

Vitamin C: Vitamin C or ascorbic acid is a water soluble vitamin that works as an antioxidant by deactivating the free radicals that commonly navigate throughout the cell. While little research supports the notion that increases in vitamin C will improve the performance, these studies have shown that increasing vitamin C levels decreases the production of various byproducts reflective of free radical production and oxidative damage. Taking high doses of vitamin C might increase the immune response in athletes during a sudden increase in training.

Vitamin E: Much like vitamin C, research on vitamin E does not support its ability to increase or improve performance, but it has repeatedly been shown to minimize damage to the cell membranes from free radicals.

MINERALS

Minerals represent a class of inorganic substances found naturally in a variety of foods. Minerals are essential for a wide variety of metabolic and physiologic processes in the human body. Minerals are involved in muscle contraction, normal heart rhythm, nerve impulse conduction, oxygen transport, oxidative phosphorylation, enzyme activation, immune functions, antioxidant activity, bone health and acid-base balance of the blood. Because many of these minerals are accelerated during exercise, an adequate amount of minerals is necessary for optimal functioning. Athletes should obtain an adequate amount of all minerals in their diet, for a mineral deficiency may impair optimal health and health impairment may adversely affect sports performance.

Calcium: Calcium excretion may be increased with high intensity training. Inadequate calcium intake and increased calcium losses may predispose one to osteoporosis. This may be especially so in women who develop the female athlete triad (disordered eating, amenorrhea and osteoporosis). Supplementation with calcium, along with vitamin D, may be necessary in persons not achieving the recommended dietary intake such as female athletes. Optimal calcium nutrition for bone health is also important for female athletes, particularly those in weight control sports, such as skating and distance running.

Phosphates: Phosphates are incorporated into many compounds in the body that are involved in energy metabolism, such as ATP as an energy substrate, thiamin pyrophosphate as a vitamin cofactor, sodium phosphate as a buffer, and 2, 3-diphosphoglycerate (2, 3-DPG) for RBC function. All of these roles could provide ergogenic potential, but the most researched theory involves the effect of phosphate salt supplementation on 2, 3-DPG. Increased levels of 2, 3-DPG could facilitate release of oxygen from haemoglobin in the red blood cell and possibly enhance aerobic endurance exercise performance.

Iron: Iron is one of the most critical minerals with implications for sports performance. Iron is a component of haemoglobin, myoglobin, cytochromes, and various enzymes in the muscle

cells, all of which are involved in the transport and metabolism of oxygen for aerobic energy production during endurance exercise. The benefits of iron supplementation may depend on the iron status of the athlete.

In iron deficiency without anaemia, when serum ferritin levels are low, iron supplementation restores serum ferritin to normal. Iron supplementation may or may not have an effect on performance. Iron supplements will not enhance performance in athletes with normal haemoglobin and iron status.

Magnesium: Magnesium is a component of over 300 enzymes, some involved in the regulation of muscle contraction, oxygen delivery and protein synthesis