



# *Sports Nutrition Supplements*

## **MUS Athletics**

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# Introduction

- The intent of this presentation is to provide basic information on sports nutrition supplements that are commonly used by athletes.
- This presentation is **not** intended to:
  - Recommend specific types of commercial sports nutrition supplements
  - Be used as a strict dietary plan
- ***MUS athletes and parents are encouraged to direct specific questions and concerns regarding sports nutrition supplements, as well as general nutrition, to an MUS athletic trainer, family physician, or registered dietitian.***



# The basics of supplements

- Supplements are popular because it's easier to take a pill, drink a shake, or eat a protein/energy bar than it is to work at good nutritional habits.
- The Food & Drug Administration (FDA) does not regulate supplements.
- Supplement manufacturers can claim anything about their product as long as it is not grossly false. *Clue #1: labels that state, "this claim has not been evaluated by the FDA."*
- Some supplements might contain ingredients that are harmful or even illegal if produced by companies not engaged in good manufacturing practices.





# Vitamins/minerals

- Vitamins and minerals are readily available in a variety of good food sources.
- A daily multi-vitamin can be used as an insurance policy on overall nutrition.
- Consuming extremely high amounts of some vitamins can be harmful. Any vitamin supplement containing more than 500% of the US RDA of any vitamin or mineral should be avoided.



# Muscle building/weight gain supplements

## ■ *Creatine*

- Used by athletes to increase the availability of the body's stores of energy (specifically phosphocreatine and ATP) needed for short, high-intensity physical activities like weight lifting and sprinting, as well as increasing the ability to rapidly replenish those energy stores once used.
- Creatine is produced by the body, but *proper* supplementation has been found to improve short, high intensity physical effort (see next slide).
- Most effective if used in conjunction with a well-designed strength training regimen.
- Not a substitute for good nutrition.



# More on Creatine

- Common mistake is overuse (**waste of money**)
  - Typical acceptable load doses: 5g, 4 times daily for first 2-5 days
  - 3-5g/day maintenance
- Must maintain adequate hydration while taking creatine
- No apparent short term side effects (if adequately hydrated)
- No good long term scientific studies of the health of past creatine users
- Creatine is sold as it's own supplement, as well as an ingredient in Nitric Oxide facilitators (ex: NO-Xplode). See *Endurance supplement section for more info.*



# Muscle building/weight gain supplements

## ■ ***Protein supplements***

- Available in powder, liquid, and nutrition bar form
- Types of protein supplement sources include whey, milk, egg, and soy
  - All are acceptable forms of protein supplementation
- Should not significantly substitute protein from healthy food sources (lean meats/poultry/fish, dairy, legumes, wheat products, nuts)
- Overall protein needs:
  - RDA for an average person is .8 g/kg body weight
  - ***Athletes in training need up to twice as much***
  - ***Upper limit of intake is 2.2 g/kg body weight (equal to 1g/pound of body weight)***



# Muscle building/weight gain supplements

- HMB ( $\beta$ -hydroxy  $\beta$ -methylbutyrate)
  - By-product of the branched-chain amino acid, leucine
  - Not necessarily dangerous by itself, but companies that sell HMB may add other harmful or illegal substances to it
  
- Chromium
  - Included in many “muscle building” supplements as an insulin promoter
  - Most healthy athletes get enough chromium from their diet
  - No scientific evidence that non-diabetic people gain from additional supplementation



# Muscle building/weight gain supplements

- Hormone precursors
  - DHEA, androstenedione
  - ***A step away from steroids***
  - Do not convert to testosterone in the body
- Anabolic steroids, Human growth hormone (HGH)
  - ***Illegal and dangerous- Don't use***



# Fat loss/weight loss

## ■ Ephedra, Ephedrine

- Banned by NCAA and IOC
- National Institutes of Health (NIH) states that sufficient evidence exists that ephedra/ephedrine could be associated with severe physical complications in young adults, including, myocardial infarctions, cerebrovascular accidents, seizures, and serious psychiatric illnesses.
- NIH link for more info:  
<http://ods.od.nih.gov/factsheets/ephedraandephedrine.asp>
- Ma Huang: the herbal equivalent to ephedra

## ■ Caffeine

- CNS stimulant used for weight loss and athletic performance.



## ***More on caffeine***

- High caffeine products have become extremely popular as a means to increase energy levels and alertness.
- Excessive consumption of caffeine drinks/supplements should ***not*** be used as a substitute for adequate sleep and a well balanced diet.
- Consuming >300mg caffeine/day is not recommended.  
*(see table in next slide)*



**Examples of caffeine content (mg) in popular commercial products**

Red Bull 8 oz. 80 mg	Starbucks Grande coffee 330 mg	Coke Classic 12 oz. 34.5 mg	Reg. coffee 8 oz. 100 mg	Amp OD 16 oz. 142 mg
<b>Extreme 6 hr Energy Shot 2 oz. 220 mg</b>	Monster 16 oz. 280 mg	Full Throttle 16 oz. 144 mg	Jolt Energy 23 oz. 280 mg	<b>Starbucks Double Shot 6.5 oz. 130 mg</b>
Diet Pepsi Max 12 oz. 69 mg	Mt. Dew Code Red Game Fuel 20 oz. 120 mg	Chocolate Milk 8 oz. 5 mg	925 Energy Shot 2 oz. 120 mg	Diet Coke 12 oz. 45 mg



# Hydration

- Commercial sports drinks (Gatorade, Powerade) are beneficial if the carbohydrate content is 4-8%, and contains electrolytes (sodium, potassium).
- During a short workout (<60 min), water is sufficient for hydration.
- For longer workouts, especially those approaching or exceeding 90 minutes, consuming carbohydrate sport drinks before and during activity is beneficial for performance and recovery.



# Recovery

- Many commercial products claim to speed physical recovery if consumed after a workout. These products typically have a combination of protein and carbohydrate content.
- Scientific studies have concluded that optimal recovery occurs if a product containing a carbohydrate to protein ratio of 3-4:1 is consumed within 15-30 minutes following exhaustive exercise. (example: 40g carbohydrate, 10-15g high quality protein).
- The proper ratio of nutritional content for post-exercise recovery can be achieved through regular food sources as easily as can be achieved by consuming commercial supplements that have the above mentioned nutritional content.

# Recovery

- ***At least one study has concluded that low fat chocolate milk can be effective in reducing recovery time after exhaustive exercise (1). This is due to it's content of the carbohydrate to protein ratio mentioned on the previous slide.***

1) Karp JR, Johnston JD, Tecklenburg S, Mickleborough TD, Fly AD, Stager JM (2006) Chocolate milk as a post-exercise recovery aid. *Int J Sport Nutr Exerc Metab.* **16** (1): 78-91.





# More on Recovery

- Most post-exercise nutrition studies involve intense exercise protocols of 90 minutes or more in duration. Thus, it should not be assumed that immediate post-exercise nutrition is as critical following light and/or short workouts.
  
- A guideline for post-workout recovery nutrition:
  - Beverage (or solid food consumed with water) containing approximately one half gram carbohydrate per pound of body weight (1-1.2g/kg bw), and approximately one-third to one-fourth of that quantity in protein content. ***Below is an example of what a 180 lb. athlete would consume:***
    - Carbohydrate intake:  $180 \text{ lb.} \times .5\text{g} = 90\text{g carbohydrate}$
    - Protein:  $90\text{g} / 3 = 30\text{g}$ , or  $90\text{g} / 4 = 22.5\text{g}$ ; **between 22.5-30g protein**
  
  - Should be consumed within 15-30 minutes after exercise.



# Muscle Endurance

- Nitric Oxide (NO) facilitators (**L-Arginine AKG**)
  - L-arginine is a non-essential amino acid (which means the body can produce it), and it's supplementation is advertised to increase blood supply to working muscles by enhancing the production of nitric oxide.
  - Most commercial products with L-Arginine AKG also contain creatine.
  - **There is no evidence that L-arginine AKG combined with creatine is more effective than creatine alone in terms of muscle performance, and creatine by itself is much cheaper than nitric oxide facilitators.**
  
- L-carnitine
  - Produced by the body, and assists in the utilization of fat as an energy source.
  - Supplementation is advertised to help the body rely more on fat as an energy source, which would theoretically increase endurance.
  - There are no studies to date supporting L-carnitine's effectiveness on increasing muscle endurance in sports performance.



## Recap on supplements

- Supplements should not be used as a substitute for a healthy diet, adequate sleep, and a well-designed strength and conditioning program.
- If an athlete uses a legal and effective supplement, it should be taken only as recommended by a health professional.
- Only supplements from well-established, reputable companies should be used.
- Any questions regarding sports supplements should be directed to an MUS athletic trainer, family physician, or registered dietitian.