



What You Are Eating?



Does this look like Chicken to you?



Boneless chicken breast, water, modified cornstarch, salt, chicken flavor (yeast extract, salt, wheat starch, natural flavoring (animal source), safflower oil, dextrose, citric acid, rosemary), sodium phosphates, seasoning (natural extractives of rosemary, canola and/or soybean oil, mono- and diglycerides, and lecithin). Battered and Breaded with: Water, enriched bleached wheat flour (flour, niacin, reduced iron, thiamine mononitrate, riboflavin, folic acid), yellow corn flour, bleached wheat flour, modified corn starch, salt, leavening (baking soda, sodium acid pyrophosphate, sodium aluminum phosphate, monocalcium phosphate, calcium lactate), spices, wheat starch, whey, corn starch. Breeding set in vegetable oil. Cooked in partially hydrogenated vegetable oils, (may contain partially hydrogenated soybean oil and/or partially hydrogenated corn oil and/or partially hydrogenated canola oil and/or cottonseed oil and/or sunflower oil and/or corn oil).



PERFORMANCE NUTRITION



OUTLINE



- Energy storage and systems
- Carbohydrates
- Protein
- Fat
- Fluids
- Dietary Supplements and Ergogenic Aids



Training Determines “Type” of Athlete



Category	Hours per workout	Times per week
Health/fitness	0.5 - 1	3 - 5
Recreational	1 - 1.5	3 - 5
Well-trained	1.5 - 3	5 - 7
Elite/World Class	2 - 6	6 - 10



ENERGY



- Energy = kcals comes from:
 - Carbohydrates 4 kcals/gm
 - Protein 4 kcals/gm
 - Fat 9 kcals/gm
 - Alcohol 7 kcals/gm
 - Comes from food we eat and stored in the body



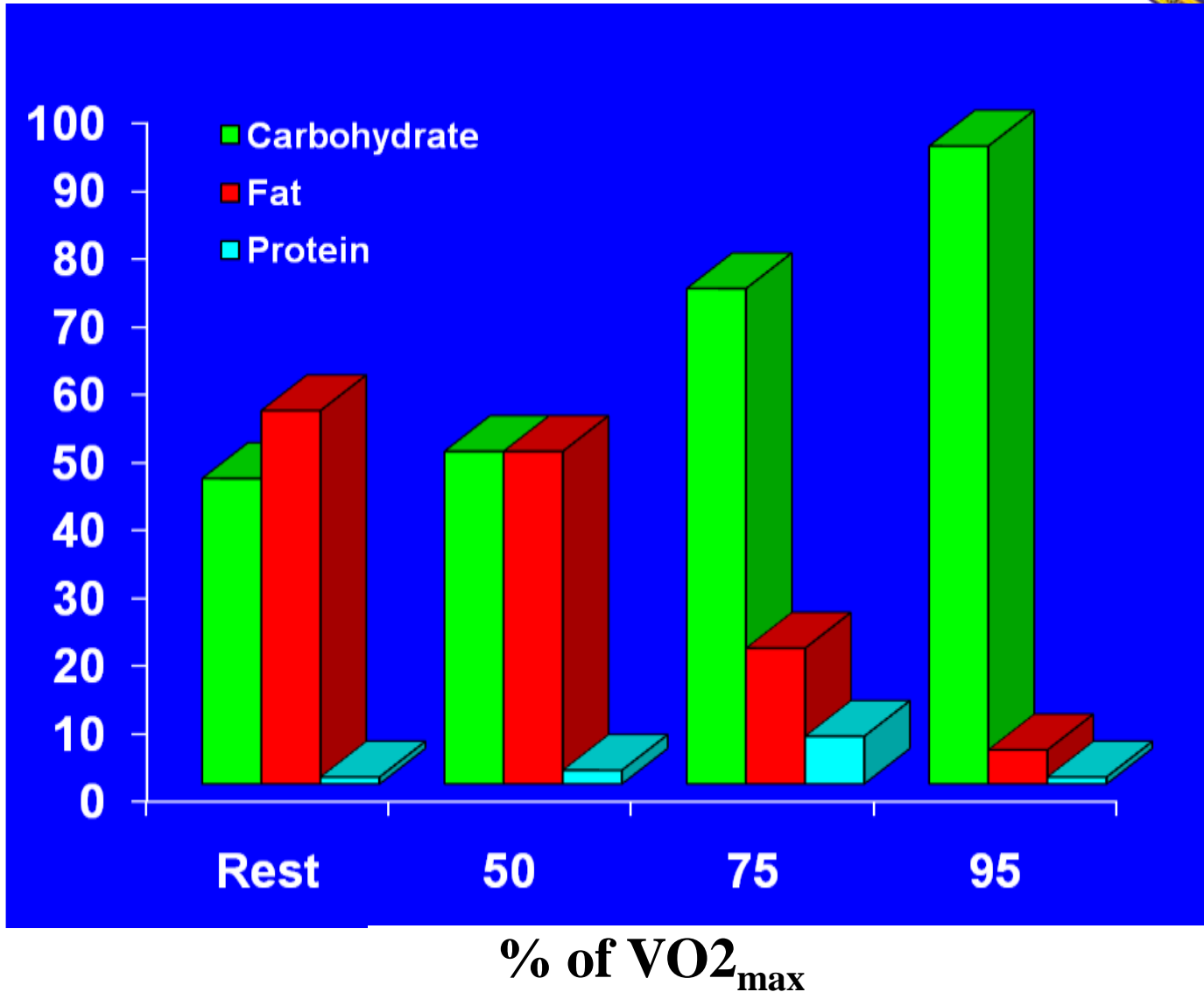
Estimated Energy Stores in Human Body



Energy Source	Storage Site	Energy, kcal
ATP/CP	Various tissues	5
Carbohydrate	Blood Glucose	80
	Liver Glycogen	400
	Muscle Glycogen	1400
Fat	Serum free fatty acids	7
	Serum triglycerides	75
	Muscle triglycerides	2500
	Adipose tissue	80000+
Protein	Muscle protein	30000



Fuel Utilization During Exercise





Carbohydrate Stores



150 lb. active male

1,800 calories total CHO stores

60,000+ calories total FAT stores



<i>Calories</i>	<i>Where stored</i>	<i>Purpose</i>
80	Blood	Feed brain
320	Liver	Blood sugar
1400	Muscle	Fuel Muscles

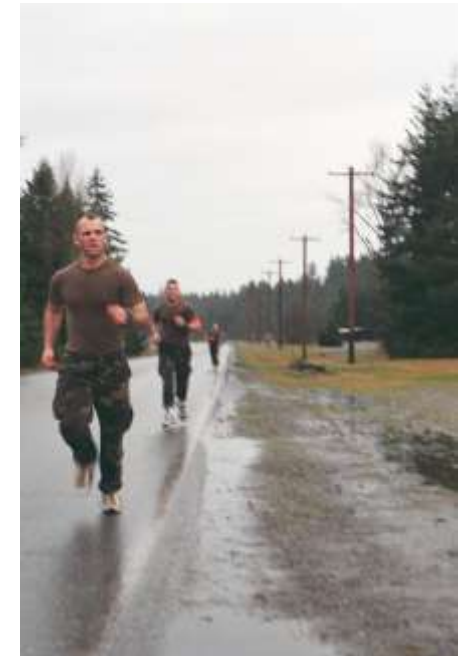


Training Increases Glycogen Stores



gm glycogen/per kg muscle

Untrained	13
Trained	32
Carbo-loaded	35-40





Energy Currency



- Adenosine triphosphate (ATP)
 - Body store small amount: 80-100g
 - ATP is continually formed, used, and re-formed.
 - When rate of metabolism increase demand for ATP increases and body breaks down energy stores to meet needs.



Energy Transfer



- 3 systems are used to transfer stored energy to form ATP
 - Phosphagen System: used for anaerobic short bursts of ~5 seconds.
 - Glycolysis System: Uses glucose under anaerobic conditions for high intensity activities of approx 1 to 3 minutes
 - Aerobic System: Aerobic system that uses CHO, Fat, and some PRO to for sustained activity.
 - All 3 systems work simultaneously but one system may predominate based on activity.



Carbohydrates



- Primary fuel during physical activity!!!
- Depleted glycogen store = depleted performance.
- Recommended daily intake for athletes:
 - 5 to 7g CHO/kg for general training needs
 - 7 to 10g CHO/kg for endurance athletes
 - 11+g CHO/kg for ultraendurance



Carbohydrate Intake Before Exercise



CHO, g/kg	Timing Prior to Exercise, hours
1.0	1
2.0	2
3.0	3
4.0-4.5	4

Athletes should experiment with different CHO sources to find ones that are best tolerated.

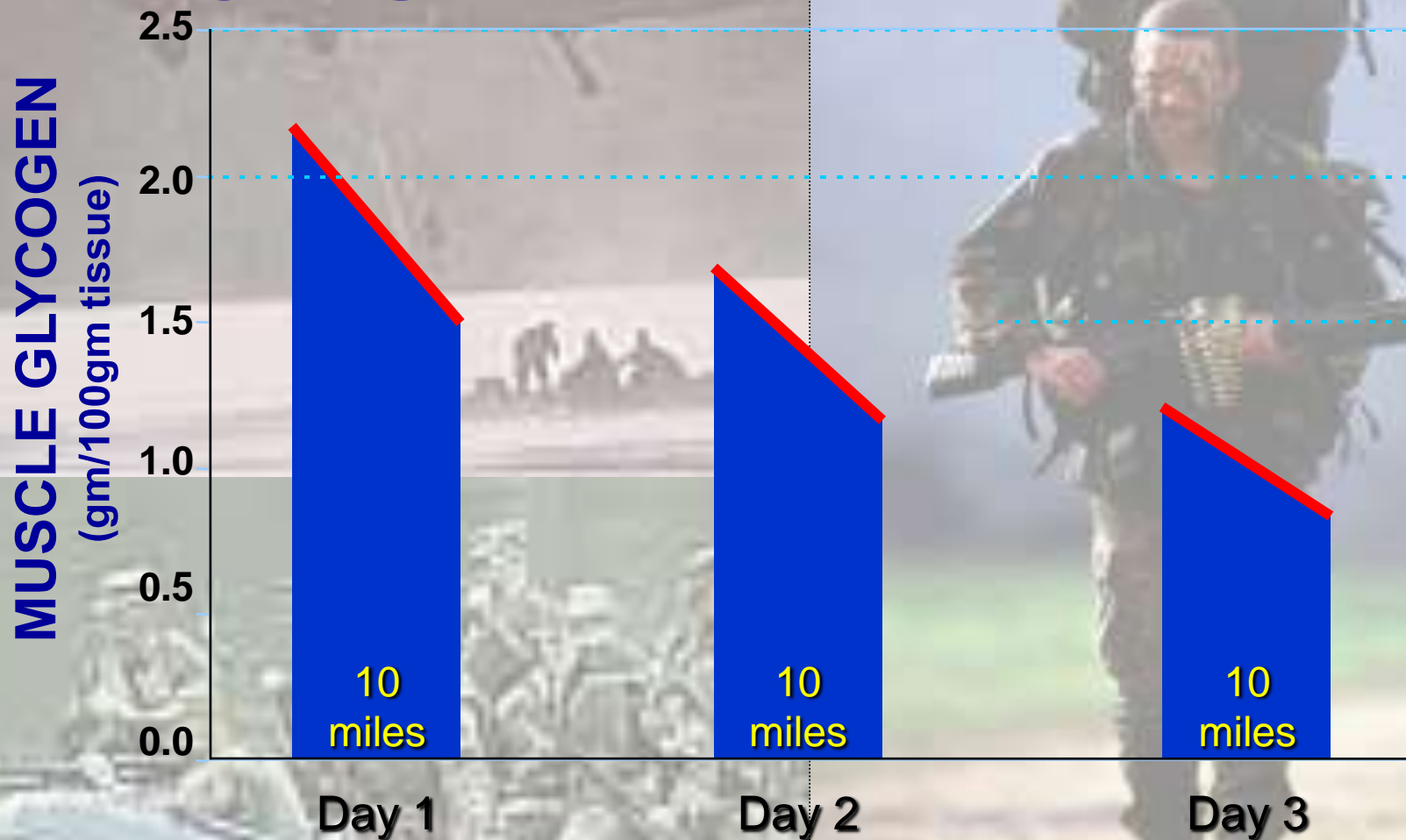


Carbohydrate Intake During Exercise



- Carbohydrate intake during exercise improves endurance performance as well as performance in stop-and-go sports.
- General recommendation is 30 to 60 g carbohydrate every hour as food and/or fluid.
- Sports drinks, gels, and bars may be most convenient.

Repeated Days of Hard Training Compromise Glycogen Stores...



Subjects consumed an “average diet” that contained 40-50 % Carbohydrate



Carbohydrate Intake After Exercise (Recovery)



- Aids recovery; not replenishing CHO will impede recovery and following performance.
- Recommended CHO intake after hard exercise >90 minutes
 - 1.5 g CHO/kg immediately after exercise
 - Additional 1.5 g CHO/kg 2 hours later



Protein



- Building blocks of muscle
- Greatest need initial phase of strength training (first 3-6 months)
- Protein efficiency increases with training so trained individuals may actually require **less** protein

Daily Protein Requirements

Activity	g/kg/d (g/lb/d)
Sedentary	0.8 (0.36)
Endurance	1.2-1.4 (0.55-0.64)
Strength	1.6-1.7 (0.73-0.77)



Protein and Glycogen Resynthesis



- Some studies have shown that a CHO + PRO combination may enhance glycogen resynthesis more than just CHO alone.
- Ideal CHO to PRO ratio is 1.5:1 to 4:1 achieved by a glass of low fat chocolate milk.



How Much Protein?



- Research shows that 30 grams post workout maximally stimulates protein synthesis.
- 40 grams did not stimulate synthesis more. (American Journal of Clinical Nutrition, 2009)
- Don't waste calories and/or money on excess protein.



FATS



- % daily intake of 20-25% recommended.
- <10% from saturated and trans fats
- Following a diet too low in fats, <15% of energy intake, could result in:
 - Menstrual dysfunctions in females
 - Low serum levels of testosterone in males
 - Inadequate intake of fat soluble vitamins such as E and D.



FATS: The Good, the Bad, and the Ugly



- Good: Unsaturated. Olive oil, canola oil, peanut oil, nuts, flaxseed, fatty fish.
- Bad: Saturated. Butter, creams, “marble streaks” in beef, solid at room temp.
- Ugly: Trans fats. Hydrogenated, in many pastries with long shelf lives such as twinkies.



Omega 3's

Not just for heart health



- DHA-FFA inhibits inflammatory signals caused by brain injury (Babcock et al.,2006;Lee et al.,2004)
- DHA-FFA reduces harmful immune cell activation following brain injury(Weatherill, et al.,2005)
- DHA-EE Supports antioxidant defense mechanisms following brain injury(Cao, et al.,2004)
- Omega-3 fatty acids reduce oxidative stress and learning disability following TBI(Wu, et al., 2004)

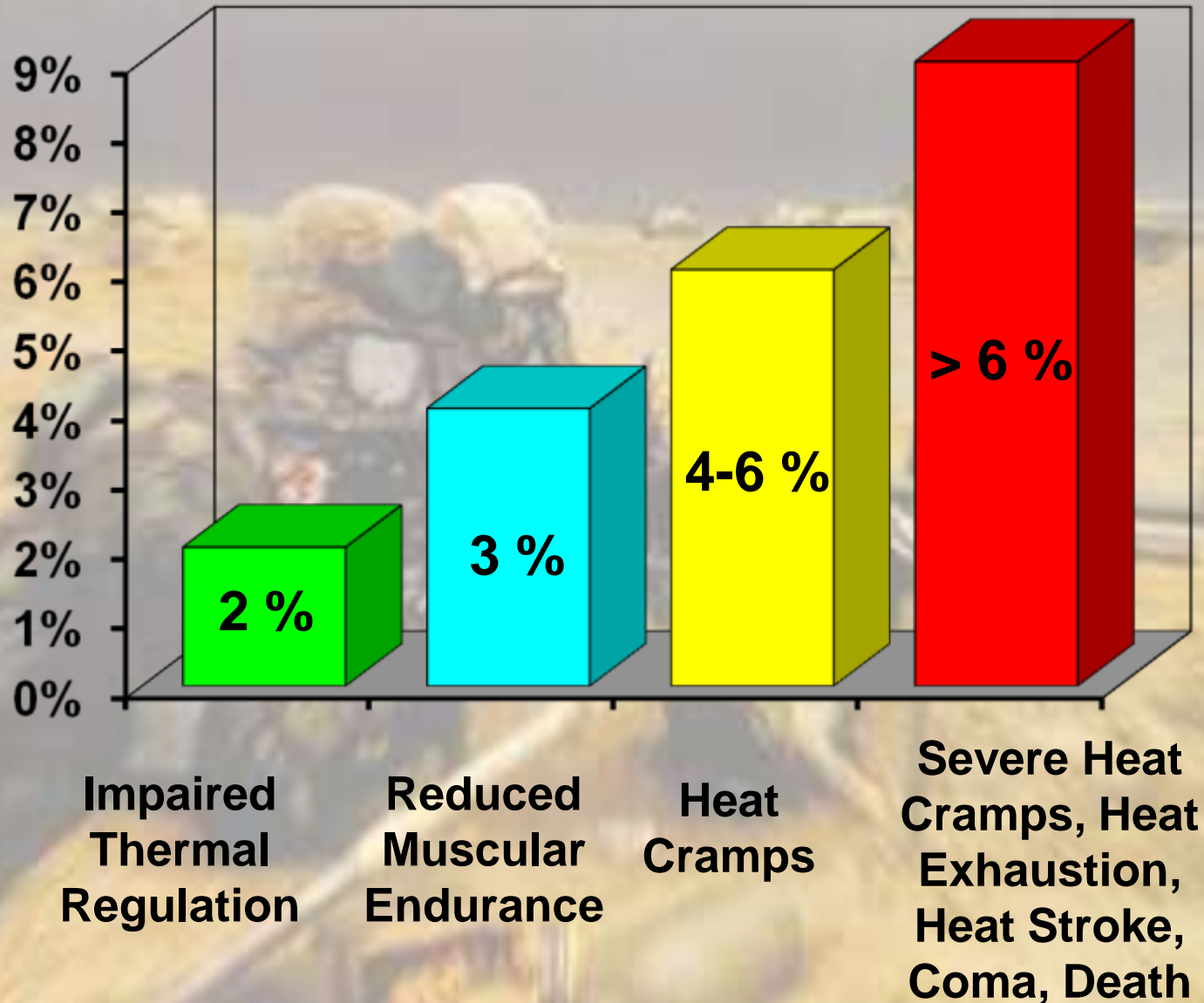


Hydration



- 2004 Dietary Reference Intake rec. 3.7 liters per day (130oz/day; 16 cups a day)
- It is well documented that 3-4% hypo hydration can reduce high intensity muscular endurance by approximately 10%
- **Significance:** The difference between the times of the gold medal and 8th place finishers in the 100 meter sprint in the 1996, 2000, and 2004 Olympics was an average of 3%

Effects of Dehydration on Physical Performance





Recommended Fluid Intake

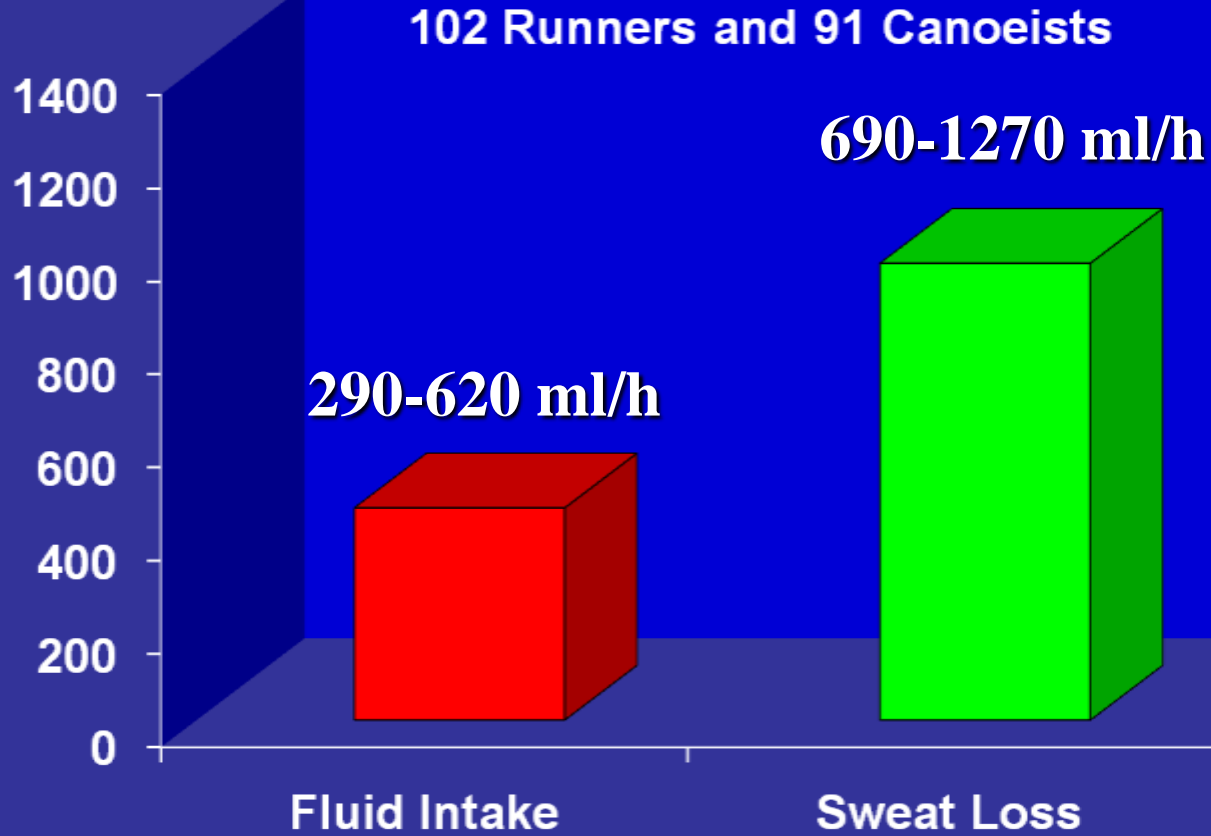


Before Activity	Drink 16oz 2 hours per activity Fifteen minutes before activity drink 8 to 16oz
During Activity	6-12oz every 15-20 minutes
After Activity	16-24 oz for every pound of body weight lost during exercise.

Rule of thumb: Every “gulp” of water is 1 ounce.



Voluntary Fluid Intake Often Inadequate





Electrolytes



- During heavy exercise don't rely solely on water. Does not replace electrolytes lost.
- Don't restrict salt in your diet.
- Sodium intake of 1g per hour is recommended during prolonged exercise where heavy sweat loss is expected.
- In extreme dry heat, water and sodium needs can be as high as 10 liters and 20g, respectively.

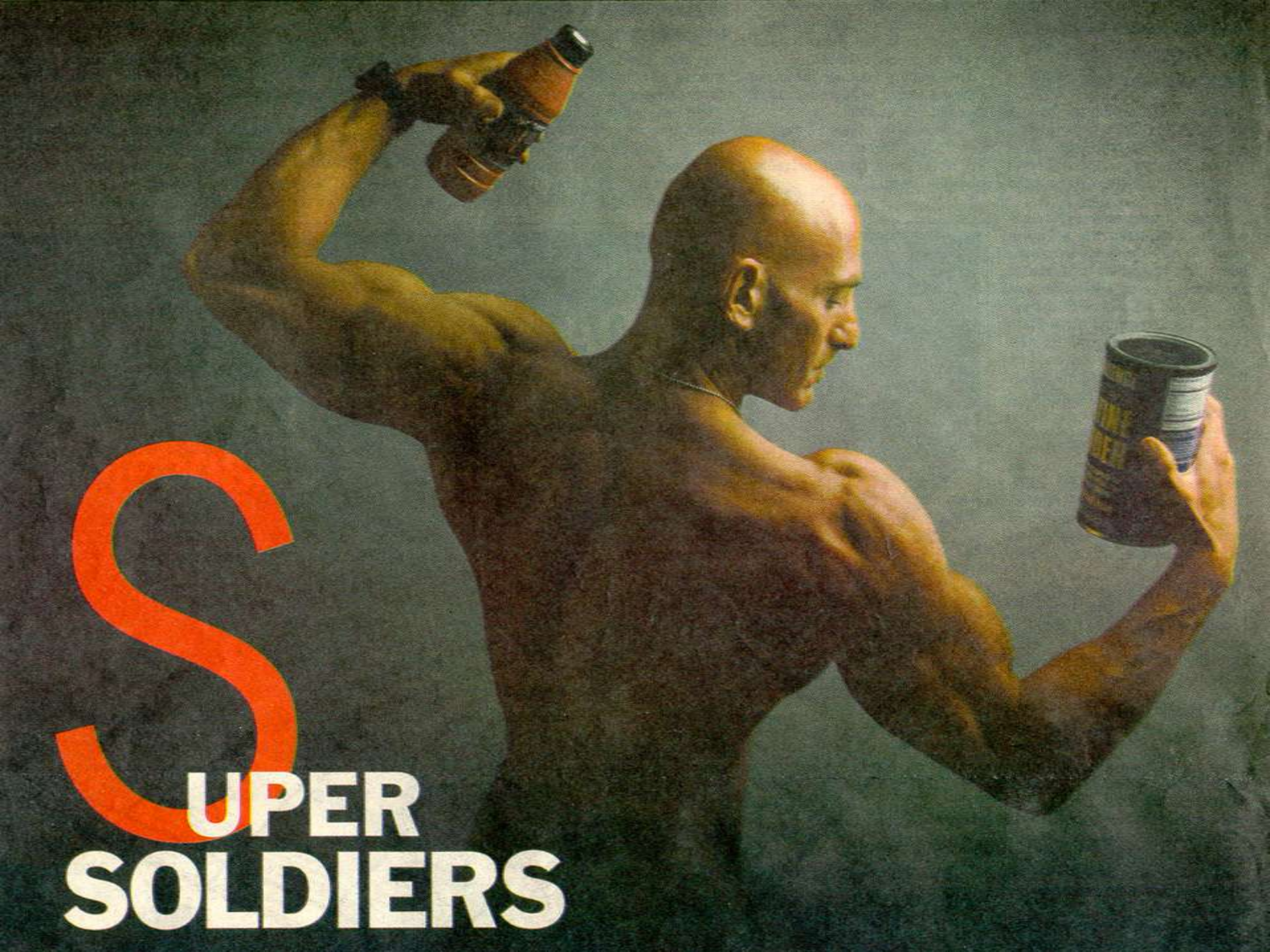


Ergogenic Aids Supplements



- Are they effective?
- Are they safe?
- Why take them?





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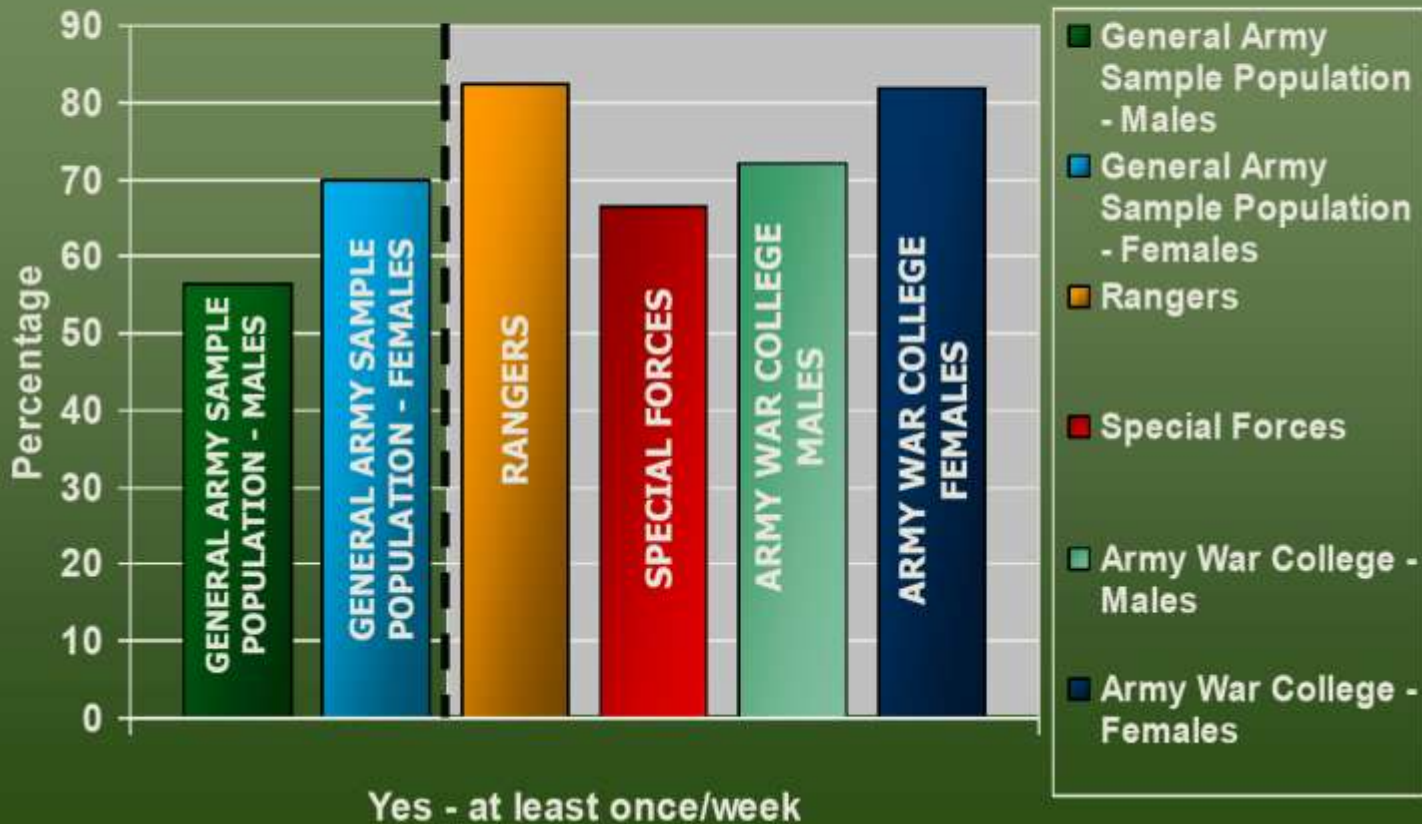
**UPER
SOLDIERS**



USARIEM DoD Supplement Survey

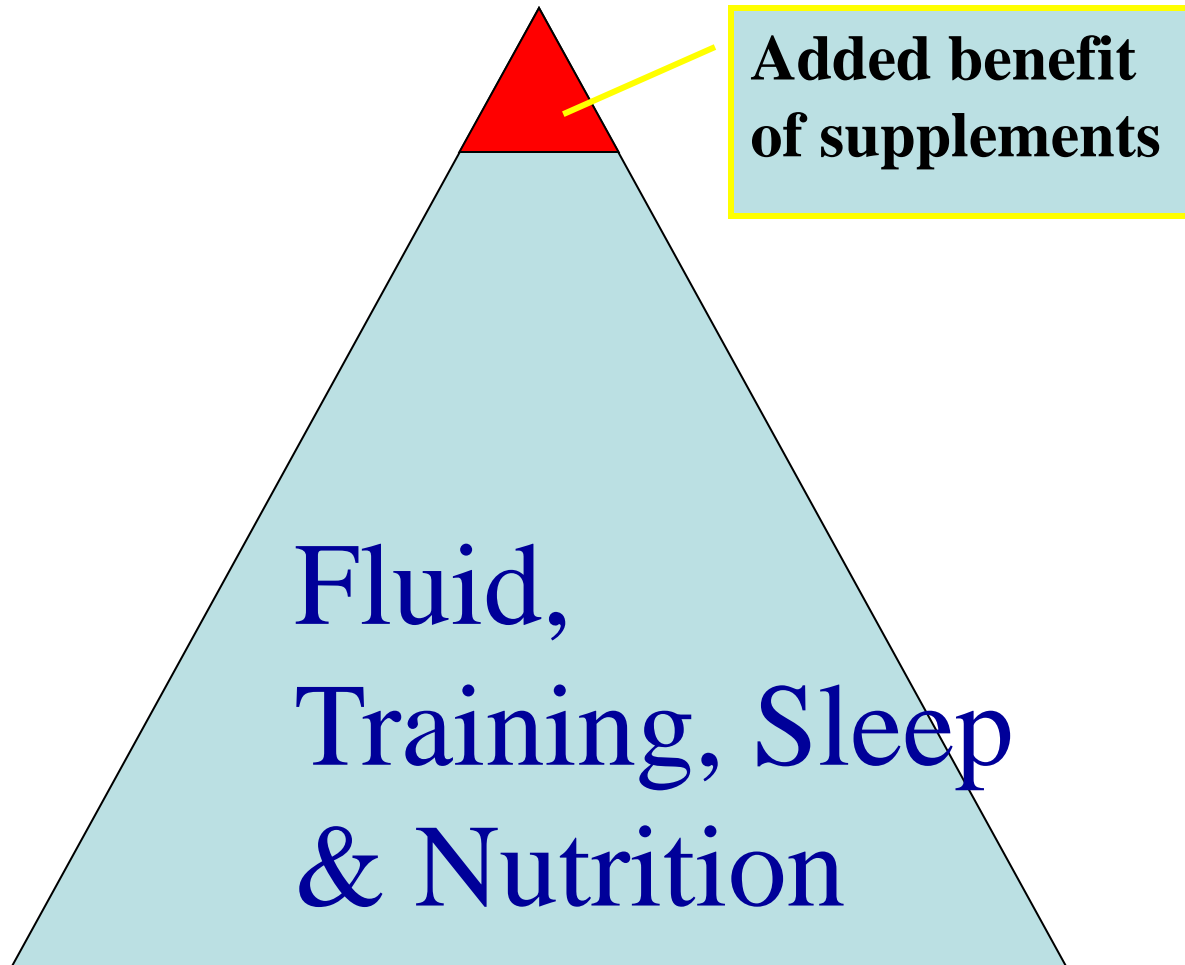


Regular Use of Supplements at Least Once a Week:
Comparison to Other Army Populations





Value of “Supplements” to Peak Performance





The Reality of Desire



50% of elite-level athletes are willing to take a substance that would guarantee them an Olympic gold medal, even if they knew that taking the substance would be fatal within a year.

(The Ergogenics Edge, Melvin Williams, 1998)



Frequently Used “Supplements”



- Sports Drinks
- Caffeine
- Amino Acids (Protein Powders)
- Creatine
- NO products
- Prohormones

Where can you find accurate, helpful information?



USACHPPM Search
 search

US Army Center for Health Promotion and Preventive Medicine
Directorate of Health Promotion and Wellness (DHPW)

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Dietary Supplements

(updated 18 January 2006)

[Fact sheets and posters](#)

[High Caliber Nutrition in the field](#)

Module 5 Manual, Performance Power...the Nutrition Connection

[Information for health care providers](#)

Do Army health care providers know enough about dietary supplement use? (AMEDD Journal article), FDA voluntary reporting, OTSG policy on medical screenings for dietary supplements, Memorandum: reporting data for patients with heat injuries and illnesses

[Internet resources](#)

[Printable resources](#)

Brochures, Hot Topics, How to spot a fraudulent product, Warfighter's Guide

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[What are dietary supplements?](#)

General description

[Caffeine](#)

Consumption, warnings, and effects



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US Army Center for Health Promotion and Preventive Medicine
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Printable dietary supplement resources

(updated 5 May 2004)

[DHPW Home](#)

[Warfighter's Guide to Dietary Supplements](#)
Technical Guide #295

[All DHPW Resources/Services](#)

[Hot Topics: Dietary supplements - Is your health at risk?](#)
Special insert to Soldiers' Magazine, Fall 2000

[Subject Matter Expertise/Consultative Services](#)

[Facts About Dietary Supplements for the Warfighter](#)
Tri-fold brochure/.doc file

[Facts About Dietary Supplements for the Warfighter](#)
Tri-fold brochure/.pdf file

[How to spot a fraudulent product](#)

[DHPW Site Map](#)

Click [here](#) to return to the Dietary Supplements main page.

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ERGO administered 6 times throughout a 10-hr test involving Road March followed by 2 timed runs

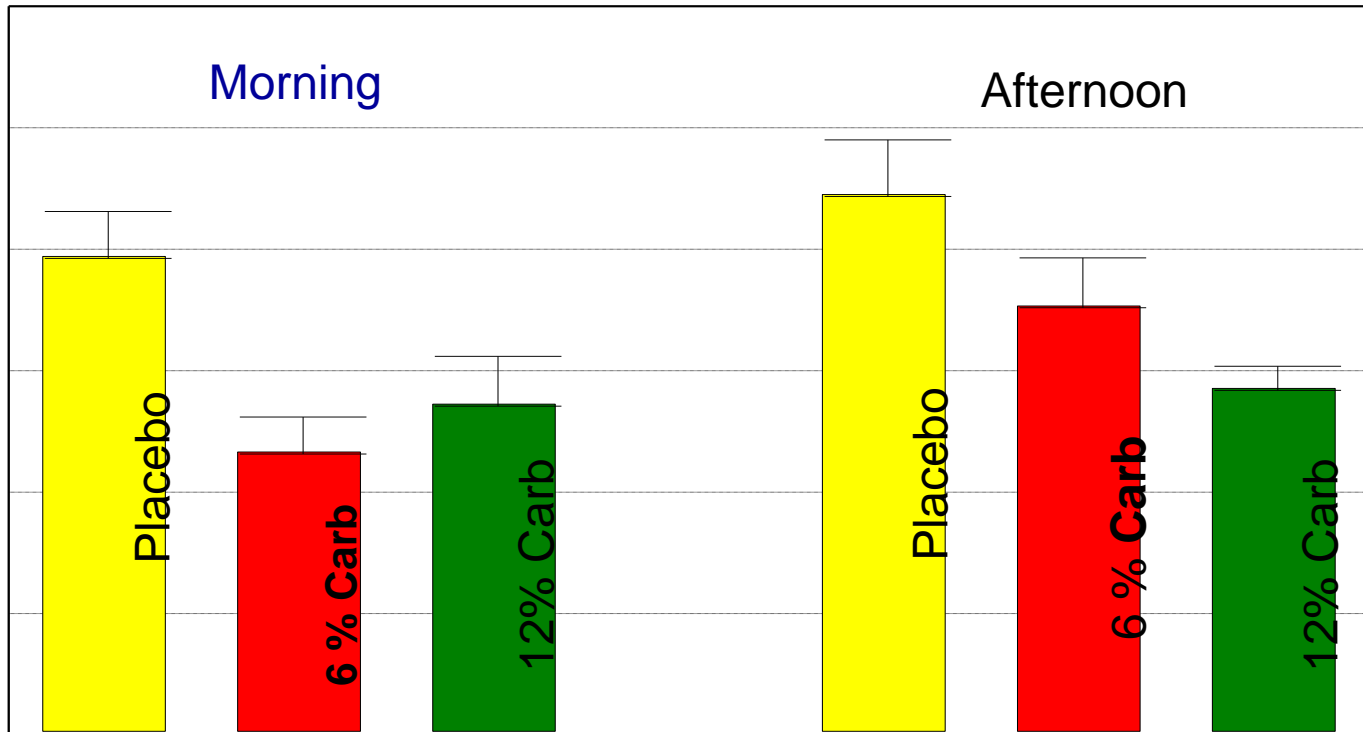


Ft. Lewis Rangers





Ft. Lewis Ranger 4.8 K Run Times



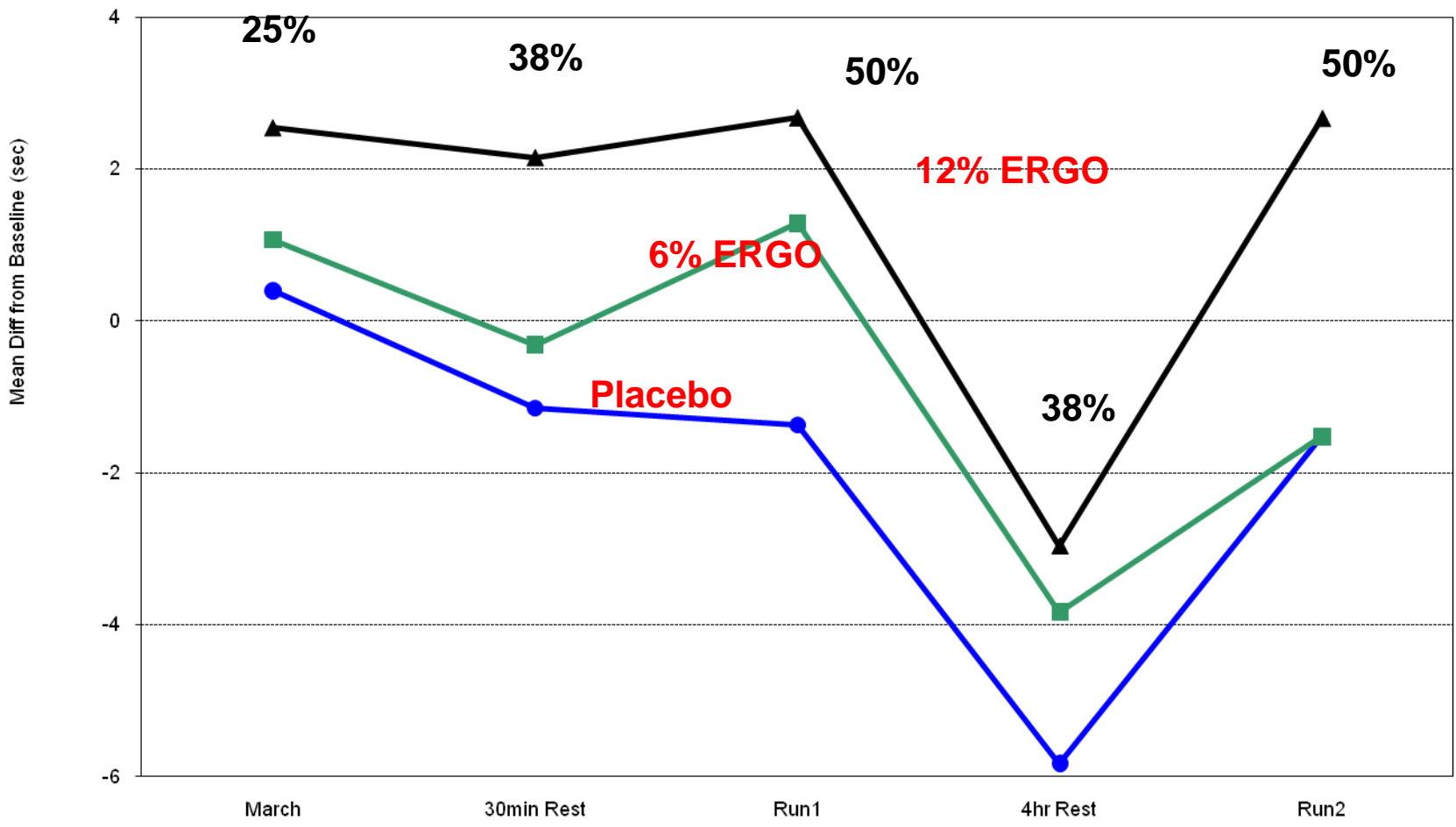
*The supplemental carbohydrate beverage improved runtime by almost **1 minute** in the final 3 mile run (Study/Data by Dr. Harris Lieberman, USARIEM).*




Effect of Carbohydrate Supplementation on Ambulatory Vigilance



25-50% Improvement from placebo



Product	Claim	Fact	Reported Side Effect
<p>Caffeine</p> 	<ul style="list-style-type: none"> • Promotes use of free fatty acids by muscle. • Spares muscle glycogen and extends endurance capacity. • Increases mental alertness. • Delays fatigue. 	<ul style="list-style-type: none"> • A central nervous system stimulant. • Improves performance by promoting release of fatty acids for use as fuel. • May increase mental alertness. • Effects blunted in habitual users. • Caffeine in coffee may not be as effective as pure caffeine. <p>Reported Dosage: 3-6 mg/kg 1 hour prior to the exercise event will produce ergogenic effect. For example: An 81 kg man X 4.4 mg caffeine/kg = 356 mg divided by ~80 mg per cup of coffee = 4.5 cups.</p>	<ul style="list-style-type: none"> • Irritability, nervousness, dehydration, upset stomach. • Tolerance varies among individuals. • Causes diuretic effect, which may accelerate dehydration. • Dangerous when combined with other stimulants (ephedrine alkaloids, synephrine, yohimbine).



Caffeine



- Committee on Military Nutrition
 - Doses of 100-600mg may improve cognitive function
 - Food bar or chewing gum preferred mechanism (more exact dosage)
- Withdrawal
 - 25-50 mg per day should prevent
 - Slowly decrease dose



Dosing for Caffeine Gum



- Mental performance when adequately rested:
 - Start with 1 stick and use as needed (100 mg)
- Mental performance when sleep deprived:
 - 2 sticks every two hours for up to 6 hours (200 mg)
- Physical performance:
 - Chew 2 sticks for 5 minutes followed by 2 more sticks at the start of activity (400 mg)
 - Re-dose with one stick (100mg) every 6 hours
- Combined physical and mental performance:
 - Follow guideline for physical performance
 - Re-dose with 1 stick as needed (100 mg)



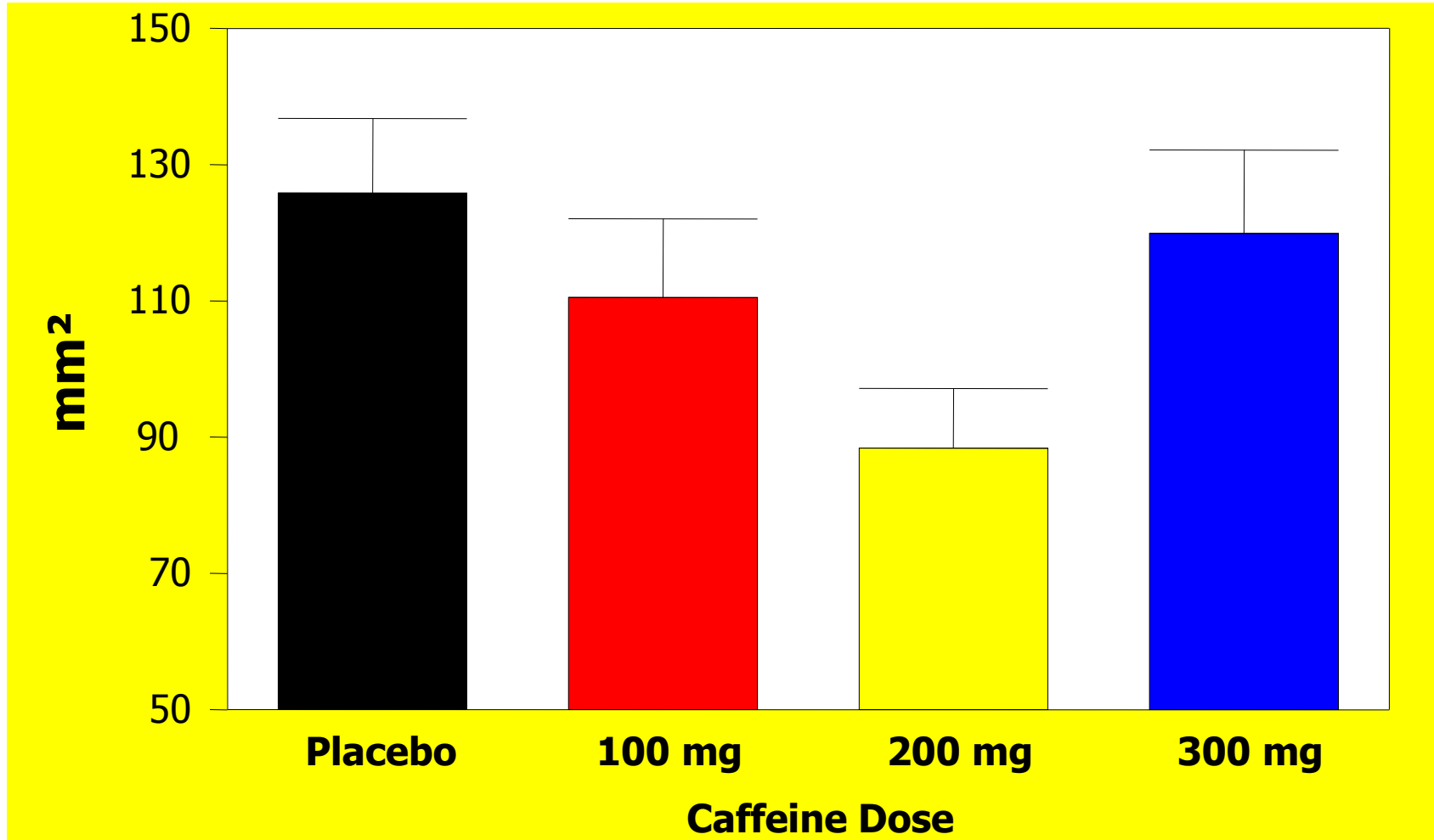
Caffeine Content



- Hot Cocoa, 6 oz 4 mg
- Cola, 12 oz 35-55 mg
- Tea, 6 oz, steeped for 3 minutes 36 mg
- Mountain Dew, 12 oz 55 mg
- Energy Drinks ~72 mg
- Coffee, 6 oz, brewed drip method 100 mg
- Caffeine gum 100 mg



Marksmanship Shot Group Tightness by Level of Caffeine





Hydroxycut



! SAFETY ALERT !

HYDROXYCUT RECALL

IF YOU ARE USING HYDROXYCUT, STOP DOING SO IMMEDIATELY.

On 1 May 2009, the U.S. Food and Drug Administration (FDA) published a consumer warning advising consumers to **immediately stop using** Hydroxycut products. These products have been linked to at least 23 cases of serious liver injuries, including damage requiring liver transplant and one confirmed death.

If you have used Hydroxycut, the early signs of liver injury include loss of appetite, nausea, fatigue or weakness. Symptoms can progress to vomiting, brown urine, light-colored stools, and/or yellowing of the skin or whites of eyes (jaundice).

Other problems associated with Hydroxycut

products include seizures, heart problems, and muscle damage. The symptoms can occur at any dose and at any time.

Products with similar ingredients may also pose a risk of causing harmful health effects and should be avoided.

If you have any symptoms that could be associated with these or other dietary supplements, consult a physician or other health care professional. Report all adverse effects you've experienced to the FDA by going to <https://www.accessdata.fda.gov/scripts/medwatch/medwatch-online.htm> and send an email to supplements@usuhs.edu.

RECALLED PRODUCTS INCLUDE:

Hydroxycut Regular Rapid Release Caplets
Hydroxycut Caffeine-Free Rapid Release Caplets
Hydroxycut Hardcore Liquid Caplets
Hydroxycut Max Liquid Caplets
Hydroxycut Regular Drink Packets
Hydroxycut Caffeine-Free Drink Packets
Hydroxycut Hardcore Drink Packets (Ignition Stix)
Hydroxycut Max Drink Packets
Hydroxycut Liquid Shots
Hydroxycut Hardcore RTDs (Ready-to-Drink)
Hydroxycut Max Aqua Shed
Hydroxycut 24
Hydroxycut Carb Control
Hydroxycut Natural



For more information:

<http://www.fda.gov/consumer/updates/hydroxycut050109.pdf>

<http://www.lovate.com/supplements@usuhs.edu>



Cost Analysis



What's the cost? Food First!

	If you consume 2 per day	for the Month	for the Year
1 cup skim milk	.56	\$16.80	\$201.60
1 package instant breakfast	.60	<u>\$18.00</u>	<u>\$216.00</u>
Total	\$1.16	\$34.80	\$417.60

Plus tastes great and contains more vitamins and nutrients.

Vs Popular Protein Powder

1 serving	\$4.98	\$149.40	\$1,792.80
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Do the math...you don't have to spend a lot of money to achieve your goals.

File Edit View Favorites Tools Help

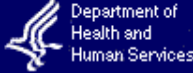
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U.S. Food and Drug Administration



CENTER FOR FOOD SAFETY AND APPLIED NUTRITION

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Dietary Supplements

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Overview

[Overview](#)

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FDA regulates dietary supplements under a different set of regulations than those covering "conventional" foods and drug products (prescription and Over-the-Counter). Under the Dietary Supplement Health and Education Act of 1994 (DSHEA), the dietary supplement manufacturer is responsible for ensuring that a dietary supplement is safe before it is marketed. FDA is responsible for taking action against any unsafe dietary supplement product after it reaches the market. Generally, manufacturers do not need to register their products with FDA nor get FDA approval before producing or selling dietary supplements.* Manufacturers must make sure that product label information is truthful and not misleading.

FDA's post-marketing responsibilities include monitoring safety, e.g. voluntary dietary supplement adverse event reporting, and product information, such as labeling, claims, package inserts, and accompanying literature. The Federal Trade Commission regulates dietary supplement advertising.

*Domestic and foreign facilities that manufacture/process, pack, or hold food for human or animal consumption in

Dietary Supplements

Warnings and Safety Information

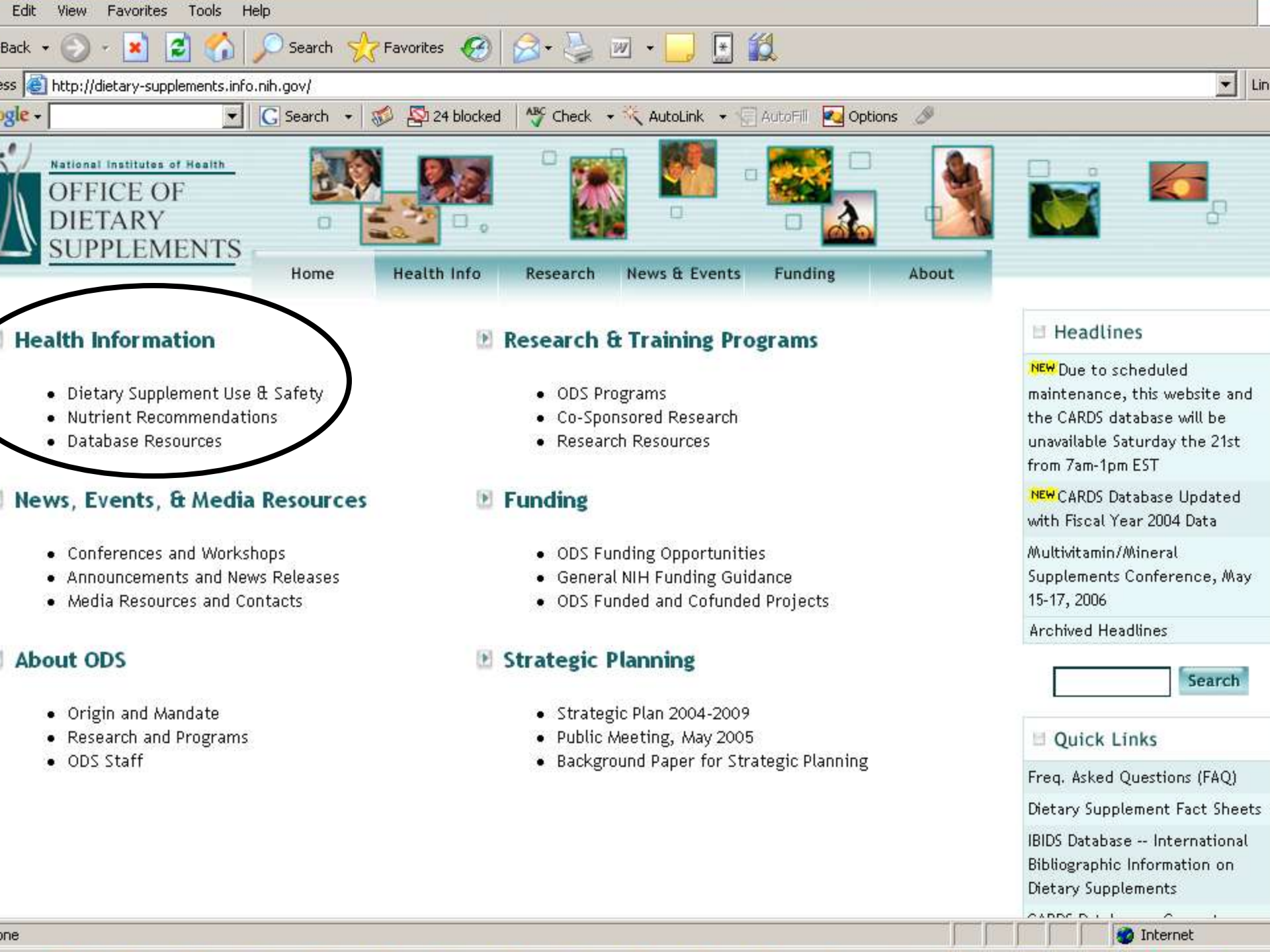
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Alerts

- **Androstenedione**
 - see [Androstenedione](#) March 11, 2004
- **Anthrax**
 - [Dietary Supplements Claiming to Prevent or Treat Anthrax](#) November 7, 2001
 - [FTC Cracks down on Marketers of Bogus Bioterrorism Defense Products](#) November 19, 2001
- **Aristolochic Acid**
 - [FDA Concerned About Botanical Products, Including Dietary Supplements, Containing Aristolochic Acid](#) April 11, 2001
- **Comfrey**
 - [FDA Advises Dietary Supplement Manufacturers to Remove Comfrey Products From the Market](#) July 6, 2001
- **Ephedrine Alkaloids**
 - see Consolidated Information on [Ephedrine Alkaloids](#)
- **Kava**



http://dietary-supplements.info.nih.gov/

OFFICE OF DIETARY SUPPLEMENTS

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- Strategic Plan 2004-2009
- Public Meeting, May 2005
- Background Paper for Strategic Planning

Headlines

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NEW CARDS Database Updated with Fiscal Year 2004 Data

Multivitamin/Mineral Supplements Conference, May 15-17, 2006

Archived Headlines

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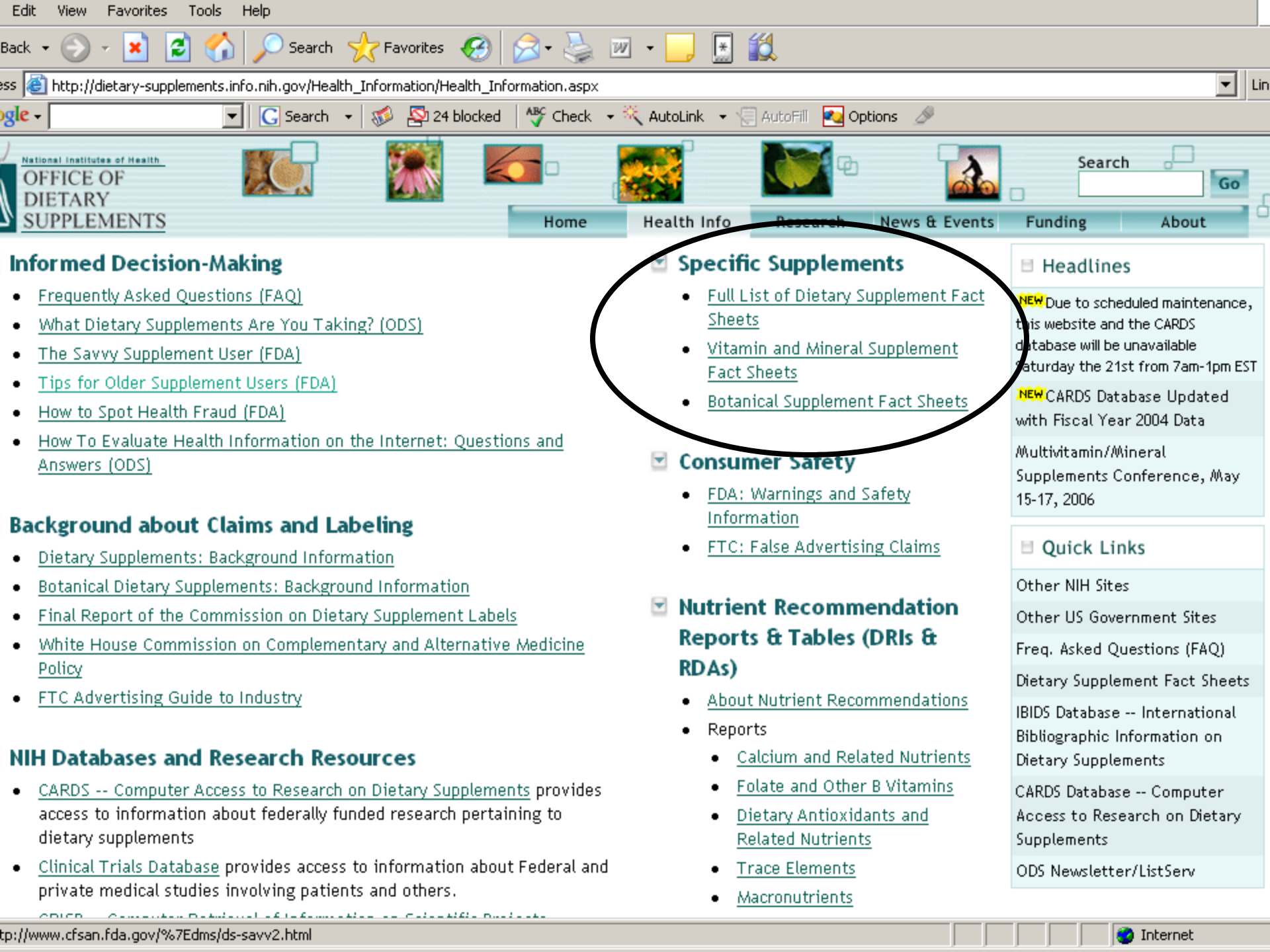
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Freq. Asked Questions (FAQ)

Dietary Supplement Fact Sheets

IBIDS Database -- International Bibliographic Information on Dietary Supplements

CARDS Database



Informed Decision-Making

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- [What Dietary Supplements Are You Taking? \(ODS\)](#)
- [The Savvy Supplement User \(FDA\)](#)
- [Tips for Older Supplement Users \(FDA\)](#)
- [How to Spot Health Fraud \(FDA\)](#)
- [How To Evaluate Health Information on the Internet: Questions and Answers \(ODS\)](#)

Background about Claims and Labeling

- [Dietary Supplements: Background Information](#)
- [Botanical Dietary Supplements: Background Information](#)
- [Final Report of the Commission on Dietary Supplement Labels](#)
- [White House Commission on Complementary and Alternative Medicine Policy](#)
- [FTC Advertising Guide to Industry](#)

NIH Databases and Research Resources

- [CARDS -- Computer Access to Research on Dietary Supplements](#) provides access to information about federally funded research pertaining to dietary supplements
- [Clinical Trials Database](#) provides access to information about Federal and private medical studies involving patients and others.

Specific Supplements

- [Full List of Dietary Supplement Fact Sheets](#)
- [Vitamin and Mineral Supplement Fact Sheets](#)
- [Botanical Supplement Fact Sheets](#)

Consumer Safety

- [FDA: Warnings and Safety Information](#)
- [FTC: False Advertising Claims](#)

Nutrient Recommendation Reports & Tables (DRIs & RDAs)

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- ODS Newsletter/ListServ

Dietary Supplement Fact Sheets

A-E, F-L, M-T, U-Z

Background Information: [Botanical \(Herbal\) Dietary Supplements](#)
[Dietary Supplements](#)

- [Anabolic Steroid Abuse](#)
- [Antioxidants Vitamin C, Vitamin E, and Coenzyme Q10: Cancer](#)
- [Antioxidants Vitamin C, Vitamin E, and Coenzyme Q10: Cardiovascular Disease](#)

- Black Cohosh
 - [Black Cohosh for Symptoms of Menopause](#)
 - [Meeting Summary: Workshop on the Safety of Black Cohosh in Clinical Studies](#)
- [Botanical Dietary Supplements: Background Information](#)

- [Calcium](#)
- [Cartilage \(Bovine and Shark\)](#)
- [Chromium](#)
 - [Glucose and insulin responses to dietary chromium supplements: a meta-analysis](#). Am J Clin Nutr 2002 Jul;76 (1):148-55 (abstract).
- Coenzyme Q10
 - [Coenzyme Q10 and Cancer](#)
 - [Study Suggests Coenzyme Q10 Slows Functional Decline in Parkinson's Disease](#)
- [Colloidal Silver Products](#)
- Copper
 - [Conference Proceedings: Genetic and environmental determinants of copper metabolism](#), Am J Clin Nutr, Vol. 67,

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Sharing knowledge on sports nutrition and exercise science.
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What's New

Featured Articles

- Sports Science Exchange #94—Creatine, Carbs, and Fluids: How Important in Soccer Nutrition?
- Sports Science Exchange #96—Herbs and Athletes
- Sports Science Exchange #97—Hydration Assessment of Athletes
- Sports Science Exchange #98—Metabolic Factors in Fatigue
- Can Too Much Exercise Make Athletes Sick?

Fluid Loss Calculator

Gatorade's Fluid Loss Calculator recommends a fluid intake strategy to help keep you hydrated.



Continuing Education



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AMERICAN DIETETIC
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Focus On: Nutrition for Soccer




Creatine, Carbs, And Fluids: How Important in Soccer Nutrition?

Learn about the benefits of proper nutrition and hydration in soccer performance.

Donald T. Kirkendall, Ph.D., FACSM, Sports Medicine Committee, US Soccer Federation

Focus on: Hydration



Hydration Assessment of Athletes

Learn why monitoring hydration status is essential to optimize health and performance.

*Samuel N. Cheuvront, Ph.D., Michael N. Sawka, Ph.D., FACSM
U.S. Army Research Institute of Environmental Medicine, Natick, MA*

Information herein is intended for professional audiences, including scientists, coaches, medical professionals, athletic trainers, nutritionists and other sports health professionals who have a fundamental understanding of human physiology.



Sharing knowledge on sports nutrition and exercise science.

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Currently Featured Articles

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CREATINE, CARBS, AND FLUIDS: HOW IMPORTANT IN SOCCER NUTRITION?

Donald T. Kirkendall, Ph.D., FACSM
Sports Medicine Committee, US Soccer Federation

KEY POINTS

- Because so much of the running in soccer is at less than maximal sprinting speed, creatine supplementation likely provides no benefit to match performance.
- Overwhelming evidence proves that a diet rich in carbohydrates can fill muscles with glycogen, and glycogen is critical to optimal performance in soccer.
- Soccer players' diets, especially in the days before hard training or competition, should include 8-10 grams of carbohydrate per kilogram of body weight (3.5-4.5 g/lb). Cereals, fruits, vegetables, breads, and pastas are good sources of carbohydrates.
- Refueling of muscle with carbohydrates should begin as soon as possible following a match or a strenuous training session.
- Inadequate replacement of fluids lost in sweat can lead to poor soccer performance and heat illness. Players should aim to drink enough during training sessions and matches so that their body weights after play are within about 1 kg (2.2 lb) of their starting weights.
- For a light workout or an easy match, especially when the weather is cool, water can be an adequate fluid replacement, if enough is ingested. But when play is strenuous and the weather is hot, carbohydrate-electrolyte sports drinks do a better job of maintaining body fluids.

INTRODUCTION



NO Products



- Key ingredient is Arginine
- Based on premise of improving vasodilation.
- If viagra can't do it, NO won't do it.
- Chinese researchers gave 6 grams for 3 days: No effect on performance/No increase in **nitric oxide levels**.
(Journal Nutrition Biochemistry, Sept 2008)



Creatine



- Creatine Monohydrate (CM)
 - Biggest bang for your buck
- Side effects = only increased performance and health
- Use CM powder only
 - Sugar-packed powders provide unneeded sugar calories
- Typical dose vs. Effective dose
 - 5 grams vs. 0.03 grams/kilogram of body mass



Beta-Alanine



- Dr. Roger Harris's research has shown that beta-alanine supplementation can in fact increase muscle carnosine levels from 34-52.2%.
- Harris's research has also supplementing Beta-Alanine an improvement in isometric endurance of 11.4%, lactate threshold of 9%, and ventilatory threshold of 9.6%.
- Dr. Jay Hoffman demonstrated a 22% increase in squat reps using 70% of 1RM.
- The only reported side effect of beta-alanine supplementation so far is a "tingling" feeling reported by some test subjects according to Dr. Jeff Stout, a beta-alanine researcher.
- The effective dosing used in the research shown by was 3 to 6 grams per day for at least 28 days to see results.



Betaine



- Protein found in beets
- Aids in cellular uptake of fluids
- Appears to have the potential to increase muscular endurance and aid in hydration status
- Research by Dr. Jay Hoffman at the College of New Jersey has show promising results similar to Beta Alanine
- Dosing in the 2-3 gram range



PRO HORMONES

**Give them the respect
that they deserve!**



2a,3a Epithio-17a-methyl-17b-hydroxy-5a-androstane



- Called methylepitiostane marketed as “Havoc/Epistane”
- Chemical cousin of steroid Thioderon(mepitiostane) used in treating anemia due to renal failure and advanced breast cancer.
- Good chance of negative effects on cholesterol levels and liver toxicity.
- Designed to be used for short term basis no more than 6 weeks and cycled off.



Estra-4,9,11-triene-17b-methoxy-3-one



- Related to anabolic steroid trenbolone only difference is methoxyl group at 17 beta instead of hydroxyl group.
- Because of this difference compound not expected to have any anabolic effect in the body so it is a waste of money.



2a,17a-dimethyl-5a-androstan-17b-ol-3-one



- Commonly referred to as “Superdrol”
- Powerful steroid that has the ability to completely shut down hypothalamic pituitary testicular axis(HPTA).
- High level of liver toxicity; some cases of liver failure reported.



17a-methyl-5a-androst-1-en-3b,17b-diol



- Direct metabolic precursor to methyl-1-testosterone.
- Very liver toxic.
- “Methyl-1-testosterone was perhaps the nastiest drug I have tested-it had me feeling like I could die”

Patrick Arnold



2,17a-dimethyl-5a-androst -1-en-17b-ol-3-one



- Hybrid of methyl-1-testosterone and “superdrol”
- Possibly called “methylstenbolone”
- Potential for enormous liver toxicity.



6a-methyl-5a-pregnan -3b, 17a,20b-triol



- Derivative of progestin drug megastrol (Megace)
- Megace used to increase appetite in patients with cancer and Aids.
- No reason to believe this drug has any anabolic effect.
- Waste of money



*The greater our knowledge
increases, the more our ignorance
unfolds.*

John F. Kennedy



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Questions

