The Organization of
Professional Exercise Physiologists

American Society of Exercise Physiologists

4th Annual National Meeting

Sponsored by:

The University of Memphis

The Department of Human Sciences and Education

Introduction

Welcome to the 4th annual meeting of the **American Society of Exercise Physiologists**. The city of Memphis is a fabulous place for our members to gather and exchange scientific information, network professionally, and renew old acquaintances. The itinerary for this year consists of quality and timely presentations. The future is bright for our profession and demands the involvement of individuals like you. Please join us this next year in striving to make ASEP grow numerically both at home and abroad. I would like to especially thank Dr. Rick Kreider and Dr. Tommy Boone for making this meeting possible. Have a great meeting!

Dr. LaGary Carter, RCEP, CSCS
ASEP President, Coordinator, Exercise Science, Valdosta State University
Valdosta, GA 31698-0095

American Society of Exercise Physiologists

4th ASEP National Meeting

Schedule of Presentations

Embassy Suites, Memphis, TN
September 27-29, 2001

Thursday, September 27, 2001

8:00 – 11:00 am Exercise Physiologists Certified Examination
Part I: Written (University of Memphis)

1:00 – 5:00 pm Exercise Physiologists Certified Examination
Part II: Practicum (University of Memphis)

Friday, September 28, 2001

8:00 – 8:15 am ASEP President's Introduction

8:15 – 9:30 am Research Session #1

8:15 – 8:30 am Group Heart Rate is not an Adequate Predictor of Power Output for Individual Cyclists

Jason McCarthy, BS
Frank Wyatt, EdD
Baylor University, Waco, TX

8:30 – 8:45 am Acute Hormonal Responses to a Novel Botanical Compound

T.N. Ziegenfuss, PhD, EPC and R.W. Mendel, PhD
Phoenix Labs, Division of Nutrition, Metabolism and Exercise and Physical Therapy Department, Walsh University

8:45 – 9:00 am Kinematics of Biophysically Asymmetric Effectors

Lee Brown, PhD, FACSM, CSCS *D, EPC
Tara Sjestrom, BS
Matt Comeau, ATC, CSCS
Mike Greenwood, PhD, CSCS *D
Arkansas State University

9:00 – 9:15 am **An Evaluation of a Guided Imagery Video on the Cardiovascular System at Rest**

Larry Birnbaum, PhD, MA
Chair, Department of Clinical Laboratory Science, College of St. Scholastica

9:15 – 9:30 am **Comparison of the Changes in Muscular Strength and Body Composition resulting from Resistance Training and Consumption of Different Protein Supplements**

Darren G. Candow, MSc
College of Kinesiology, University of Saskatchewan

Darren G. Burke, PhD
Department of Human Kinetics, St. Francis Xavier University

9:30 – 9:45 am **Positive Alterations in Blood Lipids Following Dietary Supplement Administration in Men**

Ronald W. Mendel, PhD and Tim N. Ziegenfuss, PhD, EPC
Human Nutrition Laboratory, Department of FC&S, Kent State University, and Phoenix Labs, Division of Nutrition, Metabolism and Exercise

Lonnie M. Lowery, PhD
Human Nutrition Laboratory, Department of FC&S, Kent State University

Jeff Lynn, PhD
Exercise Sciences Laboratory, School of Exercise, Leisure and Sport, Kent State University

9:45 – 10:45 am **Special Topics #1**

9:45 – 10:15 am **Resistance Overtaining**

Andy Fry, PhD
University of Memphis

10:15 – 10:45 am **Academia in Australia**

Robert Robergs, PhD, FASEP, EPC
Past-President of ASEP, Division of Physical Performance and Development, University of New Mexico

10:45 – 11:00 am **Break**

11:00 – 12:00 pm **Professional Issues #1**

11:00 – 11:30 pm **The Idaho Association of Exercise Physiologists**

Matthew Wattles, MS
President, IDAEP

11:30 – 12:00 pm **ASEP: A Call for Action**

Tommy Boone, PhD, MPH, FASEP, EPC
Past-President of ASEP, Department of Exercise Physiology, College of St. Scholastica

12:00 – 1:00 pm **Lunch**

1:00 – 1:45 pm **Keynote Speaker**

1:00 – 1:45 pm **Baby Boomers: Physiology of Exercise Capturing the Market**

Paula E. Papanek, PhD, MPT, FACSM
Director of Exercise Science, Marquette University

1:45 – 2:00 pm **Break**

2:00 – 2:45 pm **Professional Issues #2**

2:00 – 2:25 pm **Distance Learning for Exercise Physiology Courses**

Curtis Hart, EdD
San Antonio, TX

2:25 – 2:45 pm **Career Services/Job Opportunities**

Michaela Conley, M.A., Principal
Founder, HPCAREER.NET

2:45 – 3:00 pm **Break**

3:00 – 4:30 pm **Special Topics #2**

3:00 – 3:30 pm **Considerations in Developing a Productive Research Program**

Richard B. Kreider, PhD, FACSM, EPC
Department of HMSE, University of Memphis

3:30 – 4:00 pm **Roundtable Discussion: Insights on Establishing Research Collaborations with Industry**

Richard B. Kreider, PhD, FACSM, EPC
University of Memphis

Tim Ziegenfuss, PhD, EPC
Human Nutrition Laboratory, Department of Nutrition, Kent State University

4:00 – 4:30 pm **Nutritional and Metabolic Considerations Related to Exercise-Induced Muscle Damage**

Lonnie Lowery, PhD
Human Nutrition Laboratory, Department of Nutrition, Kent State University

Tim N. Ziegenfuss, PhD, EPC, Ronald W. Mendel, PhD and Joseph M. Mendel, PhD
Phoenix Laboratories, Division of Exercise, Nutrition, Metabolism and Exercise

Jeff Lynn, PhD
School of Exercise, Leisure & Sport, Kent State University

<u>Saturday, September 29, 2001</u>

8:00 – 11:00 am **Special Topics #3**

8:00 – 8:30 am **Exercise Rehabilitation for Diabetic and Non-Diabetic Transplant Recipients**

Patricia A. Cowan, PhD, RN
UT-Memphis Medical School, College of Nursing, University of Memphis

8:30 – 9:00 am **The Biochemistry of Metabolic Acidosis**

Robert Robergs, PhD, FASEP, EPC
Director, Center for Exercise and Applied Human Physiology
University of New Mexico

9:00 – 9:30 am **Use of Proton Magnetic Resonance Imaging and Spectroscopy**

Lesley White, PhD
Department of Exercise and Sport Sciences, University of Florida

9:30 – 10:00 am	**Fostering Behavior Change in Exercise Physiology Settings**
	Gary Gordon, PhD, PT Department of Exercise Physiology, College of St. Scholastica
10:00 – 10:30 am	**JOBFIT: A Strategy to Reduce Musculoskeletal Disorders**
	Julie Dial, MA, Emily Riffe, MS, Dan Freeman, PhD, Jeffery R. Davis, MD and Gerald Cleveland, MA University of Texas Medical Branch - Galveston
	Andrea Pflughoft, MS, Fikry Isaac, MD and David Gay, MS
10:30 – 11:00 am	**Relationship of Personality Type and Coronary Artery Disease**
	William Simpson, PhD, FACSM Department of Exercise Physiology, College of St. Scholastica
11:00 – 11:15 am	**Break**
11:15 – 12:00 pm	**Professional Issues #3**
11:15 – 11:35 am	**Analysis of Academic Departments by Name, Degree, Faculty, and Curriculum for Undergraduate Accreditation Purposes**
	Erin Rademacher, MA, EPC Duluth, Minnesota
	Jesse Pittsley, MA Doctorate student, University of Kentucky
11:35 – 12:00 am	**Standards of Professional Practice for Exercise Physiologists**
	Tommy Boone, PhD, MPH, FASEP, EPC Department of Exercise Physiology, College of St. Scholastica
12:00 – 1:15 pm	**Lunch**
1:15 – 3:15 pm	**Research Session #2**
1:15 – 1:30 pm	**Ventilatory Parameters Influence the Decline in VO_2 in Fit, Male Cyclists**
	Frank Wyatt, EdD and Jason McCarthy, BS Department of Health, Human Performance, and Recreation Baylor University, Waco, TX

1:30 – 1:45 pm	**Role of the Myogenic Transcription Factors Myo-D, Myogenin, and Id-1 in the Phenotypic Expression of Myosin Heavy Chain Isoform mRNA in Response to an Acute Bout of High-Intensity Weight Lifting**
	Darryn Willoughby, PhD, EPC and Matt Nelson Molecular Kinesiology Laboratory, Texas Christian University
1:45 – 2:00 pm	**Predictors of Waist Gain Among US Male Health Professionals**
	Pauline Koh-Banerjee, MS (Doctoral Degree Candidate), Nain-Feng Chu, MD, PhD, Donna Spiegelman, ScD, Walter Willett, MD and Eric B. Rimm, ScD, Department of Nutrition, Harvard School of Public Health
2:00 – 2:15 pm	**Validity and Reliability of the Accusport Blood Lactate Analyzer**
	R.A. Robergs, PhD, FASEP, EPC Center For Exercise and Applied Human Physiology, Exercise Science Program, University of New Mexico, USA,
	G. Juranovich, P.A.J. Hope and M.J. Newton Sports Science Program, School of Biomedical and Sports Science, Edith Cowan University, Australia
2:15 – 2:30 pm	**Creatine Supplementation does not Increase the Incidence of Cramping or Injury for Two Division IA Football Training/Competing in Similar Climates**
	Mike Greenwood, PhD, CSCS *D Lori Greenwood, PhD, ATC Arkansas State University
	Richard Kreider, PhD, FACSM, EPC, Charlie Melton, Christopher Rasmussen and Anthony Almada University of Memphis
2:30 – 2:45 pm	**Examination of Two Non-Invasive Methods of Determining Lactate**
	Jesse Pittsley, MA and David Holes, MA, Doctorate Student, Exercise Physiology, University of Kentucky and Pentagon

2:45 – 3:00 pm **Consistency of Squatting Force at Designated Time Intervals and at Its Peak Using an Inexpensive Dynamometer**

Lawrence Weiss, PhD, Andrew Fry, PhD, Bharat Magu, Keegan Buchanan, Loren Chiu, Barry Bondurant, Brian Schilling, Cory Scates and Shonteh Henderson
Musculoskeletal Dynamics Laboratory, University of Memphis

3:00 – 3:15 pm **Break**

3:15 – 4:15 pm **Special Topics #4**

3:15 – 3:45 pm **Creatine Monohydrate Long Term Benefits and Potential Adverse Effects**

LaGary Carter, DA, RCEP, CSCS
President, ASEP, Department of Kinesiology and Physical Education, Valdosta State University

3:45 – 4:15 pm **Periodization Essentials and Innovations in Resistance Training Protocols**

Mike Greenwood, PhD, CSCS *D
Lee E. Brown, PhD, FACSM, CSCS *D, EPC
Human Performance Laboratory, Arkansas State University

4:15 – 5:00 pm **Final Remarks**

4:15 – 4:30 pm **ASEP President's Remarks**

4:30 – 5:00 pm **New ASEP President's Message**

American Society of Exercise Physiologists

4th ASEP National Meeting

Abstracts of Presentations

Group Heart Rate Not an Adequate Predictor of Power Output for Individual Cyclists

Jason P. McCarthy and Frank B. Wyatt
Dept of Health, Human Performance, and Recreation, Baylor University, Waco TX

Introduction: Heart rate (HR) increases as a result of producing more work (i.e. power output, PO) while cycling. The purpose of this study was to determine if HR (bpm) is an adequate predictor of PO (W) for trained cyclists. **Methods:** Male USCF Category IV-I cyclists (n=16) completed cycle ergometry tests to volitional fatigue using their own bicycles on a Powertrain® cycle ergometer. HR was measured each minute during the three-minute stages of increasing power maintained by the cyclist (50W increases to 350W, then 30W increases to volitional fatigue). **Statistics:** Descriptive statistics of mean and standard deviation were measured to establish sample demographics. Pearson Product Moment R Correlation Coefficient was used to determine association between HR and PO. Linear regression analysis was performed to determine prediction level and to establish a regression equation for each individual cyclist and for the group based on HR per minute averages across all 16 subjects. Standard error of the estimate was calculated to establish variance between the group prediction equation and the independent variable heart rate for each subject. **Results:** All 16 cyclists (age 25.8±6y, body fat 9.4± 3.6%, height 178± 5cm, weight 74.5± 5.7kg, Peak PO 396± 35W) showed a positive correlation predicting PO from HR. The range for prediction of PO from HR for each individual was an $r^2 = 0.96$ to 0.99 ($p<0.0001$.) Taking the average HR per minute across all cyclists produced a correlation to PO at $r^2 = 0.986$ ($p<0.0001$.) Although the average prediction equation for PO based on HR for all 16 cyclists is PO = 3.503*HR – 291.94, the prediction error for each individual cyclist is not adequate for estimating performance (mean prediction error of -3W and a standard deviation of 39W.) **Conclusion:** It was determined that although each individual cyclist's HR can accurately predict PO; one prediction equation for the group did not show significant prediction results. In conclusion, statistical analysis of the data shows cyclists can use individual equations for predicting PO from HR for training regimens, but one equation for all cyclists does not accurately predict PO from HR. **References: 1.** Arts F. et al. *Int J Sports Med*. 15:228-231,1994. **2.** Jeudendrup A. et al. *J Sports Sci* 16:S91-S99,1988. **3.** Liedl M. et al. *Med Sci Sports Exerc.* 31:1472-1477. **4.** Palmer G. et al. *IOC World Congress Sport Sci* (5th:1999; Sydney Au). **5.** Wilmore J.H. et al. *Physician Sports Med.* 14(3):133-137;140-143.

Acute Hormonal Responses to a Novel Botanical Compound

T.N. Ziegenfuss and R.W. Mendel
Phoenix Labs – Division of Nutrition, Metabolism and Exercise and Physical Therapy Department, Walsh University, North Canton, OH

Introduction: Many of the positive adaptations resulting from resistance exercise training (i.e., increased muscle growth and strength) are thought to be mediated, in part, by exercise-induced increases in growth hormone and testosterone. **Objective:** The purpose of this study was to examine selected endocrine responses [growth hormone (GH), total testosterone (TT), and free testosterone (FT)] to a single oral dose of the dietary supplement Alpha Dopa™. **Methods:** Using a randomized, placebo-controlled, crossover design, five men (mean ± SD age, height, weight, body fat, 1-RM squat (29.8 ± 2.8 yr, 174.6 ± 1.8 cm, 81.0 ± 3.8 kg, 11.3 ± 3.3 %, 156.8 ± 67.9 kg)] ingested Alpha Dopa™ and a placebo during two rest (REST) and two heavy resistance exercise trials (HRE). All four trials were separated by at least one week and were performed at the same time of day (0600-0800) to minimize diurnal variation. Supplements were provided by an FDA-registered, pharmaceutically licensed laboratory. Each dose of Alpha Dopa™ contained: 666.6 mg mucuna pruriens (standardized to 15% L-dopa), 100 mg alpha glycerylphosphorylcholine, and 50 mg bacopa monniera extract (standardized to 20% bacosides A & B). During REST, serum samples were obtained 0, 30, 60, 90, 120, and 180 minutes post-administration. During HRE, subjects ingested Alpha Dopa™ and placebo 30 minutes prior to completing six sets of 10 repetition maximum squats interspersed with 120 second rest periods. Serum samples were also obtained prior to HRE (pre) and again 0, 5, 15, 30 and 60 minutes post-exercise. Hormone concentrations were analyzed in duplicate by ELISA and expressed as maximum concentrations (Cmax) and area under the response curve (AUC) for statistical analyses. **Results:** During REST trials, hormone concentrations remained unaltered. Integrated AUC analyses demonstrated a 19.8% higher GH increase over the entire recovery period for HRE+Alpha Dopa™ compared to HRE+placebo ($P<0.05$). Compared to baseline (pre) values, Cmax for GH increased 16-fold during HRE+Alpha Dopa™ (from 0.12 ± 0.07 to 2.1 ± 1.6 ug/L, $P<0.01$) and 8-fold during HRE+placebo (from 0.12 ± 0.08 to 1.1 ± 0.7 ug/L, $P<0.01$). A pairwise contrast of GH Cmax indicated this difference had an effect size of 1.3 and $P<0.06$. AUC and Cmax for TT and FT were not significantly different between HRE trials. **Discussion:** These data indicate that a single dose of Alpha Dopa™ does not affect anabolic hormone concentrations in a fasted, rested state. However, it appears that ingesting Alpha Dopa™ prior to HRE leads to greater increases in total (~20%) and peak (~90%) GH compared to those resulting from the exercise bout itself. Future work should examine how HRE and Alpha Dopa™ affect the GH-IGF axis and their associated family of binding proteins.

Supported in part by a research grant from Phoenix Labs, Inc. (Hicksville, NY)

The Kinematics Of Biophysically Asymmetric Effectors

Lee E. Brown, Tara Sjostrom, Matt Comeau and Mike Greenwood.
Human Performance Laboratory, Arkansas State University, State University, Arkansas

Introduction: The purpose of this study was to investigate the movement speed characteristics of two intrinsically different limbs (knee and elbow extensor/flexor muscles) across a velocity spectrum. **Methods**: Twenty subjects volunteered to participate (10 males & 10 females). Each subject performed five repetitions of concentric/concentric knee and elbow extension/flexion movements (in random order) at 60,120, 180, 240, 300, 360, 400, 450 and 500 d/s on a Biodex System 3 isokinetic dynamometer. Data were collected from the middle three repetitions at 1000 Hz and separated into three velocity ROM phases of acceleration (ACCROM), load range (LR) and deceleration (DCCROM) along with peak torque during the LR phase only. **Statistics**: Repeated measures ANOVA were performed to analyze the data. **Results**: There was a significant ($p<0.05$) main effect for gender for ACCROM and peak torque. Significant ($p<0.05$) differences were demonstrated between knee and elbow ACCROM and between knee and elbow peak torque at every speed tested. Knee and elbow ACCROM demonstrated a significant correlation only at 360 d/s ($r=-0.69$) while peak torque showed no significant correlations at any speed. The elbow demonstrated significant correlations between ACCROM and peak torque only at speeds greater than 240 d/s while the knee demonstrated none. **Discussion**: These results collectively point to the specificity of limb speed and torque as a result of biophysical differences such as length and mass. In may be concluded that strength and speed are modulated by neuromotor patterns that differ based on individual effectors. **References**: **1.** Brown L.E. et al. *J Strength Cond Res.* 12(4), 222-225, 1998. **2.** Newton R.U. et al. *Med Sci Sports Exerc.* 31(2), 323-330, 1999. **3.** Smith L.E. *Res Quart*. 32(2), 208-220, 1961.

Evaluation of a Guided Imagery Video on the Cardiovascular System at Rest

Larry Birnbaum
Department of Exercise Physiology, College of St. Scholastica, Duluth MN

Introduction: Guided imagery has been reported to be an effective means of achieving relaxation. The purpose of this study was to determine the physiologic effects of a guided imagery video at rest and to clarify the VO_2 response, if it occurred, as a central and/or peripheral adjustment. **Methods**: Twelve healthy volunteers were randomly assigned to two 20-minute rest sessions; one while watching a guided imagery video and one without the video. Physiological data was collected with a metabolic cart, a 3-lead ECG for heart rate (HR), and a sphygmomanometer and stethoscope for blood pressure (BP). HR was determined during the last 10 seconds of each of the last 5 minutes of the 20-minute rest sessions. BP was taken at minute 18 and cardiac output (Q) was obtained during minute 20 of each session. Other physiological data were collected continuously throughout the 20-minute sessions. **Statistics**: Analysis of variance (ANOVA) with repeated measures was used to determine if there were any significant differences between the Treatment and Control Sessions. An alpha level of $p \leq 0.05$ was considered necessary for statistical significance. **Results**: Watching the guided imagery video during rest had no significant ($p>0.05$) effect on VO_2 and the related cardiovascular responses (Q, HR, SV, a-vO_2 diff, SBP, MAP, or SVR). **Discussion**: Watching a guided imagery video at rest had no significant effect on VO_2 or other physiological parameters measured in this study. Since VO_2 was unchanged, it is unlikely that a central (stroke volume and/or heart rate) or a peripheral (arteriovenous oxygen difference) adjustment occurred in the subjects. The data indicate that watching a guided imagery video during 20 minutes of rest did not achieve a relaxation response. **References**: 1. Collins J.A. et al. *Heart Lung*. 26:31-44, 1997. **2.** Dossey B. **Am J Nurs**. June:41-47, 1995. **3.** Elliott D. *Heart Lung*, 23:27-35, 1994. **4.** Fried R. *Biofeedback Self Regul*. 12:273-279, 1987. **5.** Heigenhauser G.J.F. et al. *Clin Chest Med.* 10:255-264, 1989. **6.** Lysaght R. et al. *AJOT*. 44:797-802, 1990. **7.** Rancour P. *J Holist Nurs.* 12:148-154, 1994. **8.** Turton P. *Nursing.* 3:348-351, 1986. **9.** Vines S.W. *AAOHN J*. 42:206-213, 1994.

Comparison of the Changes in Muscular Strength and Body Composition resulting from Resistance Training and Consumption of different Protein Supplements

Darren G. Candow and Darren G. Burke
College of Kinesiology, University of Saskatchewan, Saskatoon, SK, Canada, and Department of Human Kinetics, St. Francis Xavier University, Antigonish, NS, Canada

Introduction: The protein needs of athletes engaged in resistance training exercise are often greater than the recommended daily amounts. Previously, weight training combined with a powder supplement containing whey protein and creatine has been found to yield greater changes in lean tissue mass and 1RM strength than the isocaloric consumption of whey protein alone or placebo. The purpose of this study was to compare the effect of three different protein-based supplements on muscular strength and body composition when combined with 6-weeks of resistance training exercise. **Methods:** Thirty-nine trained males (18-33y) were randomly assigned (double-blind) into three supplement groups. The different supplements were provided in bar form and included the following: MP (milk protein bar: 255 kcal, 34-g [whey + casein protein], 3X/d); SY (soy protein bar: 225 kcal, 14-g soy protein, 3X/d); and PC (protein + creatine bar: 290 kcal, 35-g [whey + casein protein], 3-g creatine, 3X/d). All subjects followed the same whole-body resistance training program for 6-weeks and were tested prior to the study, at the end of two weeks, at the end of four weeks, and at the end of the study for body weight, muscular strength (1RM bench press and squat), muscular endurance, and body composition (lean tissue mass and % fat) using dual energy x-ray absorptiometry (DXA). **Statistics:** Data were analyzed by two-way (supplement x time) repeated measures ANOVA, and whenever significance was evident, Tukey post hoc tests were performed for pairwise comparisons. **Results:** There were no significant differences among groups at baseline for any measure ($p<0.05$). All groups demonstrated significant increases in 1RM bench press and squat, but only MP and PC experienced a significant increase in lean tissue mass ($p<0.05$). Post hoc analysis indicated that the PC group had greater increases in body weight (+3.2 %), 1RM bench press (+19.5 %), muscular endurance (+39.8%), lean tissue mass (+5.2 %), and a greater decrease in percentage fat (-6.7%) as compared to the other two groups. **Discussion:** These findings indicate that supplement bars containing 34-g milk protein, 35-g milk protein + 3-g creatine, or 14-g soy protein combined with resistance training lead to significant increases in muscular strength, and that supplement bars containing milk protein also lead to significant increases in lean tissue mass. These positive changes in muscular strength and body composition are further augmented when 35-g milk protein is combined with 3-g creatine (PC) 3X/d. **References:** **1.** Lemon P. et al. *J Appl Physiol.* 73: 767-775, 1992. **2.** Tarnopolsky, M. et al. *J Appl Physiol.* 73: 1986-1995, 1992. **3.** Burke, D. et al. *Int J Sport Nutr Exerc Metab.* 11: 384-399, 2001.

Positive Alterations in Blood Lipids Folowing Dietary Supplement Administration in Men

R.W. Mendel, L.M. Lowery, J. Lynn and T.N. Ziegenfuss
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Phoenix Labs – Division of Nutrition, Metabolism & Exercise, and Exercise Sciences Laboratory, School of Exercise, Leisure and Sport, Kent State University, Kent, OH

Introduction: In an attempt to enhance muscle recovery and glycogen synthesis, some athletes self-administer dietary supplements that claim to improve glucose transport and/or insulin sensitivity. **Objective:** The purpose of this placebo-controlled, double-blind study was to examine the safety, efficacy and pharmacokinetics of one such supplement, Insulene™. **Methods:** Eight resistance trained men [mean ± SD age, height, weight, body fat (27.3 ± 4.1 yr, 176.3 ± 3.5 cm, 90.4 ± 12.3 kg, 12.5 ± 4.1 %)] were matched for general physical characteristics and given weekly aliquots of a placebo (6 capsules/day maltodextrin) or Insulene™ (6 capsules/day divided into 3, 350 mg doses) over a four week period. All supplements were provided by an FDA-registered, pharmaceutically licensed laboratory. Each 350 mg Insulene™ dose contained the following ingredients: langerstroemia speciosa (90 mg), d-pinitol (10 mg), gymnema sylvestre extract + chromium + lipoic acid + phosphatidyl serine (250 mg). Prior to pre (week 0) and post-testing (week 4), diet and activity patterns were controlled for 5-days. Maximum concentrations (Cmax) and areas under the response curve (AUC) for glucose and insulin were determined following a standard (2-hr, 75 g glucose) oral glucose tolerance test. **Results:** While no between group differences were noted in Cmax or AUC for glucose or insulin, the Insulene™ group experienced significant improvements in total cholesterol (-37.8 mg/dL, -17.1%, P<0.07), total cholesterol:HDL ratio (-1.4 units, -26.4%, P<0.03), triglycerides (-67.5 mg/dL, -39.8%, P<0.02) and glycosylated hemoglobin (-0.13, -2.9%, P<0.04). No adverse effects were noted on standard serum markers of hepatic or renal function (ALT, AST, CK, BUN, LDH, creatinine). **Discussion:** These preliminary data suggest that four weeks of Insulene™ administration (1050 mg/d) can positively alter blood lipids and may impact long-term glucose control. Given the physiological and clinical implications of these data, future work in this area should verify these responses and investigate the mechanism(s) underpinning their effects.

Supported in part by a research grant from Phoenix Labs, Inc. (Hicksville, NY)

Academia in Australia

Robert A. Robergs
Center For Exercise and Applied Human Physiology, University of New Mexico, Albuquerque, NM

Introduction: A 5 month sabbatical in Perth, Australia, provided opportunities to witness and participate in university academic life, as well as within the Australian society at large. **Discussion:** Student qualities, academic life, working conditions (faculty) and curricular content in Australian universities differ considerably to those within the United States (US). When pertaining to exercise physiology/science, Australian programs are generally behind in the application of the latest research content. Curricula are limited in scientific foundations, and programs are still broad at the undergraduate level, producing students familiar with the diversity of the scientific aspects of exercise/sport, but limited in the depth of knowledge of any one specialty. Australian universities function by the "European" model of graduate education, where only a few classes are required (research design and statistics), and the emphasis is on multiple research projects suitable for peer reviewed publication. One has to question the academic competencies of graduate students who complete a degree in such a model. Despite the shortcomings of the curricular characteristics of academic programs, the Australian system is far more supportive of faculty than in the US. Facilities are first rate, funding is regular and more generous, and components of "tenure" are more clearly defined. Typically, exercise physiology programs have facilities and equipment for teaching and research laboratories, and university funds are provided to support expenses of graduate student research. **Conclusions:** Knowledge of foreign academic programs and university systems has the potential to enrich faculty, and allow faculty to view local conditions more objectively.

The Idaho Association of Exercise Physiologists

Matthew G. Wattles
President, IDAHO

The purpose of this presentation is to describe how the Idaho Association of Exercise Physiology was developed and the story of its inception. Also included is a detailed overview of the recently developed “State Association Implementation Manual” that describes: (1) how a nonprofit organization is founded; (2) paper work that its filed with the state; (3) purpose of the state organization; (4) how the organization works under the leadership of the Board of Directors and Committees; and (5) the benefits and challenges of starting a state association. The goal of the manual is to serve as a template for ASEP members to set up an ASEP state affiliate in an effort to promote the professionalization of Exercise Physiology throughout the country.

ASEP: A Call for Action

Tommy Boone
Dept of Exercise Physiology, College of St. Scholastica, Duluth, MN

The 21st century exercise physiologist requires new rules for success and, therefore, new thinking is imperative. The notion of not changing and adapting to our problems is amazingly a hopelessly outdated idea. Solving problems, such as better jobs, more financial stability, increased respect, and more creditability, begin with new ideas not false assumptions that are inadequate. The good old days are gone. Those days are now replaced by a set of shared assumptions, although not unquestioned, that we need our own organization, professional certification and academic standards, policies, practices, and procedures. Such thinking is not inconsistent with established professions that have nourished and provided for their members. It is a way of thinking that may be considered radical, but nonetheless right for exercise physiologists because it is driven by reasons of conscience not expediency and by integrity not by economics.

We need academic ASEP members with the willingness and perseverance to look at the academic problems before us. Perhaps, a beginning for most of us is to admit that exercise physiology is a separate and distinct academic major in only a few colleges and universities. It is less distinct and less organized in most academic institutions when it comes to producing exercise physiologists (by academic title). The curriculum requires serious assessment and important changes, and concentrations ought to be academic majors. It is time that exercise physiology stops being a subsidiary concentration “tied to the apron strings” of another academic major. True curriculum reform consistent with our professional title is imperative if the public sector is to understand what we do. How often can a person or an organization repeat the basic advice of "Listen to your students, provide an outstanding academic curriculum and service, develop their critical thinking skills, look for and eliminate inefficiencies, and act like team players?" The problem, clearly, is not in figuring out what to do. Rather the problem is to find the strength and courage to do what we know to be right.

This means that organizational development is absolutely essential. We must work at bringing in more members into ASEP, get busy doing the business of ASEP and, in effect, get into overdrive. The time is right for us to teach who we are, to talk openly with each other about the deeper and more significant concerns for change. Careful analysis and delineation of our differences can give rise to a systematic and coherent plan to resolve our most immediate concerns and issues. Most importantly is the notion that exercise physiology is no longer about the Harvard Fatigue Laboratory. Rather, it is about educational standards by which all college graduates can leave college and access jobs in the public sector. Reality, viewed in this way, is an entirely different exercise physiology. All of us need to get involved, particularly the exercise physiology professors. It is indefensible that so many of our college teachers are not members of ASEP. Now is the time to talk about ASEP, and to introduce it to our students. They need to know that the search for a meaningful direction for all of us has begun, and yet an understanding of exactly the kind of business we are in still needs careful study. Without a professional commitment on behalf of the college professors, claims to professional status are empty noise.

Considerations in Developing a Productive Research Program

Richard B. Kreider
Department of HMSE, The University of Memphis, Memphis, TN

I am often asked by graduate students, post-doctorate fellows, and newer faculty members what insights I may have on how to develop a productive research program. The purpose of this presentation is to discuss some considerations on academic training, mentoring, and methods of developing a productive clinically-based research program from the ground up. Additionally, I will discuss some common obstacles in developing such programs, methods of obtaining grants, and insights on how to stay productive regardless of the environment one finds themselves working. The intended audience will be undergraduate and graduate students contemplating careers in academia, young exercise physiologists, and Assistant and/or Associate level faculty.

Roundtable Discussion: Insights on Establishing Research Collaborations with Industry

Richard B. Kreider and Tim Ziegenfuss
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Traditionally, exercise physiologists have depended on internal university funding to support their research programs. However, in an era of limited funding for universities, faculty are increasingly being encouraged by administrators to secure external funding to support their research programs. The primary sources of external funding for exercise science related research has been state/federal funding, funding from private foundations, and developing research collaborations with industry. Although securing private funding from industry has served as the primary source of funding in biology, engineering, and medicine, exercise physiologists are often uncomfortable in conducting research sponsored by private industry. This roundtable will overview key points (pro and con) that researchers should consider in developing such relationships. Each presenter has had considerable experience in conducting and/or coordinating such research programs at universities and/or for industry. Dr. Kreider will provide an overview and introduction. Then, Dr. Ziegenfuss will provide their perspective. Dr. Kreider will then lead the audience through a Q & A session discussing various professional issues. This presentation will be beneficial for students and researchers interested in establishing funded research programs.

Nutritional and Metabolic Considerations Related to Exercise-Induced Muscle Damage

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Introduction: Physical insult has been shown to elicit physiologic changes that can be collectively described as the "acute phase response". This phenomenon includes catabolism, pain, weakness, glucose intolerance, hypermetabolism, leukocytosis, and endocrine abnormalities. Attempts to discern the duration and magnitude of this stress response, as well as to discover nutrition interventions, have involved protocols from the clinical setting to the exercise laboratory. Some common findings have emerged. The intent of this presentation is to descriptively compare clinical situations such as trauma and sepsis to exercise recovery. Potential nutrition strategies for improving recovery will also be discussed. **Methods:** A review of 51 studies including two investigations by the authors using eccentric exercise was undertaken to describe a large spectrum of acute phase variables. These included nutritional, metabolic, immunological and performance measurements. **Statistics:** Data from the two recent investigations within the Human Nutrition Laboratory were analyzed via two-way repeated measures ANOVA and Pearson r. **Results:** Markers of physiologic stress after eccentric exercise were of less magnitude than those in clinical settings but revealed similarities between exercising subjects and trauma patients. **Discussion:** Based upon previous findings, we hypothesized that the acute phase response following eccentric exercise would include all of the same manifestations as those seen in clinical settings (1-4). However, our results indicated that some but not all markers of physiologic stress are altered consistently. We conclude that intense eccentric exercise protocols are partly effective for simulating trauma and sepsis. Further studies are needed to elucidate nutrition recommendations for athletes who are chronically sore due to eccentric training (e.g. bodybuilders).
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The Biochemistry of Metabolic Acidosis

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Introduction: Exercise physiology has portrayed the increase in acidosis during exercise to be caused by the production of lactic acid; a condition often referred to as a “lactic acidosis”. This construct exists without experimental evidence, and is not supported by fundamental principles of organic chemistry, biochemistry, and acid-base physiology. **Discussion:** A review of the biochemistry of energy catabolism within skeletal muscle reveals that lactate production consumes a proton, and that the proton releasing reactions of catabolism reside within glycolysis. Furthermore, ATP hydrolysis (such as from muscle contraction) releases a proton, and in combination with glycolysis, accounts for the majority of proton release during muscle contraction. **Conclusions:** Acidosis needs to be taught based on the following; 1) Exercise-induced metabolic acidosis results from an increased disparity between glycolytic flux and substrate entry into the mitochondria, resulting in a greater proportion of cytosolic ATP turnover that is not balanced by ATP regeneration from mitochondrial respiration; 2) Lactate production increases under these cellular conditions due to the favorable bioenergetics for the LDH reaction; 3) increases in blood and muscle lactate do not account for the protons released from muscle during exercise; 4) Increases in blood and muscle lactate are indirect indicators of increases in proton release from muscle. Until textbook sin exercise physiology and biochemistry reveal the biochemical causes of acidosis, the misconception of a “lactic acidosis” is likely to continue.

Fostering Behavioral Change in Exercise Physiology Settings: Lessons from Health Psychology

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Exercise physiologists work in collaborate settings with physical and occupational therapists, registered dieticians, nurses, physicians and psychologists. Each of these professions has its area of expertise and we are no exception. Exercise physiologists are in a good position to promote behavioral change that incorporates exercise, diet and stress management. Members of our profession are on the front lines with regard to preventative medicine. It is within our scope of practice to measure human performance, write exercise prescriptions and carry them out. Wise clients ask physicians for medical clearance before exercising, but seek our expertise in order to build a personal exercise program. It then becomes our role to motivate our customers to initiate and maintain their program. In order to succeed with our clients, we need to get their attention. Since we are asking them to alter established lifestyle patterns, this may be difficult. Health psychologists have studied behavioral change and we can learn from these folks. The goal of the presentation is to adapt behavioral change strategies to exercise physiology settings and share these with ASEP members. The format is lecture (and, where possible, discussion and audience participation). The objectives of this presentation are for exercise physiologists who may want to work in small groups to at their place of work to: (1) Select a health related behavior that they would like to modify. This could entail the cessation of a negative health habit or the initiation of an activity that promotes good health. Use compassionate listening to interview the “client”. (2) Discuss the six stages of change with members of their group and determine what stage the individual with the habit is in. (3) Apply strategies to advance their “hypothetical” client to a more advanced stage of change after determining the parameters of the problem involved. (4) Discuss how they would apply the following to helping their fictitious client, such as positive or negative reinforcement, the manipulation of antecedents, prompting. modeling, the use of support groups, cognitive re-structuring (altering self-talk). (5) Discuss how they would improve their client’s perception regarding his or her health beliefs and sense of efficacy. (6) Demonstrate the relationship between attitudes, beliefs and behaviors in their client. (7) Inform their hypothetical client about how to cope with relapse or prevent it, and (8) Decide if social engineering has a role in altering their client’s behavior.

Note: There is a document that accompanies this presentation.

JOBFIT; A Strategy to Reduce Musculoskeletal Disorders Pilot Study

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JOBFIT is a strategy that focuses on the individual's JOB, FITness and Stress management abilities. A pilot study was conducted to validate protocols and gather participant feedback on the program's effectiveness. Johnson & Johnson Health and Wellness and the University of Texas Medical Branch - Galveston (UTMB) recruited 75 volunteers at each site, for a total of 150 participants. The 12-week pilot study was composed of an integrated physical fitness and stress intervention program. The study was reviewed and approved by UTMB's Institutional Review Board. The JOBFIT Service Ladder outlines the core components of the strategy: Prevention, Conditioning Program Referral, Conditioning and Stress Management Program Implementation, Tracking and Outcomes. Tools utilized included a Job Function Survey, Ergonomic Discomfort Survey, and ESSI Stress Map Stress Assessment. This strategy can be used with a variety of "at risk" employee groups, such as, new hires, employees with injuries/illnesses, employees returning from disability, alternative duty/job transfers, employees in high risk jobs, or special populations such as employees with chronic low back pain, diabetes, etc. **Outcomes:** Data analysis from the pilot study showed improvement in most all fitness categories, including dynamic muscular strength, lower back and hamstring flexibility, aerobic capacity and weekly physical activity minutes. Data from the stress management component showed little overall movement pre to post, but participant feedback indicated the stress tool to be valuable in increasing awareness of stressors and coping options. Program completion rates were calculated based on completion of both pre/post fitness and stress management evaluations. Completion rates varied greatly between fitness and stress management, with a majority of participants completing the fitness evaluation and fewer completing the post stress management assessment. **Future considerations:** Based on data analysis and participant feedback from the pilot study, the following changes to the JOBFIT program have been suggested. (1) A trained counselor or EAP specialist should facilitate the stress management questionnaire and coping strategies. (2) Surveys and other paper work should be consolidated to reduce the pre/post screening time. (3) Actual duration of program should be tailored to meet the specific needs of the individual.

The Relationship of Personality Type and Coronary Heart Disease

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It has been well established that there is a relationship among stress, Type A personality type and cardiovascular disease as Friedman and Rosenman reported over a quarter of a century ago. Yet only a small body of literature regarding a relationship between one's Myers-Briggs [MBTI®] personality type and potential risk for development of coronary artery disease has been published over the past 20 years. The MBTI® is based on a solid research foundation from the Theory of Personality which Carl Jung, a Swiss Psychiatrist formulated in the early 1900s. It is a valid and reliable instrument designed by Katherine Briggs and her daughter Isabel Briggs Myers during the early part of the 20th century and is the most widely used personality type assessment instrument in the world. Consulting Psychologists Press, Inc. [CPP] in 1975 purchased the instrument's copyright. Prior to then, the MBTI® was only available for research purposes. After CPP secured the copyright it became available as a tool to identify how one may gain their energy, take in information, make decisions and how they are orientated to their outside world. It has been reported that those who have a preference for sensing "S" and judging "J" have a higher likelihood to suffer from hypertension and have a higher reported incidence of coronary events. Knowing ones MBTI® preference will not decrease the progression of CHD. However, this information may have implications for the health professional working with a client whose MBTI® type may have a high association with CHD. As with the some of the approaches used for the individual who is a Type "A" personality such as stress management and other popular therapies, addressing one's type dynamics may serve as a valuable asset to the treatment team members. It may also assist the client in perhaps making some adaptations to both their internal and external stressors. The purpose of this presentation is to familiarize the audience with the basics of personality type and present an overview of the current literature addressing coronary heart disease and personality type.

Analysis of Academic Departments by Name, Degree, Faculty, and Curriculum for Undergraduate Accreditation Purposes

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Introduction: This study compared the currently required coursework of colleges and universities with degree titles in exercise physiology to the required coursework of programs with related degree titles. The coursework of all colleges and universities was judged according to their compliance with American Society of Exercise Physiologists (ASEP) accreditation guidelines. **Methods:** Seventy-seven colleges and universities were selected from the ASEP Directory of Academic Programs. Data were collected via the World Wide Web. The required degree coursework for each colleges and universities was compared to the exercise physiology core content areas outlined in the ASEP accreditation document. **Statistics:** A chi-square test for goodness of fit was used to analyze the distribution of colleges and universities into categories by the percentage of exercise physiology core content areas they meet. Further chi-square tests were done to analyze the distribution of degree titles for the colleges and universities in each percentage category. **Results:** There was a statistically significant difference ($p<0.0001$) in the frequency distribution of schools by the percentage of core content areas met. There was, however, no statistical difference in the observed frequency distribution of colleges and universities by degree titles and the expected frequency distribution within each percentage compliant category. Forty-two (55%) of the 77 schools met less than 50% of the exercise physiology core content requirements. Only five (6.5%) of the 77 schools met 80% to 89% of the ASEP exercise physiology core, and no schools were observed in the 90% and above percentage category. Six of the 77 schools met the minimum credit requirement of 24 credits. **Conclusion:** The data indicate that there is no distinct difference in the academic coursework required by degree programs with the exercise physiology title (4 out of 77 schools), the exercise science title (20 out of 77 schools), and other degree programs by such names as kinesiology, physical education, and other related titles. Also, at the present time, less than 10% of the 77 colleges and universities (with 24 different degree titles) meet the ASEP accreditation guidelines.
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Ventilatory Parameters Influence the Decline in VO_{2max} in Fit, Male Cyclists

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Introduction: With age, there is a decline in maximal oxygen consumption. Brooks, Fahey, and White (1996) show decreases with age in the ventilatory attributes of the following: increased work of breathing (pulmonary function) and gas exchange at the lung (pulmonary diffusion capacity). The purpose of this study is to investigate ventilatory parameters and the effect on maximal oxygen consumption in a cross section of aging, competitive cyclists. **Methods:** Twenty-seven (N=27) male subjects were categorized by age: 20-29 yr (n=4), 30-39 yr (n=6), 40-49 yr (n=6), 50-59 yr (n=5), 60-69 yr (n=3), 70-79 yr (n=3). Subjects performed a maximal test, with their bicycle set up on a cycle ergometer (Velodyne™), to volitional fatigue. Ventilatory and gas measures were collected continuously and analyzed every 20 seconds. They included the following: VO_{2max} (ml/kg/min), expired minute ventilation (V_E, l/min), VCO_2 (l/min), breathing rate (RR/min), percent (%) O_2 expired and percent (%) CO_2 expired. **Statistics:** Descriptive statistics of mean (standard deviation) were utilized to establish demographic profiles for each age category. An analysis of variance (ANOVA) was used to establish differences between groups on measured variables. Statistical Significance was set a priori at $p \leq 0.05$. **Results:** Subject VO_{2max} (ml/kg/min) by age group were the following, respectively: 20-29 yr (69.53 ± 1.5), 30-39 yr (64.22 ± 11.5), 40-49 yr (65.03 ± 8.1), 50-59 yr (62.72 ± 6.45), 60-69 yr (43.67 ± 7.68), 70-79 yr (36.87 ± 1.75). The ANOVA revealed significant ($p< 0.05$) decline across age groups in the following measures: (1) VO_{2max} ($p< 0.01$), (2) VCO_2 ($p< 0.01$), (3) RR/min ($p< 0.03$), (4) %CO_2 expired ($p< 0.03$), and (4) V_E ($p< 0.04$). However, subgroup analyses revealed the decline in VO_{2max} and VCO_2 was only significant after age 59 (yr). In addition, V_E, RR/min., and %CO_2 expired declined only after age 69 (yr). **Discussion:** From the findings, ventilatory parameters significantly influence declines in maximal oxygen consumption in fit male cyclists. However, contrary to past research, significant declines in this fit population did not occur until 60 (yr) and 70 (yr). Indications from the measures of VCO_2, % CO_2 expired, RR/min. and V_E are that pulmonary deficiencies (i.e., compliance, closing volumes, end expired lung volumes) lead to a compromise VO_{2max} in fit male cyclists. Yet these declines may be attenuated by the level of fitness of the individual.

References: 1. Bortz W.M.(1996). How fast do we age? Exercise performance over time as a biomarker. *Journals of Gerontology*. Series A, Biological Sciences and Medical Sciences, 51 (5): M223-5. **2.** Brooks, G.A., Fahey, T. D. and White, T.P. (1996). *Exercise Physiology: Human Bioenergetics and Its Applications*, second edition. Mountain View, CA.: Mayfield Publishing Company. **3.** Ganong, W.F. (1983). *Review of Medical Physiology*, 11th edition. Lange Medical Publications, Los Altos, CA.

Role of the Myogenic Transcription Factors Myo-D, Myogenin, and Id-1 in the Phenotypic Expression of Myosin Heavy Chain Isoform mRNA in Response to an Acute Bout of High-Intensity Weight Training

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Introduction: The myogenic regulatory factors (MRF) Myo-D, myogenin, and Id-1 are known as DNA-binding proteins. Myo-D and myogenin seem to up-regulate the core promoter within muscle-specific genes to initiate transcription, whereas Id-1 seems to be a negative modulator of transcription. The phenotypic expression of the adult Type I and IIa myosin heavy chain (MHC) isoform is allegedly maintained by Myo-D, whereas Type IIx is maintained by myogenin. The phenotype of the MHC isoforms is known to change with prolonged weight training programs; however, little is known about the response of the MHC isoforms in response to an acute bout of weight training. Therefore, the purpose of this study was to determine the mRNA expression of the MHC isoforms and MRFs, in addition to the MRF protein expression, in humans in response to an acute bout of high-intensity weight training. **Methods:** Seven untrained men served as subjects in the study. Each subject performed one weight training session employing 3 sets of 8-10 repetitions at 75%-80% of their one-repetition maximum on the squat, leg press, and leg extension exercises. Muscle biopsies were obtained prior to the exercise session (pre), immediately after the session (post), and 6 hr post-exercise (6 hr-post). The relative MHC and MRF mRNA content was determined by RT-PCR using GAPDH as an external control and the MRF protein content determined by ELISA. Myofibrillar protein was determined using the Bradford method. **Statistics:** Results were analyzed with a one-way MANOVA with repeated measures. Significant main effects were further analyzed with separate one-way ANOVA with repeated measures. Significant differences between time points were determined with the Neuman Keuls Post Hoc test. Bivariate correlations were performed on selected variables using the Pearson Product Moment Correlation procedure ($P \leq 0.05$). **Results:** Compared to the pre-test, significant elevations of 49.79%, 45.61%, and 34.19% ($P<0.05$), respectively, occurred at 6 hr-post for Type I, IIa, and IIx MHC mRNA. For Myo-D and myogenin mRNA, there were significant elevations ($P<0.05$) at the post-test of 27.28% and 23.58%, respectively, but no change in Id-1 mRNA ($P>0.05$). Significant elevations ($P<0.05$) at 6 hr-post of 46.85% and 46.41%, respectively, also occurred for Myo-D and myogenin mRNA with no change in Id-1 ($P>0.05$). For Myo-D and myogenin protein levels, respective significant elevations ($P<0.05$) were detected at both the post-test (150.65% and 134.17%) and 6 hr-post (317.56% and 254.08) whereas no significant changes at either point were noted for Id-1 ($P>0.05$). Compared to the pre-test for myofibrillar protein content, a significant elevation of 84.52% was detected at 6 hr-post ($P<0.05$). There were significant correlations between MHC Type I and IIa mRNA at 6 hr-post and myogenin mRNA and protein at the post-test and 6 hr-post ($P<0.05$). There were also significant correlations between MHC Type IIx at 6 hr-post and Myo-D mRNA and protein at the post-test and 6 hr-post ($P<0.05$). **Discussion:** We hypothesized that increases in Type I and IIa MHC mRNA would be related to concomitant increase in Myo-D and myogenin as a result of an enhanced rate of transcription of the Type I, IIa, and IIx MHC genes. Our results indicate that an acute bout of high-intensity resistance training is sufficient to up-regulate the mRNA expression of all three MHC isoforms at 6 hr post-exercise, and that the phenotypic expression of the adult Type I and IIa MHC isoform mRNA is related to myogenin, while the expression of the Type IIx MHC mRNA is related to Myo-D. Therefore, it is concluded that a pre-translational mechanism exists that seems to implicate Myo-D and myogenin as playing a role in initiating transcription and moderating the phenotypic expression of the Type I, IIa, and IIx MHC genes in response to an acute bout of high-intensity weight training. **References: 1.** Kraus et al. *Eur J Biochem*. 247:98-106, 1997. **2.** Mozdziak et al. *J Appl Physiol*. 84:1359-1364, 1998.

Predictors of Waist Gain among US Male Health Professionals

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Objective*:* Android obesity is associated with various chronic disease outcomes including coronary heart disease, stroke, and diabetes. This association is independent of, and exacerbated by total body weight. While this relationship has been well documented in the literature, little epidemiologic data are available on factors that may predict the accumulation of upper body fat. The objectives of the current study are to determine the modifiable predictors of upper body fat accumulation as assessed by waist circumference. Waist circumference is a robust index of upper body fat and intra-abdominal fat mass among men and women of all ages. **Methods:** The Health Professionals Follow-Up Study is a prospective study of 51,529 US male health professionals 40-75 years of age at baseline (1986). Data on lifestyle factors including diet, alcohol intake, physical activity, and hours of TV/VCR watching were obtained from self-reported biennial questionnaires between 1986 and 1996. Participants reported their waist circumference to the closest quarter inch in 1987 and 1996. Multiple regression was used to determine the association between nine-year change in waist circumference (from 1987-1996) and change in lifestyle factors after adjusting for baseline age, total energy intake, hypertension and hypercholesterolemia. The β coefficient from the regression corresponds to the change in waist (inches) over the 9-year period per unit change in the lifestyle factor. **Results:** We included 11,966 men who were free of chronic disease and who had reported their waist circumference at both time periods. During 9 years of follow-up, the average waist gain was 1.29 inches. Change in TV watching (hours/week) (β=0.0128, $p<0.001$) and quitting smoking (β=0.428, $p<0.001$) were significantly associated with waist gain, while change in intake of dietary fiber (g/day) (β= -0.018, $p<0.01$) was strongly associated with waist reduction. Furthermore, both change in weight-training (METS/week) (β= -0.011, $p<0.05$) and vigorous physical activity (METS/week) (β= -0.005, $p<0.001$) negatively predicted waist change between 1987 and 1996. There was no significant association between change in alcohol consumption and waist change over time in this cohort. **Conclusions:** The results from these prospective analyses suggest that an increase in television watching and a decrease in dietary fiber, vigorous physical activity and weight training are significantly associated with waist gain among middle-aged to older US men.

Validity and Reliability of the Accusport® Blood Lactate Analyzer

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Introduction: Research of the validity and reliability of the Accusport® Blood Lactate Analyser (ALA) has produced conflicting results. **Methods:** We studied the validity of the ALA using each of whole blood, plasma and saline prepared with known concentrations of lactate. In addition, the reliability of the ALA for whole blood lactate across 15 samples and between two units, and the variability in results with different sample volumes (10, 15, 20, 25 and 30 μL) were determined. The range of the 19 lactate samples for each of blood, plasma and saline were 1.4 to 29.4, 1.7 to 22.9, and 0 to 30 mmol/L, respectively. Blood, plasma and saline samples were assayed for lactate using the ALA and the criterion method of enzymatic spectrophotometry (ES). Sample volumes between 20-30 μL were shown to be adequate. Statistics: Accuracy of the ALA compared to results from enzymatic spectrophotometry of the same samples was assessed by; 1) correlation, 2) standard error of the estimate, 3) mean raw score residual error, 4) two-segment regression correlation, residuals and standard error of estimate, and 5) limits of agreement as proposed by Bland and Altman. Reliability of the ALA was assessed by 1) measurement (typical or technical) error (ME = SD of repeat measures), 2) the relative coefficient of variation (CV = [ME/mean]*100), and 3) reliability limits of agreement (RLA = ±2.77*ME). **Results:** Compared to ES, lactate assay by ALA produced two function linear relationships for each of whole blood, plasma and saline to upper limits of 13.1, 10.9, and 17.3 mmol/L, respectively. The ALA underestimated lactate from blood, plasma, and saline by 0.88±0.55, 1.54±1.44, and 0.85±0.66 mmol/L, respectively. Correlation and standard error of estimate statistics for the first linear segments for blood, plasma and saline were 0.97 ($p<0.05$) and 0.95 mmol/L, 0.973 ($p<0.05$) and 1.13 mmol/L, and 0.99 ($p<0.05$) and 0.65 mmol/L, respectively. There was no difference in lactate between two units of the ALA for an 11.5 mmol/L sample (8.69±0.35 vs. 8.72±0.42 mmol/L). Reliability of the ALA for blood lactate of 2.01, 7.1, and 14.7 mmol/L resulted in coefficients of variation of 15.8, 5.5, and 4.0 %, respectively. **Discussion:** The results indicate that the ALA is not valid for blood lactates ranging from 1.4 to 13.1 mmol/L, and values > 13.1 mmol/L exceed the range of the instrument. The ALA is more accurate for saline than blood samples. The reliability is poor for low, moderate and high blood lactate readings, suggesting that the unit should not be used for research. Nevertheless, use of regression corrected values from the ALA produces acceptable results for whole blood lactate values <7 mmol/L. **References: 1.** Bland JM, Altman DG. *Lancet* 8: 307-310, 1986. **2**. Fell JW, et al. *Int J Sports Med* 19: 199-204, 1998. **3.** Hopkins WG. www.sportsi.org/resource/stats/precision.html **4.** Pinnington H, Dawson B. *J Sci Med Sports* 4(1): 129-138, *2001*. **5.** Simmons DB. et al. *J Equine Vet Sci* 19:402-407, 1999.

Creatine Supplementation Does Not Increase the Incidence of Cramping or Injury for Two Division IA Football Teams Training/Competing in Similar Climates

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Introduction: The purpose of this study was to examine the effects of creatine supplementation on the incidence of injury and cramping of two NCAA Division IA college football teams training/competing in similar climates. **Methods**: In an open label manner, athletes (n=149) participating in their respective 1999 football seasons elected to take creatine (n=72) or non-creatine (n=77) containing supplements following practices and games. Subjects who decided to take creatine were administered 20 to 30 g/d of creatine for 5-7-d followed by an average of 5 g/d thereafter in 5-10 g doses. All athletes were offered carbohydrate and/or carbohydrate/protein supplements following training sessions/games. Creatine intake was monitored and recorded by research assistants throughout the course of the study. Subjects practiced or played in environmental conditions ranging from 51.5 to 101.3 °F, 24.5 to 92% RH (78.2±10.9 F, 48.6±14.1% RH) for an average of 187.5±41min per session. Injuries treated by the athletic training staff were recorded and categorized as cramping, heat/dehydration, muscle tightness, muscle strains/pulls, non-contact joint injuries, contact injuries, and illness. The number of missed practices due to injury/illness was also recorded. **Statistics**: Data are presented as the total number of treated injuries for creatine users/total injuries observed and percentage occurrence rate of injuries for creatine users for the competitive season. **Results**: The incidence of cramping (22/60, 37%), heat/dehydration (4/8, 50%), muscle tightness (11/29, 38%), muscle pulls/strains (22/46, 49%), non-contact joint injuries (25/62, 40%), contact injuries (85/165, 51%), illness (24/64, 38%), number of missed practices due to injury (53/143, 37%), players lost for the season (2/3, 67%), and total injuries/missed practices (248/580, 43%) were generally lower or proportional to the creatine use rate among players. **Discussion**: Creatine supplementation does not appear to increase the incidence of injury or cramping in Division IA college football players.
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This research was supported in part by the ESNL, EAS, MRS, SKW Trostberg & MRM.

Examination of Two Non-Invasive Methods of Determining Lactate

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Introduction: This study determined the relationship between directly determined lactate and two non-invasive methods. **Methods:** Thirty (16 male, 14 female) college-age students volunteered to participate. A Medical Graphics Cardio2 metabolic analyzer was used to collect the physiologic data, including breath-by-breath analysis of oxygen consumption and carbon dioxide production. Blood lactate was determined using three methos: (1) the TSI 2300 STATplus™ direct method; (2) the Clode and Campbell's non-invasive method, using the carbon dioxide balance equation method; (3) and, the Jones non-invasive method. The partial pressure of carbon dioxide in the mixed venous blood was determined using the CO_2 rebreathing procedure. Each subject performed one submaximal exercise bout on a bicycle ergometer. The exercise bout consisted of 5 minutes of rest followed by 10 minutes of cycling at 45 to 55% of age-predicted maximum heart rate, followed by 10 minutes of cycling at 65 to 75% of age-predicted maximum heart rate. **Statistics:** Analysis of variance with repeated measures (ANOVA) was computed between the invasive and non-invasive techniques to determine statistical significance. Correlaton coefficients were also determined between the direct and non-invasive methods. **Results:** At the 50% work load, there were no statistical differences found among the computed means of the three methods. The lactate values, using the "direct" method, the Clode and Campbell's method, and the Jones method were all closely related with means of 1.36, 1.35, and 1.37 mMol, reswpectively. Despite the nearly identical means, the correlation between the direct method and each of the non-invasive methods was found to be 0.24 for the Clode and Campbell carbon dioxide balance equation and 0.22 for the Jones method. At the 70% work load, there was no significant difference between the directly determined lactate value and the predicted value using the Clode and Campbell approach with means of 2.72 mMol and 2.83 mMol, respectively. There was a significant difference between the means of the direct method and the Jones approach (2.72 mMol and 3.23 mMol, respectively). **Conclusion:** When applied to a group of subjects, the results appear to indicate that blood lactate may be estimated with a relatively high degree of accuracy. **References: 1.** Clode M.C. et al. *Clin Sci.* 37, 263-272, 1969. **2.** Jones N.L. et al. *Clin Sci.* 32, 311-327, 1967. **3.** Jones N.L. et al. *J Appl Phys*. 64, 811-815, 1979.

Consistency of Squatting Force at Designated Time Intervals and at Its Peak Using an Inexpensive Dynamometer

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Introduction: Muscle-mechanical force output is an integral component of human physical performance. Inexpensive dynamometers are now available that purportedly enable investigators to measure force and other muscle-mechanical variables in situations in which the load is known and constant and the movement is linear. The purpose of the current study was to determine the reliability of force data obtained from one such dynamometer during a typical heavy-resistance lift. **Methods:** Maximum-acceleration, concentric-only parallel back squats were performed at 30, 60, and 90% of 1RM in a random sequence by 29 apparently-healthy young men who had been weight training no less than three months and who were familiar with the testing procedures. Force data were obtained using a Fitrodyne® device that was mechanically coupled to an Olympic barbell. Force was evaluated at 50, 100, 200, 300, and 400 ms intervals as well as for peak. Each participant completed two single-repetition trials at each load with 3 min rest provided between attempts. Data from the repetition at which the highest peak occurred for each load were used for statistical analysis. The identical test battery was repeated 48 h later to determine reliability. **Statistics:** Reliability was determined via intraclass correlation coefficients. **Results:** Reliability coefficients ranged from .63 to .96 for measurements taken between 50 and 200 ms for the three different loads. Coefficients for peak force ranged from .86 to .97 over the load spectrum. At the same time, measurements at 300 and 400 ms were low-to-moderately reliable ranging from .19 to .68. **Discussion:** It appears the Fitrodyne® device may be useful for obtaining reliable mechanical force data over a load spectrum from young men familiar with free-weight, concentric-only squats for up to 200 ms as well as for their peak values. It is likely that circumstances exist in which muscle-mechanical peak squatting force and/or squatting force exerted during a short time frame will be meaningful.

Creatine Monohydrate: Long Term Benefits and Potential Adverse Effects
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The purpose of this presentation is to provide the audience with a brief multi-analysis review of the research findings surrounding creatine supplementation. A brief overview of the history of ergogenic aids in sport will also be given. The discussion will focus on recommendations and precautions established by the American College of Sports Medicine relative to the ingestion of creatine. The potential clinical benefits of creatine monohydrate will also be examined. The justification of ergogenic aids in sport will be philosophically challenged. This presentation should be beneficial to the exercise physiologist, clinician, academician, and athletic coach.

Periodization Essentials and Innovations in Resistance Training Protocols

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Introduction: While strength and conditioning programs typically improve various performance factors, it is difficult to attain continued physical and psychological adaptations without properly designed training protocols. If adequate training adaptations cannot be accomplished, in time the athlete can experience performance decrements, a greater susceptibility to injuries, and numerous other symptoms related to the overtraining phenomenon. The concept of periodization is considered to be a viable strategy for promoting safe long-range training and performance improvements by manipulating variations in strength and conditioning variables such as specificity, intensity, and volume. By manipulating the previously mentioned strength and conditioning training variables, properly designed periodization protocols can assist the athlete in adjusting to the General Adaptation Syndrome, which is a promoted theory that explains how the human body reacts and adjusts to stress. The General Adaptation Syndrome is a three-stage process that includes a shock or alarm phase, a resistance phase, and a supercompensation or exhaustion phase. **Purposes:** The primary purpose of this presentation is to discuss traditional or classic periodization models in relation to macrocycles, mesocycles, and microcycles in order to design safe and effective strength and conditioning protocols. Specific emphasis will be placed on the preparatory period (i.e., hypertrophy/endurance phase, basic strength phase, strength/power phase), the maintenance/competition period, and various transition periods. Secondary purposes of the presentation will include discussing innovative periodization models such as nonlinear versus linear models as well as issues regarding fractal periodization.

References: 1. Baker D. et al. *J Strength Cond Res*. 8:235-242, 1994. **2.** Kramer J. et al. *J Strength Cond Res*. 11(3):14-20, 2000. **3.** Stone M. et al. *J Strength Cond Res*. 21(3):54-60, 1999.