

Recommendation #10: Supplement Use

In general, no vitamin and mineral supplements are required if an athlete is consuming adequate energy from a variety of foods to maintain body weight. Supplementation recommendations unrelated to exercise, such as folic acid for women of childbearing potential, should be followed. A multivitamin/mineral supplement may be appropriate if an athlete is dieting, habitually eliminating foods or food groups, is ill or recovering from injury, or has a specific micronutrient deficiency. Single-nutrient supplements may be appropriate for a specific medical or nutritional reason (e.g., iron supplements to correct iron deficiency anemia).



KIN 856 – Physical Bases of Coaching
Supplements and Performance

To use or not to use...

- Hard core nutritionists or dieticians will always say you should get your nutrients from actual food.
- Practically speaking, there is no reason why athletes cannot take a multi-vitamin.



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Multivitamins

Overview

- Supplement dietary intake of athletes
- No evidence that enhances performance UNLESS deficiency exists

Situations in Sport

- Athletes undertaking a prolonged period of travel, particularly to countries with an inadequate or otherwise limited food supply.
- Athletes undertaking a prolonged period of energy restriction (e.g. 8MJ/1900 kcal for females or 10 MJ/2300 kcal for males) for weight loss, or weight maintenance.
- Athletes with a restricted dietary intake who are unable/unwilling to increase food range.
- Athletes with a heavy competition schedule, involving disruption to normal eating patterns

Suggested Intake

- Daily dose of multivitamin (e.g. Centrum)

Risks

- Provide sense of false security
- Take emphasis away from proper nutrition



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Recommendation #11: Ergogenic Aids

Athletes should be counseled regarding the appropriate use of ergogenic aids. Such products should only be used after careful evaluation for safety, efficacy, potency, and legality.



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Group A Supplements:

Supported for use by AIS athletes: These sports foods and supplements provide a useful and timely source of energy and nutrients in the athlete's diet, or have been shown in scientific trials to benefit performance, when used according to a specific protocol in a specific situation in sport.

- ✓ Antioxidant Vitamins C and E
- ✓ Bicarbonate and Citrate
- ✓ Caffeine*
- ✓ Calcium Supplement
- ✓ Creatine
- ✓ Electrolyte Replacement Supplements
- ✓ Iron Supplement
- ✓ Liquid meal supplements
- ✓ Multivitamins and Minerals
- ✓ Probiotics (use for gastrointestinal protection)
- ✓ Sports bars
- ✓ Sports drinks
- ✓ Sports gels
- ✓ Vitamin D



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Group A: Conditions for use...

- Group A supplements provided at a limited cost to AIS sports programs, through systems managed by the Sports Nutrition Department
- Athletes and coaches are educated about the appropriate use of Group A supplements, and their place in a state-of-the-art sports nutrition plan
- AIS sports have immediate access to research opportunities to investigate sports-specific protocols for use of Group A supplements.
- Inadvertent doping risk of Group A supplements is carefully considered before approval.

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Even then... what about kids?

- American Academy of Pediatrics
Policy statement condemning the use of ergogenic aids, including dietary supplements, by children and adolescents.
- American College of Sports Medicine
Recommends creatine not be used by persons under 18 years of age.
- Based on the "unknown"
 - ✓ Do not know the long-term effects of any supplement use, nor how they impact a growing/ developing body

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Antioxidant Vitamins C & E

Overview

- ✓ Combats against free radicals formed in training

Situations in Sport

- ✓ A new period of high volume and/or high intensity training
- ✓ Moving to hot environments or undertaking heat acclimatization
- ✓ Moving to altitude or undertaking altitude training

Suggested Intake

- ✓ Daily dose of 500 mg vitamin C and 500 IU vitamin E.

Risks

- ✓ Increase uptake of iron
- ✓ Large doses impact effectiveness of oral contraceptives (e.g. the pill)



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Bicarbonate and Citrate

Overview

- ✓ Work to enhance extracellular buffer capacity and

Situations in Sport

- ✓ High intensity activity, 1-7 minutes
- ✓ Longer events, intermittent high intensity activity
- ✓ Increase ability to train anaerobically

Suggested Intake

- ✓ Acute loading protocol - involves a 300 mg/kg dose, taken 1-2 hours prior to the session.
- ✓ Chronic loading protocol - involves five days of 500 mg/kg bicarbonate, split into four doses over the day.

Risks

- ✓ Gastrointestinal distress



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Caffeine

Overview


- ✓ Mobilize fats for energy use
- ✓ Enhances endurance performance

Situations in Sport

- ✓ Prior to and/or during prolonged endurance or intermittent sports, including team sports, as a training aid or competition aid.
- ✓ Prior to high-intensity events, as a training aid or competition aid.

Suggested Intake

- ✓ 3 mg/ lb BW (300-500mg) taken 1 hour prior.
- ✓ 0.5-1.5 mg/ lb BW (70-200mg) taken before and/or during endurance event



Risks

- ✓ Stimulate fluid loss/ dehydration
- ✓ Not everyone is a 'responder'
- ✓ Increased HR, impaired motor control, etc

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Creatine

Overview


- ✓ Provides improved performance in repeated bouts of high-intensity activity
- ✓ Enhances glycogen storage

Situations in Sport

- ✓ A developed athlete undertaking resistance training to increase lean body mass.
- ✓ Interval and sprint training sessions where the athlete is required to repeat short explosive maximal efforts with brief recovery intervals.
- ✓ Sports with intermittent work patterns (e.g. soccer, basketball, football, racquet sports).

Suggested Intake

- ✓ Rapid loading: 20 g daily, divided into 4 doses, for 5 days with meal/ substantial CHO. Maintenance 3g/ day.
- ✓ Slow loading: 3g/ day with meal or high CHO snack. Maintenance 3g/ day.



Risks

- ✓ Weight gain/ fluid retention
- ✓ Potential impact on kidney/ liver function

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Iron

Overview


- ✓ Improvement in performance in females with low serum ferritin levels.

Situations in Sport

- ✓ With individuals diagnosed to have low serum ferritin levels.
- ✓ Potential 'risk' factors: females, eating disorders, poor diets, vegetarians, individuals with internal bleeding

Suggested Intake

- ✓ **Under direction of physician.**
- ✓ With 500mg of vitamin C on an empty stomach for 2-3 months.



Risks

- ✓ Excessive iron intake – negative health
- ✓ Constipation/ GI issues

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Group B Supplements

Considered for provision to AIS athletes only under a research protocol: These sports foods and supplements: have received some scientific attention, sometimes in populations other than athletes, or have preliminary data which suggest possible benefits to performance and are of particular interest to athletes and coaches.

- ✓ Colostrum
- ✓ B-alanine
- ✓ Glucosamine*
- ✓ Glutamine
- ✓ HMB
- ✓ Melatonin*
- ✓ Probiotics (used for immune protection)
- ✓ Ribose

* These supplements are no longer made available to athletes under the AIS Sports Supplement Program.

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Group B: Conditions for use...

- Group B supplements may be provided to AIS athletes or teams under the following conditions:
- Supervised study or trial involving placebo/control groups and adequate monitoring of performance or health benefits.
- Clinical management plan overseen by AIS doctor, including the provision of the supplement to the athlete and adequate monitoring.
- Payment for the supplement may need to come from the budget of the sport, if it cannot be covered within the cost of the research project or from a grant from the manufacturer.
- Inadvertent doping risk of Group B supplements is carefully considered before approval.

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Overview

- ✓ Source of protein and growth factors
- ✓ Enhances immune system function

Situations in Sport

- ✓ Due to the lack of current evidence for use in sport, colostrum should be used with discretion. It may be beneficial to improve performance within a few days of completing a high intensity training block but this benefit is diminished after 1 week of rest.

Suggested Intake

- ✓ 20-60 g daily, for a period of 8 weeks (book)
- ✓ 10-60 g of colostrum powder or liquid each day for at least 4 weeks of supplementation may be required to induce a benefit (AIS)

Risks

- ✓ Expensive (\$15-70/ week)
- ✓ No long-term studies on health/ side effects

Colostrum



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Overview

- Beta-hydroxy beta-methylbutyrate is a by-product of the essential amino acid leucine, proposed to influence muscle protein metabolism and cell membrane integrity.
- HMB supplementation is claimed to decrease protein breakdown and, in doing so, enhance muscle size and strength development, promote fat loss and ease exercise-induced muscle damage.

Situations in Sport

- A recent meta-analysis of existing HMB supplementation studies found that the overall effect of supplementation is a small improvement in muscle size and strength when combined with resistance training.


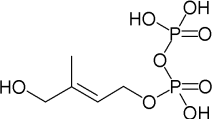
Suggested Intake

- 3 g per day in three divided doses of 1 g (e.g. upon waking, with lunch, and prior to retiring each night). Higher doses have been proven to be ineffective.

Risks

- Current evidence suggests that HMB has a minor effect on strength, body composition, muscle damage and exercise performance, especially among athletes.

HMB

KIN 856 – Physical Bases of Coaching Supplements and Performance

Overview

- Stimulate immune system
- Stimulate/maintain muscle protein/protein synthesis
- Anecdotal information from non-sport studies

Situations in Sport

- Seemingly any athlete/athlete group


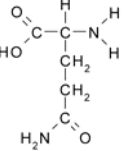
Suggested Intake

- Acute oral ingestion in the range 0.1 to 0.3 g glutamine per kg body weight per day (e.g. 7-21 g glutamine for a 70 kg individual) is absorbed safely and shows no evidence of clinical toxicity after several weeks.
- Larger doses in the range 0.3 to 0.6 g glutamine per kg body weight per day show no harmful effects after 5 days of administration in normal subjects.

Risks

- No conclusive evidence demonstrating glutamine supplementation lowers incidence of illness.
- Minimal side effects in short-term studies.
- Little knowledge of side effects following long-term use (longer than several weeks).

Glutamine

KIN 856 – Physical Bases of Coaching Supplements and Performance

Overview

- Glucosamine is a nutritional supplement that may be useful in the treatment of osteoarthritis. In athletes, it has been used in attempts to 'support' or 'repair' articular cartilage.
- Often combined with chondroitin
- Pain relief

Situations in Sport

- Individual athletes that have appropriate clinical signs and symptoms as assessed by a sports physician.

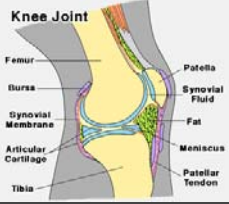
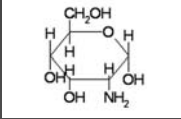
Suggested Intake

- 2000 mg/ day, to see improvements in 8 weeks.

Risks

- No evidence of efficacy in athletes with cartilage damage.
- Minimal side effects in short-term studies.
- Little knowledge of side effects following long-term use.
- Shellfish allergy

Glucosamine

KIN 856 – Physical Bases of Coaching Supplements and Performance

Group C Supplements:

Supplements which have little proof of beneficial effects and are therefore not to be provided to official AIS programs: This category includes the majority of supplements and sports products promoted to athletes. These supplements, despite enjoying a cyclical pattern of popularity and widespread use, have not been proven to provide a worthwhile enhancement of sports performance. Although we can't categorically state that they don't "work", current scientific evidence shows that either the likelihood of benefits is very small or that any benefits that occur are too small to be useful. In fact, in some cases, these supplements have been shown to impair sports performance, with a clear mechanism to explain these results. We have named many of the products that belong in this category, but others that have not been named in our supplement system more than likely belong here.

- Branched chain amino acids (& other free-from amino acids)
- Carnitine
- Chromium picolinate
- Coenzyme Q10
- Cordyceps
- Cytochrome C
- Gamma-oryzanol & ferulic acid
- Ginseng
- Inosine
- Lactaway
- Nitric oxide supplements
- Oxygenated waters
- Pyruvate
- Rhodiola rosea
- Vitamin supplements when used in situations other than summarized in Group A
- ZMA

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Group D Supplements

These supplements should not be used by AIS athletes: These supplements are banned or are at high risk of being contaminated with substances that could lead to a positive drug test.

- Androstenedione
- 19-norandrostenediol
- 19-norandrostenedione DHEA
- Ephedra
- Strychnine
- Tribulus terrestris & other herbal testosterone supplements
- Glycerol

KIN 856 – Physical Bases of Coaching
Supplements and Performance

HGH derivatives

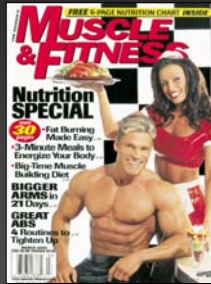
- Based off human growth hormone
- Anabolic pro-hormone type supplement
- Sublingual (place under the tongue) tablets
- Easy to purchase and relatively cheap
- RISK > Benefits (?)



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Where do athletes get their info?

- Health Professionals
- Media
- Family/friends
- Coaches/Trainers
- Others
 - ✓ Internet
 - ✓ Health Food Store
 - ✓ Product information



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Risks of Supplements...

- International Olympic Committee study
 - ✓ Tested 634 supplements from 215 companies
 - ✓ 94 (15%) contained hormones/ pro-hormones not listed on the label and would have led to a positive doping result.
 - ✓ For supplements in the US – 18% of those tested contained banned substances.
 - ✓ Pro-hormones for testosterone or nandrolone

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Energy drinks and sport...

- Supplements added (herbs
 - ✓ Kola nut, Guarana)
- Very high caffeine levels
- Expensive
- Delays fatigue by sparing glycogen reserves...
 - ✓ Also great for fostering insomnia and nervousness



KIN 856 – Physical Bases of Coaching
Supplements and Performance

Anti-Doping Agencies/ Information

- World Anti-Doping Agency (WADA)
- United States Anti-Doping Agency (USADA)
 - ✓ <http://www.usantidoping.org/>
- WADA Doping Code
 - ✓ <http://www.usantidoping.org/resources/wada-code.aspx>
- USADA Drug Reference Hotline
 - ✓ <http://www.usantidoping.org/athletes/drug-reference-line.aspx>

KIN 856 – Physical Bases of Coaching
Supplements and Performance

Supplement Exercise

Using the information contained in this presentation, the book, and supplemental materials, create a 2-sided education handout that:

1. Contains general information on supplements.
2. Outlines risks present in using supplements.
3. Presents some information on supplements commonly used in your sport (potential benefits, etc)
4. Provides resources where one can find additional information.

KIN 856 – Physical Bases of Coaching
Supplements and Performance
