protocol. Fasting blood samples and VAS ratings of muscle soreness were taken pre-squat workout, 60-minutes following the squat workout as well as after and 48 hours of recovery and analyzed by MANOVA with repeated measures. Consent to publish the results was obtained from all participants.

**Results:** Pain ratings from all 3 quadriceps locations (p<0.001); AST, ALT, CK, BUN/Cr ratio, UA (p<0.001) all demonstrated significant changes in both groups over time, but the overall Wilks’ Lambda MANOVA analysis did not reveal a significant group x time effect for any pain ratings (p=0.199); AST, ALT, CK, BUN/Cr ratio, UA (p=0.605); cortisol, testosterone, CORT/TEST ratio (p=0.35). MANOVA univariate analysis revealed significant time effects for all locations of pain ratings (p<0.001); AST, UA, (p<0.001) cortisol, testosterone (p<0.001); CK (p=0.003); and CORT/TEST ratio (p=0.022) in both groups in addition to trends for both groups over time for ALT (p=0.094) and BUN/Cr ratio (p=0.059). A significant group x time quadratic effect was shown for v. lateralis [%] pain perception (p=0.024) with a trend toward a significant cubic interaction for the v. lateralis [%] pain perception (p=0.10). No significant group x time interaction was evident in pain perception from the v. medialis [%] (p=0.24), but a delta value trend was shown based on v. medialis [%] pain perception differences in group assignment (p=0.10). A significant group x time linear effect was shown for UA (p=0.014) along with a trend toward a significant linear interaction (p=0.067) and a significant delta value based on group assignment for ALT (p=0.005). A trend toward a significant group x time linear effect was shown for cort/test ratio (p=0.10). No significant group x time interactions were evident for cortisol (p=0.45) and testosterone (p=0.17).

**Conclusion:** Results of this study indicate that acute supplementation with powdered tart cherries over the 7 days leading up to, during, and 2 days after intense resistance exercise helps to minimize post-training perceptions of pain in the most biomechanically loaded regions of the quadriceps muscle group associated with the back squat compared to a placebo. Additionally, powdered tart cherry supplementation helped attenuate the hepatic response of ALT and catabolic/antioxidant response of UA following a bout of intense resistance exercise. Overall, these findings suggest that supplementation with a powdered tart cherry product surrounding an intense resistance event reduces pain perception in addition to hepatic and catabolic stress in the post-exercise period.
Further research is necessary to determine long-term supplementation effects with resistance training.

**Acknowledgment:** Supported by Anderson Global Group, LLC (Irvine, CA) and Shoreline Fruit, LLC (Traverse City, MI)

### P32

**Powdered tart cherry supplementation moderates post-exercise immunosuppression, total cholesterol, and antioxidant status with no effect on performance recovery following an acute bout of intense lower body resistance exercise**


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**Background:** Consumption of tart cherry juice has been reported to effectively reduce inflammation, muscle damage, and muscle soreness following bouts of exercise. The purpose of this study was to determine if consumption of a powdered form of tart cherries derived from tart cherry skins prior to and following intense endurance exercise promotes similar positive results as seen with tart cherry juice consumption.

**Methods:** 23 resistance trained men (20.9±2.6 yr, 14.2±5.4% body fat, 63.9±8.6 kg FFM) volunteered to participate in this study and were matched based on relative maximal back squat strength, age, body weight, and fat free mass. Subjects were randomly assigned to ingest, in a double blind manner, capsules containing a placebo (P, n=12) or powdered tart cherries (CherryPURE® Freeze Dried Tart Cherry Powder [TC, n=11]). Participants ingested the supplements one time daily (480 mg/d) for 10-d including day of exercise up to 48-hr post-exercise. Participants performed 10 sets of 10 repitions at 70% of 1RM barbell back squat with 3 minutes recovery between sets, maintaining equivalent average work values between groups throughout the protocol (p=0.24).

Isokinetic knee extension/flexion maximal voluntary contractions (MVCs) and fasting blood samples were taken pre-squat workout, 60-minutes following the squat workout as well as after 24 and 48 hours of recovery and analyzed by MANOVA with repeated measures. Consent to publish the results was obtained from all participants.

**Results:** Overall changes in WBC, LYM (p<0.001), extension/flexion MVCs (p<0.001), and RBC, HCT, TG, TotCHL (p=0.048) were observed in both groups over time, but the overall Wilks’ Lambda MANOVA analysis did not reveal a significant group x time effect for WBC and LYM (p=0.39); extension/flexion MVCs (p=0.83); RBC, HCT, TG, andTotCHL (p=0.42). MANOVA univariate analysis revealed significant effects in LYM (p<0.001) in both groups over time, but no significant effects were seen in WBC (p=0.151). MANOVA univariate analysis revealed a significant group x time linear effect was shown for LYM (p=0.013) in addition to a trend toward a significant delta value based on group assignment for LYM (p=0.10). An overall trend for SOD and TAS changes in both groups over time (p=0.076) was demonstrated, but the overall MANOVA analysis did not reveal a significant group x time effect (p = 0.29). Further, a group x time cubic effect for SOD (p=0.046) was indicated in the univariate analysis. MANOVA uni-variate analysis indicated a significant group x time linear effect for TotCHL (p=0.009) with a significant delta value based on group assignment (p=0.014). No significant group x time effects were found for RBC (p=0.97), HCT (p=0.76), and TG (p=0.46). MANOVA univariate analysis revealed significant effects for all EXT MVCs (I-III) (p<0.001) in both groups over time, but no significant group x time effects were found for all FLEX MVCs (I) (p=0.25), II (p=0.21), III (p=0.46).

**Conclusion:** Results of this study indicate that short-term supplementation with powdered tart cherries over the 7 days leading up to, during, and 2 days after intense resistance exercise aids in overcoming the post-exercise immunosuppression (PEIS) phenomenon typically seen in trained athletes as indicated by a significantly greater post-exercise LYMHPH response compared to the placebo. Further, as a result of powdered tart cherry supplementation compared to a placebo, the SOD response was also significantly lower suggesting a diminished release of ROS in response to the resistance exercise bout. Performance recovery as assessed from isokinetic knee extension and flexion exercise was unaffected by supplementation with powdered tart cherry versus a placebo. Overall, these findings suggest that supplementation with a powdered tart cherry product surrounding an intense resistance event reduces the effect of PEIS in trained individuals, total serum cholesterol levels, and the free radical response typically associated with intense resistance exercise. Further research is necessary to determine long-term supplementation effects with resistance training.

**Acknowledgment:** Supported by Anderson Global Group, LLC (Irvine, CA) and Shoreline Fruit, LLC (Traverse City, MI)

### P33

**Powdered tart cherry supplementation effectively reduces markers of catabolism and perceptions of muscle soreness following an acute bout of intense endurance exercise**


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**Background:** Consumption of tart cherry juice has been reported to effectively reduce inflammation, muscle damage, and muscle soreness following bouts of exercise. The purpose of this study was to determine if consumption of a powdered form of tart cherries derived from tart cherry skins prior to and following intense endurance exercise promotes similar positive results as seen with tart cherry juice consumption.

**Methods:** 27 endurance trained or triathlete (21.8±2.9 yr, 15.0±6.0% body fat, 67.4±11.8 kg) men (n=18) and women (n=9) volunteered to participate in this study and were matched based on average reported race pace, age, body weight, and fat free mass. Subjects were randomly assigned to ingest, in a double blind manner, capsules containing a placebo (P, n=16) or powdered tart cherries (CherryPURE® Freeze Dried Tart Cherry Powder [TC, n=11]). Participants ingested the supplements one time daily (480 mg/d) for 10-d including day of exercise up to 48-hr post-exercise. Rate perceptions to a standardized application of pressure via an algometer on their dominant thigh at 3 designated locations using a 10-point visual analogue scale were implemented to assess muscle soreness/tenderness over the course of the testing protocol. A half-marathon run (13.1 mi/21.1 k) was completed under 2-hr (111.98±11.9 min) as the intense endurance exercise protocol. Fasting blood samples and VAS ratings of muscle soreness following a powdered form of tart cherry versus a placebo. Overall, these findings suggest that supplementation with a powdered tart cherry product surrounding an intense resistance event reduces the effect of PEIS in trained individuals, total serum cholesterol levels, and the free radical response typically associated with intense resistance exercise. Further research is necessary to determine long-term supplementation effects with resistance training.

**Acknowledgment:**Supported by Anderson Global Group, LLC (Irvine, CA) and Shoreline Fruit, LLC (Traverse City, MI)
2 days after intense endurance exercise helps to minimize post-training perceptions of pain in the most biomechanically loaded regions of the quadriceps muscle group associated with running impact compared to a placebo. Additionally, powdered tart cherry supplementation is also proven to help attenuate the catabolic response of cortisol following a bout of intense endurance exercise. This attenuation of the catabolic response following the acute bout of endurance exercise is substantiated by a significantly lower BUN/creatinine ratio in the powder tart cherry group versus those supplementing with the placebo. Overall, these findings suggest that supplementation with a powdered tart cherry product surrounding an intense endurance event reduces pain perception and catabolic stress in the post-exercise period. Further research is necessary to determine long-term supplementation effects with endurance training.

Acknowledgment: Supported by Anderson Global Group, LLC (Irvine, CA) and Shoreline Fruit, LLC (Traverse City, MI)

Background: Consumption of tart cherry juice has been reported to effectively reduce inflammation, muscle damage, and muscle soreness following bouts of exercise. The purpose of this study was to determine if consumption of a powdered form of tart cherries derived from tart cherry skins prior to and following intense endurance exercise promotes similar positive results as seen with tart cherry juice consumption.

Methods: 27 endurance trained or triathlete (21.8±3.9 yr, 15.0±6.0% body fat, 67.4±11.8 kg) men (n=18) and women (n=9) volunteered to participate in this study and were matched based on average reported race pace, age, body weight, and fat free mass. Subjects were randomly assigned to ingest, in a double blind manner, capsules containing a placebo (P, n=16) or powdered tart cherries (CherryPURE® Freeze Dried Tart Cherry Powder [TC, n=11]). Participants ingested the supplements one time daily (480 mg/d) for 10-d including day of exercise up to 48-hr post-exercise. A half-marathon run (13.1 mi/21.1 km) was completed under 2-hr (111.98±11.9 min) as the baseline VO2, VCO2, and REE test. Participants repeated the experiment after a one week washout period with the alternate supplements in a randomized and controlled manner for WBC (P), heart rate (HR), 12-lead electrocardiographs (ECG), and resting energy expenditure (REE) measured for 10 minutes. Participants then ingested in a randomized and counterbalanced manner a dextrose flavored placebo (P); a pre-workout supplement (PWS) containing 3.0 g beta alanine, 2 g creatine nitrate, 2 g arginine AKG, 300 mg of N-acetyl tyrosine, 270 mg caffeine, 15 mg of Mucuna pruriens; or, the PWS with 20 mg of synephrine (PWS-S). Metabolic changes were measured continuously while BP, HR, and ECG's were obtained every 10 minutes during the REE test. Participants repeated the experiment after a one week washout period with the alternate supplements in a randomized and counterbalanced manner. Data were analyzed by repeated measure MANOVA and are presented as means ± SD or SEM from baseline. Consent to publish the results was obtained from all participants.

Results: Overall changes in markers of general immune response, WBC and LYM/PH, were observed in both groups over time (p<0.001), but the overall Wilks’ Lambda MANOVA analysis did not reveal a significant group x time effect (p=0.22) for these markers. MANOVA univariate analysis revealed significant effects for LYM/PH and WBC (p<0.001) in both groups over time. A significant group x time quadratic effect was shown for WBC (p=0.034) in addition to a trend toward a significant delta value based on group assignment for WBC (p=0.09). The overall Wilks’ Lambda MANOVA analysis did not reveal a significant time effect (p=0.78) or group x time effect (p=0.32) for SOD and TASM. MANOVA univariate analysis revealed a significant group x time linear effect for TAS (p=0.046) in addition to a trend toward a significant delta value based on group assignment for TAS (p=0.099). No significant group x time interaction was evident with SOD (p=0.73). Overall changes in RBC, HCT, TG, and TotCHL were observed in both groups over time (p<0.001), but the overall MANOVA analysis did not reveal a significant group x time effect (p=0.438). MANOVA univariate analysis revealed significant group x time cubic effect for TG (p=0.043). No significant group x time interaction was evident with RBC (p=0.46), HCT (p=0.48), and TotCHL (p=0.73).

Conclusion: Results of this study indicate that short-term supplementation with powdered tart cherries over the 7 days leading up to, during, and 2 days after intense endurance exercise aid in reduction of the general immune response as indicated by a significantly lower WBC response post-exercise compared to a placebo supplement. The mitigated immune response following exercise with powdered tart cherry supplementation correlates with the decreased catabolic response indicated by BUN/Cr ratio and cortisol levels reported in a companion abstract. Further, as a result of significant tart cherry supplementation compared to a placebo, the TAS response was also significantly lower suggesting a diminished release of ROS and RNS in response to the endurance exercise bout. With powdered tart cherry supplementation compared to a placebo, blood triglyceride levels were also significantly reduced over the post-exercise recovery period. Overall, these findings suggest that supplementation with a powdered tart cherry product surrounding an intense endurance event reduces the general immune and free radical response typically correlated with endurance exercise in addition to reducing serum triglyceride levels. Further research is necessary to determine long-term supplementation effects with endurance training.

Acknowledgment: Supported by Anderson Global Group, LLC (Irvine, CA) and Shoreline Fruit, LLC (Traverse City, MI)

Background: A number of nutritional strategies have been developed to optimize nutrient delivery prior to exercise. As a result, a number of pre-workout supplements have been developed to increase energy availability, promote vasodilation, and/or positively affect exercise capacity. The purpose of this study was to examine the acute effects of ingesting a pre-workout dietary supplement with and without synephrine on energy metabolism and cardiovascular hemodynamics.

Methods: In a double-blind, crossover, randomized and placebo-controlled manner, 25 apparently healthy and recreationally active men and women (21.7±3.00 yr, 15.2±4.56% fat, 25.0±9.30 kg/m2) volunteered to participate in this study and had resting blood pressure (BP), heart rate (HR), 12-lead electrocardiographs (ECG), and resting energy expenditure (REE) measured for 10 minutes. Participants then ingested in a randomized and counterbalanced manner a dextrose flavored placebo (P); a pre-workout supplement (PWS) containing 3.0 g beta alanine, 2 g creatine nitrate, 2 g arginine AKG, 300 mg of N-acetyl tyrosine, 270 mg caffeine, 15 mg of Mucuna pruriens; or, the PWS with 20 mg of synephrine (PWS-S). Metabolic changes were measured continuously while BP, HR, and ECG’s were obtained every 10 minutes during the REE test. Participants repeated the experiment after a one week washout period with the alternate supplements in a randomized and counterbalanced manner. Data were analyzed by repeated measure MANOVA and are presented as means ± SD or SEM from baseline. Consent to publish the results was obtained from all participants.

Results: MANOVA analysis revealed a significant overall overall Wilks’ Lambda time (p<0.001) and time x group interactions (p<0.001) for oxygen uptake (VO2), carbon dioxide production (VCO2), minute ventilation (Ve), respiratory exchange ratio (RER), and REE values. MANOVA Greenhouse-Geisser univariate analysis revealed significant interactions among groups in VCO2 (p<0.003) and RER (p<0.001) with a trend towards significance in REE (p=0.098). Delta analysis revealed significant differences among groups in mean change in VO2 (P: 3.8±5.2; PWS: 15.4±5.2; PWS-S: 23.5±5.2 ml/min; p=0.03), VCO2 (P: 12.5±1.1; PWS: 31.8±1.5; PWS-S: 37.7±1.5 ml/min; p=0.002), RER (P: 0.03±0.009; PWS: 0.07±0.009; PWS-S: 0.07±0.009; p=0.005), and REE (P: 0.03±0.025; PWS: 0.09±0.025; PWS-S: 0.13±0.025 kcal/min; p=0.02) with significant differences among the placebo group with supplemented groups. PWS-S ingestion promoted a more prominent increase in VO2, VCO2, and REE during the initial 5-10 minutes after ingestion with differences minimizing thereafter. Area under the curve (AUC) analysis of changes from baseline revealed that PWS-S and PWS supplementation resulted in significantly greater AUC values than P in VO2 (PWS-S: 1.034±0.84; PWS: 802±434; P: 684±576; p=0.01); VCO2
Ingesting a PWS containing beta alanine, creatine nitrate, arginine AKG, N-Acetyl Tyrosine, caffeine, and Mucuna pruriens increased resting VO2, VCO2, RER, and tended to increase REE values in comparison to a placebo. Addition of 20 mg of synephrine to the PWS resulted in a greater increase in the metabolic response during the first 5-10 minutes after ingestion, but differences were not as apparent thereafter (and AUC values) were not significantly different between the PWS and PWS+S groups. PWS and PWS+S ingestion did not result in a significantly different HR or BP responses during the REE test in comparison to P responses. Results indicate that ingestion of these pre-workout supplements promoted modest thermogenic response and that addition of 20 mg of synephrine to the PWC provided limited additional benefit.

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P36

Effects of ingesting a pre-workout supplement with and without synephrine on cognitive function, perceptions of readiness to perform, and exercise performance

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Background: A number of nutritional strategies have been developed to optimize nutrient delivery prior to exercise. As a result, a number of pre-workout supplements have been developed to increase energy availability, promote vasodilation, and/or positively affect exercise capacity. The purpose of this study was to examine the acute effects of ingesting a pre-workout dietary supplement with and without synephrine on cognitive function, perceptions of readiness to perform, and exercise performance.

Methods: In a double-blind, crossover, and placebo-controlled manner, 25 apparently healthy and recreationally active men and women (21.76±3.00 yr, 15.24±5.26% fat, 25.09±3.03 kg/m2) volunteered to participate in this study and performed a Stroup-Color cognitive function test (CFT) and rated perceptions of readiness to perform on a visual analogue scale (RTP-VAS). Participants then ingested in a randomized and counterbalanced manner a dextrose placebo (P); a pre-workout supplement (PWS) containing 3.0 g beta alanine, 2 g creatine nitrate, 2 g arginine AKG, 300 mg of N-acetyl tyrosine, 270 mg caffeine, 15 mg of Mucuna pruriens, and the PWS with 20 mg of synephrine (PWS+S). Approximately 30 minutes following ingestion of the supplements, participants performed a second CFT, completed a RTP-VAS, and then performed 3 sets of 10 repetitions at 70% of 1 repetition maximum (1RM) on the bench press and leg press with 2 minutes recovery between sets and 5 minutes recovery from exercise modes. Participants completed as many repetitions as possible during the final set. Following a 5-minute recovery, subjects also performed a 30-sec Wingate Anaerobic Capacity test on a cycle ergometer for determination of peak power (PP), mean power (MP), and total work (TW). Lastly, subjects performed a third CFT and RTP-VAS test. Participants repeated the experiment after a week washout period with alternate supplements provided in a randomized and counterbalanced manner. Data were analyzed by repeated measure MANOVA or ANOVA and are presented as means ± SEM from baseline. Consent to publish the results was obtained from all participants.

Results: Repeated measures MANOVA analysis revealed significant interactions among supplementation groups in ratings of “I am optimistic about my future performance” (P: 3.70±0.95; PWS: 4.05±0.79; PWS+S: 4.21 ±0.63; p<0.01), “I feel vigorous and energetic” (P: 3.35±0.91; PWS: 3.77±0.79; PWS+S: 3.89±0.74; p<0.01), and “I have little muscle soreness” (P: 3.42±1.00; PWS: 3.81±1.36; PWS+S: 3.27±1.29; p=0.04) 30 minutes after ingestion. MANOVA revealed an overall Wilks’ Lambda time (p<0.001) and time x group interaction (p<0.003) effect on the CFT results. Delta analysis revealed that mean changes in word (P=0.64±1.1; PWS: 5.37±1.1; PWS+S: 7.40±1.1; p<0.001), color (P=1.41±0.7; PWS: 4.01±0.7; PWS+S: 5.80±0.7; p=0.002), and word-color (P=1.8±1.0; PWS: 3.28±1.0; PWS+S: 5.41±1.0; p=0.03) were greater in the PWS and PWS+S groups than P with PWS+S word responses greater than PWS. There were no significant differences among groups in Wingate PP (P: 1.57±0.15; PWS: 1.50±0.16; PWS+S: 1.49±0.16; p=0.46; MP: (P: 602±132; PWS: 596±145; PWS+S: 583±188 W; p=0.60), or TW (P: 17.66±4.60; PWS: 17.85±4.41; PWS+S: 18.20±4.66; J; p=0.49; MANOVA revealed significant Wilks’ Lambda time and time x group (p<0.001) effects in bench press and leg press lifting volume in the final set of exercise. MANOVA univariate analysis revealed no significant Greenhouse-Geisser differences among groups in three set bench press lifting volume (P: 4,740±1.60; PWS: 4,890±1.61; PWS+S: 4,870±2.00; p=0.51), Leg press lifting volume differed among groups (P: 27,607±9.608; PWS: 28,903±9.559; PWS+S: 19,342±4,855; p<0.05) but PWS supplementation did not provide greater benefit than P. Conclusion: Ingesting a PWS and PWS+S with 20 mg of synephrine 30-minutes prior to exercise enhanced perceptions of readiness to perform and cognitive function with no significant effects on anaerobic capacity or isotonic lifting volume.

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P37

Utilization of non-invasive measures to evaluate eccentric exercise damage in an untrained population

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Background: One of the most common modes of exercise among males is resistance training. The associated movements among the most common resistance training exercises completed include periods of both concentric and eccentric contraction. Previous research has demonstrated that repeated eccentric contractions of a muscle produce damaging results to the muscles involved. Invasive measures, such as blood draws and muscle biopsies have been utilized to assess skeletal muscle damage in individuals. However, the efficacy of the utilization of Creatine Kinase concentration as a marker of recovery has recently been called into question. Furthermore, biopsies and blood draws may not be applicable to identify muscle damage and recovery in an untrained population for the nutritional or strength and conditioning professional.

Methods: Subjects (n=19) volunteered to participate in this study and were untrained (resistance training) male college students between the ages of 18-30. Untrained criteria consisted of less than two years lower body resistance training. Prior to completion of the study participants completed a health history questionnaire. Participants were asked to refrain from the completion of any physical activity for the duration of the study. The first day of testing included completion of a muscle soreness scale (DOMS), range of motion (ROM) of the dominant knee, swelling of the vastus lateralis (SWVL) via ultrasound (Teron T3200), Peak force measurement using an isokinetic dynamometer, a fatiguing exercise protocol on the dynamometer (a total of 50 eccentric contractions set at 120% of peak MVC force with an angular velocity of 60°/sec), followed immediately by post-test measurements of DOMS and peak force. The peak force measurement was determined using an isometric maximum voluntary contraction (MVC) of the quadriceps on the dynamometer with the knee joint held at 45°. The participants were then asked to return to the lab 24, 48 and 72 hours later. Each returning visit included a battery of tests comprising of measurements of DOMS, ROM, SWVL-Teeresaipe, SWVL-Long, SWVL-Trans and peak force. Repeated measures ANOVAs (placebo vs. multi ingredient supplement) were used to analyze changes in peak power, intramuscular swelling, DOMS, and ROM. The alpha level was set at p≤0.05. Consent to publish the results was obtained from all participants.

Results: Mean scores of DOMS for all participants differed significantly between baseline and immediate post (p<0.001), 24 (p=0.07), 48 (p=0.01), 72-hours (p<0.004) respectively. Also, significant differences for DOMS were found between baseline, post (p<0.001), 24 (p=0.07), 48 (p<0.01), and 72-hours (p<0.004). Further significant differences were observed between 24 and 48-hours (p<0.008), 48 and 72-hours (p<0.008). Mean scores for FForce differed significantly between baseline and immediate post (p<0.001), 24 (p<0.03), and 72-hours (p<0.002). Mean scores between baseline and 48-hours
were just barely non-significant (p=.06). ROM means were significantly different between 48-h and 72-hours (p=.009). SWWL-Long had a significant effect of time between pre-fatiguing and 72-hours (p=.045). No significant effects of time were found on the SWWL-Terascape measurement or SWWL-Trans.

Conclusion: We conclude that certain noninvasive measures can be utilized to determine muscle damage in an untrained population. This study further exemplified the importance of strength measurement being one of the key components of skeletal muscle damage. The utilization of panoramic or transverse ultrasound imaging to assess skeletal muscle swelling in an untrained population following eccentric exercise may not be warranted. Due to the small sample size, the main effect of time may not be able to be observed so future studies evaluating non-invasive measures of assessment may seek for a greater sample. Additionally, DOMS may be a reliable predictor of physiological performance and recovery in untrained male participants.

P38 The effects of probiotic supplementation on lean body mass, strength, and power, and health indicators in resistance trained males: a pilot study

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Background: While growing evidence suggests beneficial effects of probiotics on the gut-brain-axis, only a limited number of studies have investigated the impact of gut microbiota modulation on muscle physiology (gut-muscle-axis). The probiotic BC30 (Bacaneder Biotech Inc., Maryfield Heights, OH) has been shown to increase protein absorption and the anabolic potential of a respective protein source has been directly linked to peak plasma leucine levels. Post-workout administration of slow digesting proteins such as casein show inferior results on muscle protein synthesis in comparison to fast absorbed proteins such as whey. Thus, the purpose of this investigation was to determine if the co-administration of a probiotic with a slow digested protein has a beneficial effect on body composition, performance, and measures of perceived health.

Methods: 10 healthy resistance-trained individuals volunteered to participate in this study (mean±SD; age: 22.0±2.4 yr; height: 181.8±4.1 cm; weight: 85.6±12.9 kg). Subjects were randomly assigned to consume either 20g of casein (Control = CON) or 20g of casein plus probiotic (500M BC30, =BC30) twice daily. Subjects were instructed to consume one serving in the morning while the second serving was consumed after training or before bed on non-training days. With assistance from a dietitian, macronutrients were controlled to 50% carbohydrate, 25% protein, and 25% fat between groups using the Mifflin-St Jeor formula. Subjects performed full body workouts 4-times per week for 8 weeks consisting of hypertrophy (8-12 RM loads and 60 seconds rest), and strength (1-5 RM loads with 3-5 minutes rest) under supervision of the researchers in order to ensure compliance. Body composition (Dual X-Ray Absorptiometry; DXA), quadriiceps thickness (ultrasound), peak power (Monark Wingate Cycle), vertical jump power (Tendo unit), 1-RM bench press, and 1-RM leg press were measured at baseline and after the eighth week of supplementation. Perceived GI health (GSRS) was measured weekly and upper respiratory health (WURSS-21) daily. Consent to publish the results was obtained from all participants.

Results: BC30 showed a trend (p=0.10) to increase vertical jump power (BC30: pre 2,136 W, post 2,262 W; CON pre 1,712 W, post 1,691 W) and might have a beneficial effect on peak power and fat mass. There were no significant differences between groups for body composition, or other performance measures. Due to an overall very low number of incidences in digestive and immune health in both groups no meaningful analysis could be done.

Conclusions: This pilot study indicated that probiotic supplementation in form of BC30 in combination with a slow digesting protein might increase athletic performance. However, further research with a larger n-size is needed to confirm these findings.

P39 The effects of very high fat, very low carbohydrate diets on safety, blood lipid profile, and anabolic hormone status

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Background: Very low carbohydrate (<5 %), high fat (>70 %) (VLCKD) diets have previously been shown to decrease fat mass in obese or overweight individuals. The very high fat, high cholesterol diet has caused alarm and researchers question its safety. However, because lipids provide the raw substrate necessary for the biosynthesis of anabolic hormones such as testosterone the diet may have implications for athletes. PURPOSE: Therefore the purpose of this study was to investigate the effects of 11 weeks of VLCKD dieting on safety, blood lipid profile, and anabolic hormone status.

Methods: Twenty-six college aged resistance trained men volunteered to participate in this study and were divided into VLCKD (5 % CHO, 75 % Fat, 20 % Pro) or a traditional western diet (55 % CHO, 25 % fat, 20 % pro). All subjects participated in a periodized resistance-training program three times per week. Blood samples were taken at week 0 and 11 of the study and analyzed for safety (comprehensive metabolic panel, and comprehensive blood panel), blood lipid profile (triglycerides, HDL, LDL and total), and insulin and testosterone. Consent to publish the results was obtained from all participants.

Results: There were no differences in any of the safety parameters measured (CBC/CMP) in either the VLCKD or traditional group. Total cholesterol increased slightly in the VLCKD group while it decreased in the traditional western group. However this rise was driven by an increase in HDL in the VLCKD group (6.69 mg/dl) compared to the western (-1.6 mg/dl) with no changes in LDL. Triglycerides were significantly higher in the VLCKD group (29.3 mg/dl) than the western (-8.4 mg/dl). Total testosterone increased significantly in the VLCKD diet (118 ng/dl) as compared to the western (-36 ng/dl) while insulin increased significantly in the western group (3.7 uIu/ml) compared to the VLCKD (1.1 uIu/ml).

Conclusion: This study data suggests that a VLCKD is safe. In addition this diet strategy improves testosterone values while simultaneously increasing insulin sensitivity. Lastly, even though the total cholesterol increased in the VLCKD group, their HDL drove this response. Athletes looking to optimize their hormone levels while employing a safe dieting strategy can use a VLCKD.

P40 The effects of ketogenic dieting on skeletal muscle and fat mass

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Background: Very low carbohydrate (<5 %), high fat (>70 %) ketogenic diets (VLCKD) diets have previously been shown to have favorable changes in body composition (increased lean mass and decreased fat mass) in obese or overweight individuals. However, the impact of this dieting relative to a traditional high carbohydrate diet has not yet been investigated in resistance trained athletes. PURPOSE: Therefore the purpose of this study was to investigate the impact of VLCKD verses a traditional western diet on changes in muscle and fat mass.

Methods: Twenty-six college aged resistance trained men volunteered to participate in this study and were divided into VLCKD (5 % CHO, 75 % Fat, 20 % Pro) or a traditional western diet (55 % CHO, 25 % fat, 20 % pro). All subjects participated in a periodized resistance-training program three times per week. Body fat and lean mass were determined via dual xray absorptiometry (DXA), while muscle mass was determined via ultrasonography analysis of the quadriceps. All measures were taken at week 0 and 11. Consent to publish the results was obtained from all participants.

Results: Lean body mass increased to a greater extent in the VLCKD (4.3 ± 1.7 kg) as compared to the traditional group (2.2 kg ± 1.7). Ultrasound
These results indicate that VLCKD may have more favorable changes in LBM, muscle mass, and body fatness as compared to a traditional western diet in resistance trained males.

**P41 Effects of a ketogenic diet on strength and power**

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**Background:** The effects of a LC KD on endurance performance has been investigated several times, and it has already received a review. For this type of activity, no decrements in performance are observed once the participants are adjusted to the diet. However, LC KD’s are yet to be investigated in a resistance training model. One study has examined strength in relation to a LC KD, finding no decrements, yet this study failed to incorporate a well-controlled training protocol.

**Methods:** The subjects all participated in the LC KD then all participated in the control diet 3 months later. They were reported as having 30 hours of training per week, although the training is not adequately described. All participants volunteered to participate in this study. Additionally over the course of three months, a significant training adaptation could occur. Thus, the results of this study are inconclusive. Additionally, data is lacking for LC KD’s in a healthy population. We aim to investigate the effects of a LC KD compared to a high carbohydrate diet, more typically used by athletes, on measures of athletic performance and perceived effects of exercise to eight weeks of periodized resistance training. Consent to publish the results was obtained from all participants.

**Results:** For all strength and power measures there was a time effect. The 1RM bench press increased in both the LC KD (10.3±4.4kg) and western (9.5±4.0kg). The 1RM squat increased in both LC KD (12.7±5.9kg) and western (15.2±7.6kg). The wingate peak power increased in both the LC KD (51.8±64.7W) and western (80.5±66.8W).

**Conclusion:** Both the LC KD and western group experienced an increase in bench press 1RM strength, squat 1RM strength, and wingate peak power. In the literature there is a lack of studies testing a LC KD diet on strength and power performance. For purely aerobic performance, there is no difference between high carbohydrate and high fat as long as a 3-4 week period for adaptation to a high fat diet is permitted. However, one study attempted to simulate a race-like environment, which incorporated anaerobic sprints during the aerobic event. This study found that no differences were present during the aerobic portion, but the time to travel 4km in the sprint was significantly greater in the ketogenic group. In our study we were able to demonstrate that a LC KD can produce similar strength and power gains to a western diet.

**MyoT12 on skeletal muscle growth and strength in recreationally trained individuals.**

**Methods:** 37 recreationally trained college aged males volunteered to participate in this study and were divided equally into 3 groups receiving a placebo macronutrient matched control, 10 or 30 grams of MYOX (MyoS Corp) supplementation for 8 weeks. All subjects participated in a 12 week periodized resistance training split. DXA determined lean mass, ultrasonography determined muscle mass, and lower and upper body strength were measured pre and post 12 weeks of training. Consent to publish the results was obtained from all participants.

**Results:** Results indicated a group X time effect (p<0.05) for lean mass in which the 10 (+1.7 kg) and 30 gram (+1.68 kg), but not placebo (+0.6 kg) groups increased lean mass. Similarly there was a group X time effect for muscle thickness (p<0.05) in which the delta change (post – pre values) increased to a greater extent in the 10 (+ 0.26 cm) and 30 gram (+ 0.2 cm) conditions as compared to the placebo condition (+ 0.06). All groups increased equally in bench press and leg press strength.

**Conclusions:** Our findings indicate that MyoX supplementation is efficacious in increasing muscle mass in recreationally trained males. It is likely that the relatively novice subjects in this study experienced the majority of their strength gains via neural adaptations irrespective of changes in muscle size. Future research should investigate the impact of MYOX on females, as well as males who are highly trained and have plateaued in their ability to obtain neural adaptations.

**P43 Impact of glycogen resynthesis on lean mass**

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**Background:** It has frequently been demonstrated that resistance training has a negative effect on muscle glycogen content. Additionally, the rate of resynthesis seems to be dependent upon the degree of depletion. However, the impact of glycogen resynthesis on lean mass in a resistance trained population consuming a very low carbohydrate diet has yet to be examined. This has important implications for athletic populations as body composition appears to be related to performance. Therefore, the purpose of this study was to examine the effects of glycogen resynthesis on body composition in resistance trained individuals consuming a ketogenic diet.

**Methods:** Thirteen experienced resistance trained males volunteered to participate in this study (mean ± SD, age: 23.5 ± 3.3, weight: 187.6 ± 32.6 kg). All subjects participated in a 12 week placebo macronutrient matched control, 10 or 30 grams of MYOX (MyoT12) supplementation for 8 weeks. All subjects participated in a 12 week periodized resistance training split. DXA determined lean body mass.

**Results:** Total Mass, LBM, and quadricipes thickness significantly increased (p < .05) from week 8 to week 9 by 4.81 kg ± 2.8, 2.9 kg ± 2.1, and 0.2 ± 0.2 cm, respectively, meanwhile fat mass significantly decreased by 1.8 kg ± 1.3.

**Conclusions:** The primary finding of this study is that the reintroduction of carbohydrate for one week in a depleted population significantly increases DXA determined lean body mass.

**P44 The effects of t-bomb II on lean body mass and hormonal profile in resistance trained athletes**

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**Background:** Myostatin is considered an inhibitor of satellite cell activation and as a result skeletal muscle hypertrophy. One promising supplement which has suppressed blood levels of myostatin by 44% is a proprietary bioactive ingredient, Myo-T12, which is follistatin derived from fertile chicken egg yolk isolate. Myo-T12 would therefore theoretically enhance skeletal muscle growth. However this remains to be examined. Therefore the purpose of this study was to investigate the effects of...
Periodization describes an organized approach to training variation throughout a given year. For competitive athletes this typically includes and offseason, pre-season and in-season. The offseason is meant to build muscle, increase power, strength and endurance. However, the season brings on stress that can negatively impact body composition via decreasing lean body mass (LBM). One general cause may be a decline in anabolic hormones, particularly testosterone. T Bomb II is a product made by Maximum Human Performance, INC. (MHP). It is a proprietary blend of ingredients such as fenugreek extract which has been shown to elevate testosterone levels. PURPOSE: Therefore, the purpose of this study was to investigate the 6 week impact of T Bomb II (TB) supplementation on the ability to maintain testosterone and LBM during season.

**Methods:** 20 resistance trained NCAA National Championship baseball athletes (age 22.1 ± 1.9 years, mass 69.89 ± 6.6 kg, height 180.8 ± 13.1 cm) volunteered to participate in this study and were given supplementation of either TB (n=10) or placebo (n=10) for six weeks taking 3 capsules twice a day. All subjects participated in supervised resistance training three days a week and were on controlled diet (50% CHO, 25% FAT, 25% PRO). Dual X-Ray Absorptiometry (DXA) scans were performed at 0 and 6 weeks to determine LBM. Hormonal and safety panels including free testosterone (FT), total testosterone (TT), IGF-1 and total estrogen (TE) were collected at weeks 0 and 6. Consent to publish the results was obtained from all participants.

**Results:** The ability to sustain LBM was significant in the TB group (-0.2 kg) compared to the placebo group (-1.5 kg). The FT level increased significantly in the TB group (13.28 ± 3.32 to 15.45 ± 3.22 ng/dL), and decreased in the placebo group (541.5 ± 153.89 to 639.1 ± 110.91 ng/dL) a 18.02% and -8.25% change, respectively. The changes in IGF-1 and FT at weeks 0 and 6 were insignificant for both groups.

**Conclusion:** This study suggests that taking 3 capsules (one serving) of T-Bomb II twice daily can reduce the rate of LBM lost and increase FT and TT of competitive athletes during season.

**P46**

**Inter- and in-day test-retest reliability of the Cosmed Fitmate ProTM indirect caloriometer for resting metabolic rate**

**Background:** In order to make objective and intelligent decisions regarding caloric intake for fat loss/physique enhancement, one’s resting metabolic rate should be measured. It is important that the device used to measure resting metabolic rate be valid and reliable. Therefore, the purpose of this study was to establish the inter- and in-day test-retest reliability of the Cosmed Fitmate ProTM indirect caloriometer for resting metabolic rate (RMR).

**Methods:** 34 participants (18 males [27 ± 9.5 years, 176.3 ± 7.0 cm, 85.5 ± 14.8 kg, 27.4 ± 4.1 BMI] and 16 females [21 ± 13 years, 163.4 ± 5.8 cm, 61.1 ± 12.3 kg, 22.9 ± 4.6 BMI]) volunteered to have their RMR measured a total of three times on two different days. On day 1, two 15-minute RMR tests were conducted in back to back fashion. On day 2 (occurring within 7 days of day 1), another 15-minute RMR test was conducted. All RMR tests were conducted after an overnight fast in a rested condition. Reliability of RMR was evaluated using Pearson’s correlation, intraclass correlation coefficients (ICC), standard error of the measurement (SEM), and standard error of the measurement as a percentage of the mean (SEM%), Systematic error was examined using a one-way repeated measures ANOVA. Data was analyzed using SPSS version 22.0. Consent to publish the results was obtained from all participants.

**Results:** Average RMR values for each test are shown in Table 1 below. The intra-day RMR Pearson correlation was r = 0.96 (p < 0.01) and the inter-day RMR Pearson correlation was r = 0.90 (p < 0.01). Intra-day RMR ICC was 0.981 and the inter-day RMR ICC was 0.946. Intra-day RMR SEM (SEM%) was 70.62 (4.13%) kilocalories. Inter-day RMR SEM (SEM%) was 116.9 (6.89%) kilocalories.

**Conclusion:** The Cosmed Fitmate ProTM indirect caloriometer is a reliable instrument for measuring resting metabolic rate in non-overweight males and females. The instrument demonstrated test-retest reliability both within the day and between two different days. Relative consistency was acceptable with ICC values of 0.981 and 0.946 for intra and inter-day measures, respectively. Absolute consistency was also acceptable with SEM values (expressed as a percentage of the mean) of 4.13% and 6.89% for intra and inter-day measures, respectively. Further, the ANOVA results indicated no systematic error among tests and days.

**P47**

**Effects of a thermogenic supplement on resting metabolic rate in healthy males: preliminary results**

**Background:** The effects of a thermogenic supplement was tested to see if it can increase resting metabolic rate in healthy males.

**Methods:** Five college-aged males volunteered to participate in this study and were randomly assigned to consume MindSet (Haleo Inc., San Diego, CA), Caffeine, and a placebo (rice flour) in a double-blind, placebo-controlled, randomized, crossover design. After baseline testing, subjects consumed one of the assigned supplements 30 minutes prior to testing. Tests were separated by a 48 hour wash-out period. All subjects participated in a variety of mental aptitude tests, visual reaction tests, and power output measurements. Mental aptitude tests (A, F, CAL, MOT) were measured on an interval scale. COG was measured as serial subtraction test; accounting for improvement in scores from pre and post testing. RT and MRT were measured through the use of Dynavision, and VJP was measured through Vertical Jump Test via Tendo Unit. Consent to publish the results was obtained from all participants.

**Results:** Caffeine increased alertness (+19%), focus (+35%), cognition (+26%), memory (+11%), motivation (+10%) and vertical jump power (+1%), however, decreased calmness by 18%. MindSet increased alertness (56%), focus (58%), motivation (43%), cognition (26%), memory (+15%), vertical jump power (3%), and calmness by 6%.

**Conclusion:** A stimulant-free multi-ingredient pre-workout formula can be as effective as caffeine in increasing cognitive functioning without the unwanted side-effects. The results of this pilot study should be confirmed in a larger scale study.
Table 1(abstract P46) Average Resting Metabolic Rate Values for Each Assessment

<table>
<thead>
<tr>
<th>Day 1 – RMR Test #1</th>
<th>Day 1 – RMR Test #2</th>
<th>Day 2 – RMR Test</th>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resting Metabolic Rate</td>
<td>1,711 ± 373 kcals</td>
<td>1,703 ± 370 kcals</td>
<td>1,679 ± 356 kcals</td>
</tr>
</tbody>
</table>

**Background:** Males looking to improve their body composition may ingest caffeine-containing supplements for the purposes of elevating resting metabolic rate. The purpose of this study was to examine the effects of a commercially available dietary supplement (containing ingredients that promote thermogenesis) on resting metabolic rate (RMR) in a randomized, double-blind, placebo-controlled cross-over study. **Methods:** 8 male participants (30.1 ± 10.0 years; 181.1 ± 9.0 cm; 84.8 ± 13.0 kg) volunteered to participate in this investigation. Each participant underwent two different testing sessions separated by approximately 7 days. On their first visit, participants arrived to the laboratory after an overnight fast and underwent a baseline RMR. Following this, each participant ingested a caffeine-containing dietary supplement (Arnold Iron CutsTM) or a placebo and repeated the RMR assessments at 30, 60, 90, 120, and 180 minutes post-ingestion. The placebo was void of active ingredients known to elevate RMR. Approximately 1-week later, the alternative supplement was ingested and the assessments were repeated in the exact same manner. Data were analyzed via a 2-factor [2x4] within-subjects repeated measures analysis of variance (ANOVA) using SPSS version 22.0. Post-hoc tests were analyzed via paired samples t-tests. The criterion for significance was set at p ≤ 0.05. Consent to publish the results was obtained from all participants.

**Results:** The repeated measures ANOVA revealed a significant effect for time relative to the raw RMR data. Post-hoc analyses revealed that the dietary supplement treatment demonstrated significant elevations in RMR (kilocalories/day) at 30-minutes, 60-minutes, and 180-minutes post-ingestion (p ≤ 0.05) and demonstrated statistical trends at 90 and 120-minutes post-ingestion (p ≤ 0.10). There were no significant elevations (or statistical trends) at any time point in the placebo treatment. Table 1 demonstrates the raw data (mean ± SD) and the percentage increases in RMR for each time point for both supplement groups.

**Conclusion:** The caffeine-containing dietary supplement treatment exerted greater elevations in RMR values as compared to the placebo treatment. Taken on a daily basis, Arnold Iron CutsTM may increase overall energy expenditure possibly leading to reductions in fat mass over time. Caloric expenditure either significantly increased or demonstrated statistical trends for improvement at each time point, whereas the placebo treatment experienced no change in energy expenditure.

**Acknowledgment:** This study was supported by an ISSN Educational Research Grant

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**P48**

**Effects of BioCell Collagen** on connective tissue protection and functional recovery from exercise in healthy adults: a pilot study

**Background:** The extracellular matrix (ECM) of muscle, tendon, and ligament is sensitive to exercise-induced mechanical stimuli. Exercise-induced muscle damage is associated with not only myofibrillar injury, but also the involvement of connective tissue elements such as collagen, proteoglycans (PG), tendon and ligament. However, little is known about the impact of nutritional agents and metabolic optimization for enhancing adaptation and recovery of the connective tissue elements that support musculoskeletal function. BioCell Collagen* (BCC) is a patented hydrolyzed chicken sternal cartilage extract that contains a naturally-occurring matrix of hydrolyzed collagen type II, and low molecular weight glycosaminoglycans such as chondroitin sulfate and hyaluronic acid. The purpose of this pilot study was to determine the potential impact of daily supplementation with BCC on functional indices and molecular biomarkers of recovery from intense exercise, and identify effect sizes on various outcome measures.

**Methods:** Eight healthy, recreationally active subjects (29.3 ± 9.2 y, 173.1 ± 8.2 cm, 77.3 ± 13.5 kg) volunteered to participate in this study and were randomized in a double-blind, placebo-controlled fashion to ingest either 3 g of placebo or BioCell Collagen* daily over a 6-week period prior to an upper body muscle-damaging resistance exercise challenge (UBC) on day 43, and a re-challenge on day 46. At the end of the 6-week supplementation period, participants completed a UBC consisting of 8 sets of barbell bench press at 75% of body weight load to exhaustion with a 4/0/X repetition tempo and 90 seconds rest between sets; the UBC exercise challenge was repeated 72 hours later to assess recovery of function. Consent to publish the results was obtained from all participants.

**Results:** Daily intake of BCC for 6-weeks attenuated an increase in serum markers for muscle tissue damage in response to bench press exercise, creatine kinase (CK), lactate dehydrogenase (LDH), and C-reactive protein (CRP). Change in CK: +20 U/L (BCC) vs. +4726 U/L (placebo); change in LDH: -3.5 U/L (BCC) vs. +82.9 U/L (placebo); change in CRP: +0.07 mg/L (BCC) vs. +0.7 mg/L (placebo). In terms of performance, the decrement in bench press repetitions to failure was only 49% (day 43) and 43% (day 46) in the BCC group vs. 60% (day 43) and 55% (day 46) in the placebo group.

**Conclusion:** The preliminary data of this proof-of-concept study suggests that daily intake of BCC for 6 weeks may favorably impact key biochemical markers of connective and skeletal muscle tissue damage and enhance stress resilience following intense resistance exercise. Supplementation was well tolerated and did not adversely affect markers of health or side effect profiles.

**Acknowledgement:** Funding for this study was provided by BioCell Technology, LLC. (Newport Beach, CA)

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**Table 1(abstract P47)**

<table>
<thead>
<tr>
<th>Baseline</th>
<th>30-minute</th>
<th>60-minute</th>
<th>90-minute</th>
<th>120-minute</th>
<th>180-minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arnold Iron Cuts™</td>
<td>1,880 ± 202</td>
<td>2,004 ± 133 (6.6%)*</td>
<td>2,033 ± 92 (8.1%)*</td>
<td>2,048 ± 103 (8.9%)*</td>
<td>2,013 ± 75 (7.1%)*</td>
</tr>
<tr>
<td>Placebo</td>
<td>1,908 ± 236</td>
<td>1,995 ± 301 (4.6%)</td>
<td>1,971 ± 253 (3.3%)</td>
<td>1,969 ± 316 (3.2%)</td>
<td>1,984 ± 241 (4.0%)</td>
</tr>
</tbody>
</table>

* - Post-hoc statistical trend compared to baseline values (p ≤ 0.10)
- - Post-hoc statistical difference compared to baseline values (p ≤ 0.05)
chemically equivalent bioactive compound known as theacrine (1,3,7,9-tetramethylxanthine), in humans.

**Methods:** Using a randomized, double-blinded, within-subject (crossover) design, 15 healthy subjects (mean ± SD age, height, weight, BMI: 28.3 ± 6.1 y, 175.7 ± 11.5 cm, 89.8 ± 21.7 kg, 29.1 ± 4.7) volunteered to ingest 200 mg of TeaCrine™ (Compound Solutions, Inc., Carlsbad, CA) (TC) or Placebo (PLA). Anchord VAS questionnaires were used to detect changes in various aspects of physical and mental energy and performance; side effect profiles, hemodynamics and biochemical markers of safety were also collected over a 3-hr post-dosing period. A subset of 6 subjects underwent a separate 7-day, open-label, repeated dose study comparing 100 mg, 200 mg and 400 mg of TC. Consent to publish the results was obtained from all participants.

**Results:** The 200 mg dose of TC caused significant improvements in energy (TC: +8.6% vs. PLA: -5.7%, P=0.049) and reductions in fatigue (TC: -6.7% vs. PLA: +5.8, P=0.04). A trend for improved concentration was also noted (TC: +2.4% vs. PLA: -1.3%, P=0.07). No changes in systemic hemodynamics or side effect profiles were noted. The N=6 cohort study demonstrated moderate to large effect sizes (0.50 to 0.71) with the 200 mg dose of TC over a 7-day period of assessment for the following subjective measures: energy, fatigue, concentration, anxiety, motivation to exercise and libido.

**Conclusion:** These preliminary data support the benefits of acute TeaCrine™ supplementation on subjective ‘energy’ levels and some indices of mental performance. Future studies are underway to confirm these neurotropic effects and also explore potential benefits of TeaCrine™ on objective measures of cognitive and physical performance, inflammation, pain perception, and functional capacity.

**Acknowledgement:** Partial funding for this study was provided by Compound Solutions, Inc (Carlsbad, CA)

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**P50**

**Phosphatic acid feeding increases muscle protein synthesis and select mTORC1 pathway signaling mediators in rodent skeletal muscle**

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**Background:** Human and cell culture studies have demonstrated that phosphatic acid (PA) can increase muscle mass and anabolic signaling, respectively. However, no in vivo evidence to date has examined whether PA can increase intramuscular anabolic signaling in vivo. The purpose of this study was to examine – a) if PA feeding acutely increases post-prandial muscle protein synthesis (MPS) and anabolic signaling markers; and b) if PA can enhance the post-prandial anabolic effects of whey protein concentrate (WPC).

**Methods:** Male Wistar rats (n=250) were fasted overnight (~18 h) and fed either: a) 1 ml water (n = 14), b) 28 mg PA (eq. to 1.5 g human dose; n = 8), c) 197 mg WPC (eq. to 10 g human dose; n = 8), or d) PA+WPC (n = 8). 2.5 h post-feeding rats were injected with 5.44 mg puromycin diHCl for MPS assessment via SUnSET and 3 hours post-feeding rats were euthanized and samples were provided for immunoblotting analyses. The treatment of the animals in this study adhered to commonly accepted ethics guidelines.

**Results:** Compared to water-fed rats, PA feeding caused an elevation in numerous Akt-mTOR markers and, in some instances, PA+WPC exhibited a greater increase in Akt-mTOR signaling markers (Erk1/2 Thr202/Tyr204, Bad Ser112, p70S6K Thr389). However, compared to water-fed rats, the PA, WPC, and PA+WPC groups exhibited greater MPS responses with no differences existing between conditions.

**Conclusion:** This is the first in vivo data demonstrating that PA feeding increases MPS. More post-prandial time course data with resistance exercise is needed to better elucidate how PA feeding affects muscle anabolism.

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**P51**

**Post-prandial amino acid and leucine responses to serum albumin concentrate compared to whey protein concentrate in healthy subjects**

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**Background:** Supplemental protein sources vary in composition in regards to size, structure, and amino acid composition of the varying individual proteins. Serum albumin concentrate (SA) is a new protein source extracted from edible-grade bovine plasma, which was recently made available on commercial scale. As compared to the low MW proteins in whey protein concentrate (WPC), SA consists of higher MW protein constituents such as albumin (66kD, >60%) and globulin proteins (130 kD, >10%), which contain a high quality amino acid composition. These differences in the protein profile of SA may both delay and sustain amino acid absorption in comparison to WPC. The objective of this study was to determine the post-prandial amino acid response to oral ingestion of SA and to compare the response to that of WPC.

**Methods:** Eight healthy, 20-30 year old, male (n=4, 80.3 kg BW) and female (n=4, 63.7 kg BW) volunteers participated in an open label, clinical study utilizing a cross-over design (Clinicaltrials.gov: NCT01643265). The volunteers received each of the two protein sources in a random order with a 7 day washout period between treatments. After a 12 h overnight fast, 7 mL of blood was collected from a catheter inserted into a forearm vein. Baseline amino acid values at 30 and 15 min were determined prior to administration of the experimental protein sources. Twenty grams of either WPC or SA was provided in 335 mL of water. Subsequent blood samples were collected at 15, 30, 45, 60, 90, 120, 180, and 210 min after ingestion for analysis of individual amino acid concentrations. An EZFaastTM amino acid analysis kit was used for sample pretreatment and chromatographic separation was conducted using an Agilent 6460 triple quadrupole LC/MS system. Data were analyzed using repeated measures and General Linear Models procedures from SAS (Version 9.2) including treatment, gender, and test period as independent variables in the statistical model. Significance is reported as P<0.05 and P<0.01.

**Results:** Total plasma amino acid concentration at baseline was found to be higher (P<0.01) at baseline in male subjects (2,633 nmoles/mL) compared to female subjects (2,153 nmoles/mL). In contrast, plasma leucine concentration was found to be higher (P<0.05) in female subjects (156 nmoles/mL) compared to male subjects (103 nmoles/mL). Rises in post-prandial individual amino acid concentration were observed for both WPC and SA (P<0.01). The rises reflect the amino acid pattern of the protein source ingested. The ingestion of whey protein concentrate increased plasma total amino acid concentration 30 min post-prandially compared to SA (P<0.05) by 10%, without differences in leucine. In contrast, the ingestion of SA promoted 14% higher leucine concentrations 120 min post-prandially than did WPC (P<0.05).

**Conclusion:** Individual post-prandial amino acids reflect the amino acid pattern and characteristics of the protein source ingested. The digestion and absorption of the protein and amino acid composition of serum albumin concentrate (SA) results in an increase in total plasma amino acids, including leucine. WPC, comprised of low molecular weight proteins, elevates the post-prandial amino acid response rapidly but SA ingestion, comprised of proteins with high molecular weights, maintains leucine concentrations over a longer time after ingestion.

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**Cite abstracts in this supplement using the relevant abstract number, e.g.: Weaver et al. Post-prandial amino acid and leucine responses to serum albumin concentrate compared to whey protein concentrate in healthy subjects. Journal of the International Society of Sports Nutrition 2014, 11(Suppl 1) P51**