Vitamins and Minerals

This download covers b-vitamins, vitamin C, calcium, and iron. There are many other vitamins and minerals of equal importance in human nutrition. These are covered because they are either closely linked to physical activity, or are related to nutrient risks commonly faced by athletes.

B-VITAMINS

B-vitamins have a well-established role in energy metabolism and muscle function and, because of this role, are frequently taken in supplement form by athletes. These vitamins, which include thiamin (B-1), riboflavin (B-2), niacin, pyridoxine (B-6), folacin, cyanocobalamin (B-12), pantothenic acid, and biotin, work together in energy metabolic processes. Taking supplements, in the absence of a known deficiency, does NOT improve athletic potential, and may introduce harmful side effects. Therefore, a balanced diet is the best approach to making certain you get enough of the B-vitamins.

- Thiamin Food Sources: Liver, pork, lean meats, wheat germ, whole grains, enriched breads, and cereals.
- Riboflavin Food Sources: Milk and milk products, liver, enriched breads, and cereals.
- Niacin Food Sources: Liver, poultry, fish, peanut butter.
- Pyridoxine Food Sources: Liver, herring and salmon, wheat germ and whole grains, lean meats.
- Folacin Food Sources: Liver, wheat bran, whole grains, spinach and other green leafy vegetables, legumes, orange juice.
- Cyanocobalamin Food Sources: Foods of animal origin, specially prepared fermented yeasts, and fortified soy products.
- Biotin Food Sources: Egg Yolk, liver, and legumes.
- Pantothenic Acid Food Sources: Eggs, liver, wheat bran, peanuts, legumes, lean meats, spinach, and other vegetables.

VITAMIN C

Vitamin C is involved in the manufacture of collagen, a connective tissue protein, and is also involved in the manufacture of thyroxin, a hormone that controls the rate at which energy is used. Vitamin C is also involved in the absorption of iron, resistance to infection, and metabolism (breakdown and build-up) of amino acids, the building blocks of protein.

It is not clear from studies whether a marginal vitamin C status impairs athletic performance or work capacity. Therefore it does not appear that taking supplements, even when a good diet is consumed, is necessary for optimizing athletic performance. Toxicity symptoms to excessive vitamin C intake are rare.

Symptoms of vitamin C deficiency include:

- Microcytic anemia (small and inadequate red blood cells, limiting oxygen carrying capacity.)
- Purpura (small red dots appearing at the base of hair follicles, due to hemorrhage.)
- Easy hemorrhaging Depression
- Frequent infections

Symptoms of vitamin C toxicity (excess) include:

- Early red-cell breakdown
- Nausea
- Frequent urination
- Abdominal cramps
- Diarrhea

Good Food Sources of Vitamin C include fresh fruits, fruit juices, an vegetables. Bean sprouts are also good sources.

CALCIUM

While the recommendation for calcium is between 800 to 1,500 mg/day many athletes have an intake that is far less than this amount. Further, there is evidence that the current requirement is actually lower than it should be. These factors, coupled with the fact that exercise increases bone stress, suggest that more athletes should be concerned about their level of calcium intake. Inadequate calcium intake can increase the risk of stress fractures and, if there is inadequate intake during growth, may increase the risk of early osteoporosis (bone disease) later in life. Bones consist of living cells that are constantly changing (just like all other cells in the body). Providing enough calcium helps to assure that the bones will change in a positive direction.

Major functions of calcium include:

- Bone formation and bone strength
- Nerve impulse transmission
- Muscle contraction
- Blood clotting
- pH control
- Blood pressure control

The following foods contain about the same amount of calcium (297mg) as 8 oz (1 cup) of milk:

- Cheddar Cheese l.5oz
- Cottage Cheese 2 cups
- Yogurt 1 cup
- Processed Cheese 1.5 slices
- Ice Cream 1.5 cups
- Ice Milk 1.5 cups
- Tofu 8 oz

- Broccoli 2 cups
- Collard Greens 1 cup
- Turnip Greens 1 cup
- Mustard Greens 1.5 cups
- Salmon 4 oz
- Sardines 2.5 oz
- Orange Juice w/calcium 1 cup

Common calcium supplements and elemental calcium concentration:

- Calcium gluconate 9% calcium
- Calcium lactate 13% calcium
- Calcium carbonate 40% calcium

IRON

Iron deficiency may lower athletic performance because of its involvement in carrying oxygen to cells and removing carbon dioxide. Many athletes may be at risk f or iron deficiency because of poor iron intake, poor iron absorption, loss of iron in sweat, blood loss in the GI tract, and red blood cell breakdown.

A condition called "sports anemia" has been reported in athletes, and is most associated with increased red blood cell breakdown and lower hemoglobin concentration when an exercise program is initiated. However, "sports anemia" appears to be a transient condition that disappears when red cell production has an opportunity to catch up to the increased blood volume that occurs with exercise.

It appears that female and growing athletes are more at risk for iron deficiency than male or grown athletes. Vegetarian athletes also appear to be at increased risk of deficiency.

The following recommendations should help to reduce the risk of iron deficiency:

- Consume lean cuts of meat (dark poultry or red meat) 3 to 4 times per week.
- Consume enriched grains and cereals (breads, pastas, etc.) regularly
- Consume vitamin C containing foods (fruits, fruit juices) with grains and vegetables. The vitamin C enhances iron absorption from these foods.
- Consume tea, coffee, and all-bran products in moderation. These foods contain substances that may inhibit iron absorption.
- Women of child-bearing age may require a low-level supplement of iron to assure an adequate intake (consult your physician).