PERFORMANCE NUTRITION:
...FROM A SWIMMING PERSPECTIVE
WHAT NEEDS TO BE CONSIDERED FOR PEAK PERFORMANCE?
FUNCTIONS OF FOOD

• Locomotion
• Cellular growth, maintenance, and repair
• Growth
• Thermoregulation
• Oxidative stress regulation
• Reproduction
WHAT IS NEEDED FOR OPTIMAL PERFORMANCE?

- Hydration
- Energy Availability
- Muscle strength and contractility
- Bone Density
- Oxygen availability
- Immune system integrity
- Nutrition Periodization
PERIODIZATION: AS TRAINING CHANGES, NUTRITION CHANGES
Periodization: As Training Changes, Nutrition Changes

<table>
<thead>
<tr>
<th>Month</th>
<th>November</th>
<th>December</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
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</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>44,513</td>
<td>45,508</td>
<td>46,547</td>
<td>47,565</td>
<td>48,575</td>
<td>49,585</td>
<td>50,595</td>
<td>51,605</td>
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<tr>
<td>Week 2</td>
<td>43,524</td>
<td>44,514</td>
<td>45,548</td>
<td>46,569</td>
<td>47,579</td>
<td>48,589</td>
<td>49,599</td>
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<td>Week 3</td>
<td>42,535</td>
<td>43,525</td>
<td>44,553</td>
<td>45,574</td>
<td>46,584</td>
<td>47,594</td>
<td>48,604</td>
<td>49,614</td>
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<tr>
<td>Week 4</td>
<td>41,546</td>
<td>42,536</td>
<td>43,562</td>
<td>44,583</td>
<td>45,593</td>
<td>46,603</td>
<td>47,613</td>
<td>48,623</td>
</tr>
</tbody>
</table>

**Competitions**
- FAST Finals 7-9
- Winter Open

**ANNUAL PLANNING CALENDAR**
- Competitions
- FALL Meet/Race Week
- State - Epic
- PEAK Performance
- Spring Open
- HOTSPOT Meet
- LCM Meet/Race Week
- State - Epic
- Summer Open

**Exams**
- Exam 1: 2.5.13
- Exam 2: 2.18.13
- Exam 3: 2.11.13
- Exam 4: 2.4.13
- Exam 5: 2.28.13

**S&C**
- Strength: Basement
- Endurance: Basement
- Flexibility: Basement
- Recovery: Basement

**SMALL BLOCKS**
- Performance: Basement
- Stabilization: Basement
- Power: Basement
- Speed: Basement

**MEDIUM BLOCKS**
- Endurance: Basement
- Flexibility: Basement
- Recovery: Basement

**LARGE BLOCKS**
- Strength: Basement
- Endurance: Basement
- Flexibility: Basement
- Recovery: Basement

**AGE GROUP SEASON PLAN**
- Senior Season Plan
- High School Girls Plan
- Spring Plan
- Junior Season Plan
- Age Group Season Plan
Nutrition
Periodization
THE CAR THEORY

Gasoline  Hardware  Oil
WHAT IS GLYCOGEN??
PHYSIOLOGICAL NEEDS

• CARBOHYDRATE (Gasoline)
  – Most efficient form of energy
  – Sports Drink, Bars, Gels
  – Carbohydrate will fuel activity
    • High intensity, sustained and explosive energy

Recovery Nutrition

• Equally as important as pre- and during competition nutrition
  – Carbohydrate and Protein
    • 20g Protein doses
  – Chocolate Milk
    • 4 g of Carbohydrate/1 g or Protein
    • Endurance Recovery: Consider more CHO
  – Protein Sports Drinks during and after practice...
    • Endurance vs. Strength/Power
    • Prevent muscle breakdown
    • Heavier training phases

UNITED STATES OLYMPIC COMMITTEE
## RECOVERY NUTRITION IDEAS

<table>
<thead>
<tr>
<th>Natural Foods</th>
<th>Sports Nutrition Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-fat Chocolate Milk</td>
<td>Clif Bar</td>
</tr>
<tr>
<td>Half of a bagel with fruit preserves</td>
<td>Powerbar Performance Bar</td>
</tr>
<tr>
<td>Low-Fat Yogurt with cereal/fruit</td>
<td>Endurox</td>
</tr>
<tr>
<td>Cereal with low-fat milk</td>
<td>PowerBar Recovery Drink</td>
</tr>
<tr>
<td>Peanut Butter and Jelly Sandwich</td>
<td>First Endurance Bar</td>
</tr>
<tr>
<td>Fruit Smoothie (yogurt, fruit, protein)</td>
<td>Liquid Meal Supplement (Boost, Ensure)</td>
</tr>
<tr>
<td>Turkey Sandwich</td>
<td></td>
</tr>
</tbody>
</table>
Use FOOD for Recovery!

<table>
<thead>
<tr>
<th>Food</th>
<th>Protein (g)</th>
<th>Carbohydrate (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 oz skim milk</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>6 oz nonfat Greek yogurt</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>12 oz low fat choc milk</td>
<td>12</td>
<td>42</td>
</tr>
<tr>
<td>Medium banana + 2 Tbsp PB</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>3 oz turkey breast</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>2 slices wheat bread</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PB and J sandwich</td>
<td>20</td>
<td>82</td>
</tr>
</tbody>
</table>
# 4 R’s of Recovery Nutrition

<table>
<thead>
<tr>
<th>4 R’s of RECOVERY Nutrition</th>
<th>FOODS to EAT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rehydrate</strong> with FLUIDS and ELECTROLYTES</td>
<td>Water or Sports Drink (3 cups for every pound lost during activity)</td>
</tr>
<tr>
<td><strong>Replenish</strong> muscle glycogen stores with CARBOHYDRATES</td>
<td>Sports Drinks/Bars, Breads, Fresh/Dried Fruit (w/ Peanut Butter and/or Jelly)</td>
</tr>
<tr>
<td><strong>Repair</strong> and regenerate muscle tissue with high quality PROTEIN.</td>
<td>Dairy products, Recovery Mix (w/whey, soy, casein, or simply whey protein)</td>
</tr>
<tr>
<td><strong>Reinforce</strong> your immune system with antioxidant rich foods like FRUITS and VEGETABLES</td>
<td>Apples/Bananas/Oranges, Spinach/Carrots/Peppers (Meals higher in sodium and potassium)</td>
</tr>
</tbody>
</table>
PHYSIOLOGICAL NEEDS

• PROTEIN
  (Gears, Pistons, etc. under the hood)
  • High intensity activity breaks down muscle fibers
    – Muscle soreness
  • Dietary protein provides building blocks for the maintenance, growth and repair of muscle fibers
  • Intense training periods increase muscle breakdown
    – Ingestion of protein is necessary, and timing is equally important
PHYSIOLOGICAL NEEDS

• HYDRATION *and* Anti-oxidents (Car: Motor Oil)

• As little as a loss of 2% body weight can be detrimental to performance:

• Many athletes begin training dehydrated
ROLE OF FLUID IN THE BODY

• Physiological
  – Transport: Glucose and O2
  – Muscle Contraction: Dependent on H2O
  – Excretion of toxins: Urine Production
  – Regulation of core body temperature: Via Sweat

• Psychological
  – Motivation: Decreased Perceived Exertion
  – Concentration: Ability to focus on race
  – Drive to compete: Both physical and psychologically!
ASSESSING HYDRATION STATUS

• The “P” Test
  – Simple, cost effective and convenient

• Urine Specific Gravity Testing
  – Measurement directly proportional to urine osmolality which measures solute concentration or urine density
  – Refractometer used to produce values between 1.000 and 1.030
URINE COLOR CHART

If your urine color matches # 1,2, or 3, you are well hydrated.

If your urine color matches # 4, 5, or 6, you are dehydrated.
DETERMINING HYDRATION NEEDS

• Weighing before and after to monitor sweat losses
  – 162 lbs before – 158 lbs after = 4 lbs lost
  • 4 lbs is equivalent to 2.5%
  • 4 x 16 fl ounces to replenish wt lost = 64 fl ounces needed to maintain euhydration
  • But, to prevent negative performance effects, hydrate allow for no more than 2% weight loss.
    – A weight of 159 would have been acceptable
IMMUNE SUPPRESSION POST-TRAINING

• Training at high intensities and volumes compromises immune system
  – Stress promotes training adaptation
• Carbohydrate depletion and energy depletion increases stress and suppresses immune function
• Choose nutrition-rich foods during training and the recovery time frame
• Fruit and other energy dense foods are optimal for recovery
GENERALIZATION FOR ELITE ENDURANCE ATHLETE (SWIMMING?)

• Low energy availability
  – Low in carbohydrate intake
• Low in bone building nutrients
  – Calcium, Vitamin D and magnesium
• Low in Oxygen Transporting Nutrients
  – Iron, folate, vitamin B12
• Sometimes low in B vitamins
OLD SCHOOL
“FEMALE ATHLETE TRIAD”

- Disordered Eating
- Amenorrhea
- Osteoporosis
THE FEMALE ATHLETE TRIAD
ACSM POSITION 2007

Optimal Energy Availability
Optimal Bone Health
Normal Menstruation

Reduced Energy Availability
Low Bone Mass
Subclinical Menstrual Disorder

Low Energy Availability
Amenorrhea
Osteoporosis
<table>
<thead>
<tr>
<th>Old School Thoughts (Females Only)</th>
<th>New Thoughts (ACSM Position Paper 2007)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anorexia, Disordered Eating</td>
<td>Low Energy Availability</td>
</tr>
<tr>
<td>Amenorrhea (No menstrual cycle)</td>
<td>Abnormal Menstrual Cycle</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>Low Bone Density, Low Vitamin D Status</td>
</tr>
</tbody>
</table>

"FEMALE ATHLETE TRIAD"
“THERE’S NO CRYING IN BASEBALL!...”
ENERGY AVAILABILITY

- *Insufficient intake* compared to expenditure vs.
- *Intentional* altering of body size and/or composition
  - Due to either ideals for competitive success or social pressures
- Long term low energy availability leads to suppressed sex hormone levels: estrogen/testosterone
HORMONAL MARKERS

• Female
  – Menstrual Status
    • Primary Amenorrhea vs. Secondary Amenorrhea
  – Estradiol, Luteinizing Hormone (LH), Follicular Stimulating Hormone (FSH), and Prolactin

• Male
  – Serum Testosterone
OTHER IMPORTANT MARKERS

• Oxygen Transporting Nutrients
  – Iron: Serum Ferritin, Complete Blood Complex (CBC)
  – Vitamin B12 and Folate

• Bone Building Nutrients
  – Vitamin D: 25(OH) D3
  – Calcium and Magnesium

• Creatine Kinase (CK)

• Total Cortisol
OPTIMIZATION VIA PREVENTION

- Educate and adopt nutrition periodization along with training periodization
- Focus less on the scale and more on healthy eating
- Mark changes in performance, energy levels, prevention of injury and normal menstrual function
DXA SCANs: Lumbar Scan

<table>
<thead>
<tr>
<th>Region</th>
<th>BMD (g/cm²)</th>
<th>Young-Adult T-score</th>
<th>Age-Matched Z-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>0.972</td>
<td>-1.4</td>
<td>-1.4</td>
</tr>
<tr>
<td>L2</td>
<td>1.127</td>
<td>-0.7</td>
<td>-0.7</td>
</tr>
<tr>
<td>L3</td>
<td>1.107</td>
<td>-0.9</td>
<td>-0.9</td>
</tr>
<tr>
<td>L4</td>
<td>1.151</td>
<td>-0.5</td>
<td>-0.5</td>
</tr>
<tr>
<td>L1-L4</td>
<td>1.094</td>
<td>-0.8</td>
<td>-0.8</td>
</tr>
</tbody>
</table>
DXA SCANs: Femoral Scan

DualFemur Bone Density

Image not for diagnosis

<table>
<thead>
<tr>
<th>Region</th>
<th>BMD (g/cm²)</th>
<th>Young-Adult T-score</th>
<th>Age-Matched Z-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck</td>
<td>0.888</td>
<td>-1.1</td>
<td>-1.1</td>
</tr>
<tr>
<td>Left</td>
<td>0.889</td>
<td>-1.1</td>
<td>-1.1</td>
</tr>
<tr>
<td>Right</td>
<td>0.889</td>
<td>-1.1</td>
<td>-1.1</td>
</tr>
<tr>
<td>Mean</td>
<td>0.889</td>
<td>-1.1</td>
<td>-1.1</td>
</tr>
<tr>
<td>Difference</td>
<td>0.001</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>0.886</td>
<td>-1.0</td>
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<tr>
<td>Left</td>
<td>0.886</td>
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<td>-1.0</td>
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<tr>
<td>Right</td>
<td>0.886</td>
<td>-1.0</td>
<td>-1.0</td>
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<tr>
<td>Mean</td>
<td>0.886</td>
<td>-1.0</td>
<td>-1.0</td>
</tr>
<tr>
<td>Difference</td>
<td>0.001</td>
<td>-</td>
<td>-</td>
</tr>
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</table>
MALE ATHLETE: BONE DENSITY

**Total Body Bone Density Trend**

- **Densitometry Ref: Total (BMD)**
  - BMD (g/cm²) vs Age (years)
  - **BMD**:
    - Head: 2.186
    - Arms: 0.773
    - Legs: 1.337
    - Trunk: 0.949
    - Ribs: 0.744
    - Pelvis: 1.068
    - Spine: 1.048
    - Total: 1.159
  - **Young-Adult T-score**: -0.4
  - **Age-Matched Z-score**: -0.4

- **Trend: Total (BMD)**
  - %Change vs Previous
  - 6/12/2012: 28.9, BMD: 1.159, Change: -0.014, %: -1.2
  - 8/18/2011: 28.1, BMD: 1.173, Change: -

**Graphs:**
- Analysis of BMD across different body regions and age groups.
- Comparison of BMD measurements over time.
Male Athlete: Lumbar Scan

AP Spine Bone Density Trend

Densitometry Ref: L2-L4 (BMD)
- BMD (g/cm²)
- YA T-score

Trend: L2-L4 (BMD)
- %Change vs Previous

Age (years)

<table>
<thead>
<tr>
<th>Region</th>
<th>BMD (g/cm²)</th>
<th>Young-Adult T-score</th>
<th>Age-Matched Z-score</th>
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</thead>
<tbody>
<tr>
<td>L1</td>
<td>1.038</td>
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<tr>
<td>L2</td>
<td>1.185</td>
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<td>-0.5</td>
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<tr>
<td>L3</td>
<td>1.182</td>
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<td>-0.6</td>
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<tr>
<td>L4</td>
<td>1.126</td>
<td>-1.1</td>
<td>-1.1</td>
</tr>
<tr>
<td>L1-L4</td>
<td>1.136</td>
<td>-0.8</td>
<td>-0.8</td>
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<tr>
<td>L2-L4</td>
<td>1.162</td>
<td>-0.8</td>
<td>-0.8</td>
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Trend: L2-L4

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<th>Measured Date</th>
<th>Age (years)</th>
<th>BMD (g/cm²)</th>
<th>Change vs Previous (g/cm²)</th>
<th>Change vs Previous (%)</th>
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<tbody>
<tr>
<td>6/12/2012</td>
<td>28.9</td>
<td>1.162</td>
<td>-0.031 *</td>
<td>-2.6 *</td>
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<tr>
<td>8/18/2011</td>
<td>28.1</td>
<td>1.193</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>
Male Athlete: Femoral Scan

DualFemur Bone Density Trend

Image not for diagnosis

<table>
<thead>
<tr>
<th>Region</th>
<th>BMD (g/cm²)</th>
<th>Young-Adult T-score</th>
<th>Age-Matched Z-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>1.070</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Right</td>
<td>1.022</td>
<td>-0.4</td>
<td>-0.4</td>
</tr>
<tr>
<td>Mean</td>
<td>1.046</td>
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<td>-0.2</td>
</tr>
<tr>
<td>Difference</td>
<td>0.048</td>
<td>-0.4</td>
<td>-0.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>1.171</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Right</td>
<td>1.137</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Mean</td>
<td>1.154</td>
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<tr>
<td>Difference</td>
<td>0.035</td>
<td>-0.2</td>
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Trend: Total Mean

<table>
<thead>
<tr>
<th>Measured Date</th>
<th>Age (years)</th>
<th>BMD (g/cm²)</th>
<th>Change vs Previous (g/cm²)</th>
<th>Change vs Previous (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/12/2012</td>
<td>28.9</td>
<td>1.154</td>
<td>-0.007</td>
<td>-0.6</td>
</tr>
<tr>
<td>8/18/2011</td>
<td>28.1</td>
<td>1.161</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

HAL chart results unavailable

(Right = 116.6 mm)
STAY AHEAD WITH YOUR NUTRITION/HYDRATION ...SO THAT YOU DON’T FALL BEHIND

Design a plan and stick to it.

Eat/Drink Early, Attack Later!

Water weight loss of 2% can impair performance!

Muscle glycogen will only last for ~2 hours of maximal activity...give or take.
GAS IN THE ENGINE...

• What Octane?
• How much?
  – Race Car Model: Carbohydrate/Protein/Fat
    • Carbohydrate: Before, During and After
    • Carbohydrate **WITH FLUID**
    • Protein: Before and After
    • Fat: …another time.
WHAT ARE SPORTS SUPPLEMENTS?

• Muscle Growth/Repair
  – Creatine
  – Protein and amino acids
  – HMB
• Fat Reduction
  – Caffeine
  – Pyruvate
  – Carnitine
• Joint Health
  – Glucosamine
  – Chondroitin
• Fluid/Electrolytes
  – Sport drinks electrolytes
• CNS stimulation
  – Caffeine, taurine, guarana
• Exercise Metabolism
  – Creatine
  – Sodium Bicarbonate
  – Carbohydrate
  – Ribose
  – Carbohydrate
  – Glutamine
  – Echinacea
  – Vitamins, Antioxidants
• Recovery
  – Vitamin C, E
  – Carbohydrate
  – Protein
  – Ginseng

These ingredients or products are not guaranteed to work, nor are they guaranteed tested for safety!
WHAT IS THE CONUNDRUM?

- Many athletes believe that they need dietary supplements in order to compete at the best of their abilities, the most elite levels, and against the best competition.
- In a 2004 study by Burns et al, 88% of the collegiate athletes surveyed used 1 or more nutritional supplements, yet the perceived efficacy of those supplements was only moderate.
- According to the 2011 “Sports Nutrition and Weight Loss Report,”
  - 9% annual sales growth
  - $22.7 billion in total sales were noted for sports nutrition and weight-loss products in 2010.
- A “No Tolerance Policy” does not provide guidance or education to athletes (consumers) on how to navigate through this highly misleading industry.
BOTTOM LINE: SOME DIETARY SUPPLEMENT INGREDIENTS CAN BE SAFE AND EFFECTIVE

AIS Supplement Classification System: Effectiveness and safety

- **Group A**: Supported for use in specific situations in sport.
  - Provided to AIS athletes for evidence-based uses
- **Group B**: Deserving of further research.
  - Considered for provision to AIS athletes under a research protocol.
- **Group C**: No meaningful proof of beneficial effects.
  - Not provided to AIS athletes
- **Group D**: Banned or at high risk of contamination.
  - Should not be used by AIS athletes.
### EXAMPLES OF AIS CLASSIFIED SUPPLEMENTS

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport Drink/Gels</td>
<td>B-alanine</td>
<td>Coenzyme Q10</td>
<td>Ephedrine</td>
</tr>
<tr>
<td>Creatine</td>
<td>Beetroot Juice</td>
<td>Ribose</td>
<td>Siburamine</td>
</tr>
<tr>
<td>Caffeine</td>
<td>Fish Oils</td>
<td>Oxygenated Waters</td>
<td>Methylhexanamine</td>
</tr>
<tr>
<td>Whey Protein</td>
<td>Carnitine</td>
<td>MCT Oils</td>
<td>DHEA</td>
</tr>
<tr>
<td>Iron Supplement</td>
<td>Quercitin</td>
<td>Pyruvate</td>
<td>Glycerol</td>
</tr>
<tr>
<td>Vitamin D</td>
<td></td>
<td>Ginseng</td>
<td>Prohormones</td>
</tr>
<tr>
<td>Probiotics</td>
<td></td>
<td>Cordyceps, Rhodiola Rosea</td>
<td>Tribulus terrestris</td>
</tr>
</tbody>
</table>

AIS SUPPLEMENT CLASSIFICATION SYSTEM

Group B

Overview   Classification   Group A   Group B   Group C   Group D   Other Resources   Policies   FAQ   Members Area

Group B supplements are deserving of further research and considered for provision to AIS athletes only under a research protocol.

These sports foods and supplements:

1. have received some scientific attention, sometimes in populations other than athletes, or have preliminary data which suggest possible benefits to performance and
2. are of particular interest to athletes and coaches

The table below outlines the Group B supplements. Click on the factsheet or research summary tables for detailed information on the supplement.

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Factsheet</th>
<th>Research summary tables</th>
<th>Members resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-alanine</td>
<td></td>
<td></td>
<td>Member's B-alanine</td>
</tr>
<tr>
<td>Beetroot juice / Nitrate</td>
<td></td>
<td></td>
<td>Member's Beetroot Juice/Nitrate</td>
</tr>
<tr>
<td>Anti-oxidants C and E</td>
<td></td>
<td></td>
<td>Member's Anti-oxidants C and E</td>
</tr>
<tr>
<td>Carnitine</td>
<td></td>
<td></td>
<td>Member's Carnitine</td>
</tr>
<tr>
<td>HMB</td>
<td></td>
<td></td>
<td>Member's HMB</td>
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<tr>
<td>Fish oils</td>
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<tr>
<td>Quercetin</td>
<td></td>
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<td>Member's Quercetin</td>
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<tr>
<td>Other polyphenols as antioxidants and anti-inflammatories</td>
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</tbody>
</table>
CONSIDER RISKS VERSUS BENEFITS

Benefits

- Muscle Builders
- Single AAs
- Weight loss suppl.
- High doses of vitamins/minerals

- Creatine
- Caffeine
- Bicarbonate
- Dietary Antioxidants
- Glycerol

Risks

- Carbohydrate
- Protein
- Fluids & Electrolytes
- Calcium, Iron, Vitamin D
HOW ARE DIETARY SUPPLEMENTS MANUFACTURED AND REGULATED?

In the United States, dietary supplements are regulated by the FDA through the Federal Food, Drug, and Cosmetic Act according to the intended use.

  - DSHEA holds the manufacturers and distributors of dietary supplements responsible for ensuring that their products are safe before they are marketed; no third-party screening ensures this has happened.

- Therefore, manufacturers and distributors are free to determine whether a dietary ingredient is new or contains ingredients that were marketed in the United States before 1994. Under DSHEA, once the product is marketed, the FDA has the responsibility for showing that a dietary supplement is unsafe or illegal before it can take action to restrict the product’s use or remove it from the marketplace.
DSHEA DEFINES A DIETARY SUPPLEMENT AS:

“A product (other than tobacco) intended to supplement the diet that contains one or more of the following dietary ingredients:

- Vitamin/Mineral
- Herb or other botanical
- Amino acid
- Dietary substance to supplement the diet by increasing the total dietary intake;
- Concentrate, metabolite, constituent, extract or combination of any of the aforementioned ingredients
RISK CONTAMINATION OF DIETARY SUPPLEMENTS

• USADAs Stance on Dietary Supplements: “Strict Liability”
  – Athletes who use dietary supplements do so at their own risk and are 100% responsible for what is in their system.
  – Health risks
  – Risk of inadvertent positive test

• USADA considers supplement use to be voluntary, and thus even if supplement contamination is the source of a positive drug test the athlete is usually held responsible.
<table>
<thead>
<tr>
<th>Name of Substance/Method</th>
<th>Dose</th>
<th>Date Last Taken</th>
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</thead>
<tbody>
<tr>
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<td>2 tbs</td>
<td>09/21/10</td>
</tr>
<tr>
<td>Androedrol</td>
<td>2 tbs</td>
<td>09/21/10</td>
</tr>
<tr>
<td>Levyl 1</td>
<td>2 scoops</td>
<td>09/21/10</td>
</tr>
<tr>
<td>Ignition</td>
<td>1 scoop</td>
<td>09/21/10</td>
</tr>
<tr>
<td>MEEX Special</td>
<td>3 scoops</td>
<td>09/21/10</td>
</tr>
<tr>
<td>Jack 3cd</td>
<td>1 std</td>
<td>09/20/10</td>
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</table>

Declaration of the Form for Consideration.
250 Grams  Lemon Lime
Supplement Facts
Serving Size
1 Scoop (5.55 grams)
Servings Per Container: 45
Amount Per Serving  % Daily Value*
Proprietary Blend  4145mg*
(Arginine alpha-Ketoglutarate, Creatine
Monohydrate, Beta Alanine, Caffeine,
1,3-Dimethylamylamine (Geranium [Stem]),
Schizandrol A)
* Daily Value not established

Other Ingredients:
Citric Acid, Natural Lemon-Lime Flavor,
Acesulfame-K, Sucrose, Vegetable
Stearate, Silicon Dioxide, Chlorophyll (For
Coloring).

This product is produced in a facility that
processes milk and soy ingredients
Black Box Warning:
2013 WADA PROHIBITED LIST

PROHIBITED SUBSTANCES

S6. STIMULANTS

All stimulants (including both optical isomers where relevant) are prohibited, except imidazole derivatives for topical use and those stimulants included in the 2010 Monitoring Program*. Stimulants include:

a: Non-Specified Stimulants:

Adrafinil; amfepramone; amiphenazole; amphetamine; amphetaminil; benfluorex; benzphetamine; benzylpiperazine; bromantan; clobenzorex; cocaine; dopropamid; crotetamine; dimethylnamphetamine; etilamphetamine; famprofazone; fenacaine; fenetylline; fenfluramine; fenproporex; furfenorex; mephentermine; mesecarb; methamphetamine(d-); p-methamphetamine; methylenedioxyamphetamine; methylenedioxymethamphetamine; methylhexanamine (dimethylpentylamine); modafinil; norfenfluramine; phendimetrazine; phenmetrazine; phentermine; 4-phenylpiracetam (carphedon); pynylamine; prolintane.

A stimulant not expressly listed in this section is a Specified Substance.
**EXAMPLE: BIOSTEEL ENERGY DRINK**

### INGREDIENTS & NUTRITION FACTS

#### Supplement Facts
One (1) scoop (6.25g) contains:

- **Amino Acids:**
  - L-Leucine, L-Isoleucine, Glycine, Taurine, L-Glutamine, L-Valine
  - 3,841 mg

- **Organic Mineral Matrix:**
  - Calcium (from Lithothamnium Calcareaum), Magnesium (Magnesium Citrate), Zinc (Zinc HVP Chelate)
  - 59 mg

- **Vitamin B blend:**
  - Thiamine, Vitamin B2 (Riboflavin), Niacin, Vitamin B6 (Pyridoxine hydrochloride), Pantothenic Acid (Calcium-d-pantothenate), Biotin, Vitamin B12 (Cyanocobalamin), Choline Bitartrate, Inositol, Folic Acid, Inositol
  - 1.8 mg

- **Other Ingredients:**
  - Citric Acid, Natural Mixed Berry Flavour, Red Beet Powder, Celtic Sea Salt, Sodium Citrate, Potassium Citrate, Organic Stevia, Sucralose

#### Nutrition Facts:
- Calories: 6.25
- Fat: 0 g
- Carbohydrates: 1.5 g
- Sugars: 0 g
- Sodium: 78.5 mg
- Calcium: 12.6 mg
- Magnesium: 5.4 mg
- Zinc: 162 mcg

- Sugar free
- 60 scoops per container
- 30-60 servings per container

**BUY NOW**
FUNCTIONAL FOODS MANUFACTURED LIKE DIETARY SUPPLEMENTS

• The FDA regulates “functional” foods like dietary supplements
  – Bars, RTD’s, Protein Powders and Gels
• Intentional labeling of supplements as food with a Nutrition Facts label does not mean that it is regulated.
THIRD PARTY TESTING: IS IT THE ANSWER TO THIS PROBLEM?

• Does not assure safety or efficacy
• A third-party certified or verified product is not necessarily a better or more effective product.
• Assures truth in labeling and good manufacturing practices for the batch of product tested.
• Can be seen as a level of commitment from Manufacturer to the Elite athlete.
THIRD PARTY TESTED PRODUCT: ANECDOTAL STORY

- Line of Sports Nutrition products marketed to USA Swimming athletes
- BSCG Third Party Tested product AND…
  “W.A.D.A CERTIFIED NO BANNED SUBSTANCES”
- Owner of this product was contacted
  - Summary of Discussion
    - “What is USADA?”
    - “Never visited manufacturing plant where products made. Don’t need to, its safe”
    - “Tested a few of the products, good enough?”
    - Third Party Test means WADA Approved.
    - “Can’t afford NSF Testing…”
ATHLETE WANTS TO USE A DIETARY SUPPLEMENT: QUESTIONS TO ASK TO AVOID RISK AND/OR HARM (WHILE UNDER STRICT LIABILITY)

- Does the athlete’s diet support his/her Performance Goals?
  - Refer to Sports Dietitian
  - Research Dosage and Applications

- Is the Supplement Legal for Use? (Olympic vs NCAA)
  - Eligibility at Risk
  - Health at Risk
  - Wasted Money/Resources

- Has supplement been tested for side-effects and/or safety?
  - Is there evidence of efficacy?
  - Is the supplement 3rd Party Tested for label accuracy & banned substances?

Adopted from NATA Position Statement: Eval. Of Dietary Supp for Perf Nutr., 2013
IN SUMMARY...

- Endurance athletes (Swimming) should adjust eating patterns to high training and competition loads
  - Sports nutrition education (Sport Nutrition Presentations)
- Screening and monitoring
  - Performance, fatigue, injury
  - Biochemical Testing
    - Serum Ferritin and Iron Profile
    - Vitamin D
    - Estrogen?
- Refer to multidisciplinary team (Coach, Sports RD, Sports Med)
QUESTIONS