



**TENNISNUTRITIONSECRETS**

# Supplements



# Vitamin D

Vitamin D strengthens your bones and immune function, helps reduce high blood pressure, and can even help you lose weight. And by improving muscle recovery after exercise, vitamin D just might make you a better athlete. It helps us absorb calcium – which, in turn, affects bone development and growth, nerve signaling, immune function, blood pressure, and even muscle strength and mass, especially as we get older.



# Vitamin C

Everybody needs Vitamin C, whether you are a hard training athlete or an everyday person just trying to get in shape. Vitamin C protects the immune system and can help with recovery from intense training. Vitamin C is also essential for wound healing, and for repair and maintenance of cartilage, bones, and teeth. It is a key component of collagen, a protein present in skin, scar tissue, tendons, ligaments, and blood vessels. Vitamin C also helps reduce blood pressure by strengthening the walls of the arteries. For male athletes, Vitamin C allows increased testosterone levels by supporting a lower ratio of cortisol to testosterone. This helps your body maintain that high level of performance you require on a daily basis.



# B Vitamins

B vitamins each have their own specific functions, but they are all required for effective conversion of proteins and carbohydrates into energy, as well as cell repair and production. A study showed that athletes with B vitamin deficiency had reduced exercise performance and impaired ability to repair and build muscle compared with athletes who consumed high amounts of B vitamins. It was concluded that athletes may need to consume greater amounts of B vitamins than the United States Recommended Daily Allowance. In particular, the study suggested that athletes likely required more vitamin B2 and vitamin B12 than non-athletes, but the results were less conclusive for vitamin B12. Athletes should aim to consume sufficient B vitamins in their diet, but if they are following specialized eating plans that preclude this, supplementation may be appropriate.



# Green Drinks

Green drinks contain concentrated greens, such as spinach, kale or seaweed. They may contain a single green vegetable or a combination, and may come as a liquid or a powder. Different greens offer different benefits. In particular, spinach is rich in antioxidants that can mop up harmful free radicals that are released during exercise, and has also been shown to reduce blood pressure, reducing the risk of medical problems such as stroke. It is also thought that it may have a role in the prevention of prostate cancer. Both spinach and kale contain omega-3 fatty acids, which can enhance athletic performance. Seaweed, on the other hand, is great source of protein, which provides the basis for muscle building and repair – great after a workout.



# Magnesium

Magnesium is involved in a huge variety of metabolic processes and is key for optimum neurological, cardiac and bone health. Not surprisingly, it also plays an important role in muscle function. Most importantly, magnesium is necessary for normal energy metabolism. The enzymes that control synthesis and metabolism of adenosine triphosphate (ATP), the body's 'energy currency', are dependent on this critical mineral. To give an indication of how important these enzymes are, consider this: the average person stores only 85 grams of ATP, yet we can burn through as much as 15 kilograms of ATP per hour during heavy exercise!



# Zinc

This mineral is essential for maintaining good health and optimizing athletic performance. Healthy cell division and metabolism, including tissue repair after exercise and wound healing, depend on zinc. It is also required for production of some hormones, including testosterone, which is essential for building lean muscle mass. Zinc is necessary to maintain a strong heart and respiratory system, as well as healthy cholesterol levels. Research has shown that adequate zinc levels improve your aerobic capacity, or VO2 max. VO2 max is a measurement of how much oxygen your body is able to supply to your muscles per minute, which is a big determinant of endurance and can affect your athletic performance. Zinc also plays a critical role in bone health. Athletes who have low levels of zinc are at risk for decreased bone mineral density or even osteoporosis, which can lead to bone fractures.



# Selenium

Selenium is an important trace element and an essential ingredient of the antioxidant glutathione peroxidase, which is found in the liver, gastrointestinal tract, lungs and muscle. In rats, it has been shown that reduced concentrations of glutathione peroxidase in muscle are correlated with increased cellular damage from exercise. The researchers took this as evidence that free radicals cause muscle damage and fatigue. Similarly, in another study 24 males, half of whom received selenium supplementation and half of whom did not, were asked to cycle to the point of exhaustion. It was found that those who took selenium showed less cellular damage to their muscles. Studies also show that selenium supplementation can improve immune function.





# Probiotics

Probiotics are supplements containing healthy bacteria. They promote higher levels of interferon, a protein that is released by cells of the immune system in response to infection. Interferon levels tend to decrease in fatigued athletes, so probiotic supplementation is critical to reduce the risk of illness. Probiotics maintain a healthy balance in the gut, improving digestion and nutrient absorption and helping athletes to meet their high nutritional needs. They can reduce nausea, intestinal inflammation, bloating and food hyper-sensitivity, which athletes commonly experience after training. Finally, probiotics increase antioxidant absorption, which promotes neutralization of free radicals.



# Enzymes

Muscle building obviously relies upon sufficient intake of proteins, carbohydrates, fats and other micronutrients. Optimal absorption and assimilation of key nutrients relies upon digestive enzymes. Digestive enzymes are produced naturally in our bodies, but can also be obtained from food. Athletes are increasingly recognizing the need for effective digestion, and are using supplements to improve the digestion and absorption of important nutrients.



# Antioxidants

While there is no doubt that exercise is beneficial, it increases the body's production of free radicals as a metabolic byproduct. Free radicals can have a harmful effect on the body's blood vessels and organs. While the body has some protective mechanisms to reduce the effect of these free radicals, they can't counter all the negative effects. This is where antioxidants come in. Recent research has examined the protective effects of Vitamin C and Vitamin E. It appears that these vitamins can act as powerful antioxidants, helping prevent damage to cells by free radicals. Future research will further clarify the role of these vitamins, as well as other antioxidants, in reducing cell damage from exercise.



# Green Tea Extract

In recent years, researchers have been investigating the effects of green tea on metabolic processes. It has been found that green tea has antioxidant properties, but we are also finding beneficial effects on fat oxidation in the body. Many studies support the belief that certain chemicals in green tea, called catechins, can promote weight loss in obese individuals. Interestingly, this effect may be enhanced in combination with caffeine, creating a ‘thermogenic effect’ that increases the rate at which we burn calories and fat.



# Pine Bark Extract

Due to its powerful antioxidant effects, pine bark extract is often used in supplements for cardiovascular health. The flavonoids in pine bark are active against a wide variety of oxidants and free radicals, and it has been suggested that they are even more effective than either vitamin C or vitamin E. Pine bark can help with skin health, circulation and joint flexibility, and also has anti-inflammatory effects. Athletes have reported that taking pine bark extract has resulted in shorter recovery time after exercise.



# Raspberry

Raspberries contain several anti-inflammatory and antioxidant chemicals that can protect against free radicals and improve recovery from exercise. However, it is only more recently that we have found that the phytochemicals that give them their color may be the most important of all. Phytochemicals reduce the effects of exercise-induced muscle damage (EIMD) and accelerate the recovery process.



# Trans Resveratrol

Trans resveratrol is a chemical very similar to resveratrol, which is produced by many plants as a defense against stress or harm. Trans resveratrol is found in grapes, peanuts and some berries, and its protective qualities can be harnessed by consuming it. It, however can be even more beneficial as it also improves muscle endurance and increases calorie burn. For these reasons, trans resveratrol can be particularly valuable for athletes wishing to maximize their gain from physical exercise.



# Glutathione

Glutathione, a natural antioxidant, is produced in all cell types throughout the body, but is particularly rich in the liver, spleen and skin. In today's world, the body is always fighting an uphill battle to maintain its levels of glutathione, which can be depleted by aging, toxins, drugs, trauma and even the simple stresses of everyday life. The most important ingredient of glutathione is an essential amino acid called cysteine, which must be obtained through the diet. For athletes in particular, it is important to maintain a high intake of cysteine and/or glutathione to prevent unnecessary damage from free radicals.





# Whey Protein

For anyone looking to improve their athletic performance or build muscle, whey protein supplements may be useful. Whey protein is highly digestible, and contains important amino acids for promoting improvement in both muscle mass and strength. In particular, the amino acid leucine is known to alter gene expression in a way that promotes muscle protein synthesis. Further, it stimulates release of certain hormones, including insulin, that alter the metabolism towards muscle growth.



# Hemp Seed Protein

When athletes do resistance training, they undergo increased amino acid metabolism and their muscles can become damaged. To repair and rebuild muscle, they have increased protein requirements. The superior density of amino acids and other nutrients in hemp protein makes it the best type of protein supplement for muscle growth. Moreover, it contains enzymes and bacteria that help promote absorption and utilization of amino acids.



# Colostrum

The health benefits of colostrum are only just being discovered, but they are many and varied! Colostrum is the first milk produced by a cow to feed her calf, and contains high concentrations of immune factors. These are critical for a newborn, but can also promote better immune function in adult humans. Colostrum has restorative and regenerative properties that can aid maintenance and repair of damaged tissues in the body, including muscle, bone, cartilage, skin and nerves. It is also thought that some of the growth factors present in colostrum may help regulate chemicals inside the brain, improving and stabilizing our mood. Perhaps the greatest benefit for athletes is that it can shift the body's metabolism towards breakdown of fat rather than muscle and maintain lean muscle mass.



# Collagen

Collagen is the main structural component of the body's connective tissues, including skin, tendons, ligaments and cartilage. It is also an important component of muscle and bone. Throughout our lives, our bodies are continually producing collagen to repair and rebuild damaged connective tissue. However, the process of collagen synthesis can become impaired as we get older. Collagen can help supplement this natural process and maintain faster and more effective tissue repair, particularly following injury.



# Medium Chain Triglyceride Oil (MCT Oil)

MCT oil improves endurance and athletic performance, and can help you get in shape. It can be quickly metabolized for energy and promotes thermogenesis, a process that burns fat in the body. In fact, there is mounting evidence to suggest that MCT oil increase your metabolic rate. MCT oil also assist in preventing muscle breakdown by promoting the production of ketones, which are used as an energy source in the muscles. This means there is no need for muscle catabolism (breakdown) to provide amino acids as an energy source. They are also able to act as amino acid carriers helping to assimilate proteins to build muscle.



# Coenzyme Q10 (CoQ10)

CoQ10 is involved with almost all energy production in the body, so it is no wonder that it enhances athletic performance. CoQ10 supplementation has been shown to increase maximal oxygen uptake (VO<sub>2</sub> max), meaning oxygen reaches cells faster. CoQ10 is also involved with recycling vitamin E, which can maintain higher levels of this vitamin in the body. This in turn assists with the production of red blood cells, which carry oxygen throughout the body – potentially increasing VO<sub>2</sub> max even further!



# Activated Charcoal

Activated charcoal binds to many chemicals, drugs, pesticides and heavy metals. When taken regularly, it prevents your body from absorbing unwanted toxins and can greatly improve your general wellbeing. Not only that, activated charcoal can also help reduce bloating, bad breath, body odor and flatulence. It has also been shown to prevent cellular changes associated with aging and has a protective effect on the adrenal glands and kidneys. Finally, activated charcoal helps lower the amount of fat and cholesterol in the blood and organs, and protects against atherosclerosis (hardening of the arteries).



# Milk Thistle

Milk thistle (*Silybum marianum*) has long been known as a medicinal herb. For millennia it has been used to treat various injuries and illnesses, as it is thought to enhance liver function and health, thereby aiding detoxification of the body. This may be particularly useful for athletes taking multiple supplements. Although these supplements may provide many benefits, they also may place excess stress on the liver as it struggles to metabolize all these chemicals. Milk thistle may be especially beneficial if taken periodically during regular breaks from supplementation, giving the liver a chance to recover and regenerate. To maintain excellent athletic performance, it is important to look after not only the muscles, but the rest of the body as well – and milk thistle can be an important part of that.





# Dandelion Root

Dandelion root is a herbal remedy with a natural diuretic effect. This means that it increases urine production, which in turn increases the body's excretion of water-soluble salts, minerals, metabolic by-products and toxins. It is important to use dandelion root only occasionally and for short periods of no more than a few days at a time. It stimulates improved waste excretion very quickly and effectively, so it is unnecessary to take large amounts. Not only that, but if taken in excess diuretics can cause dehydration and stress to the body.



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