

# Sports Nutrition

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by Ronald Steriti, NMD, PhD

## **About this booklet**

This booklet was written as a handy guide for athletes.

## **Acknowledgements**

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## **About the Author**

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Dr. Steriti advocates freedom of choice in health care and assists people in making informed decisions about natural health throughout the United States and Canada.

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# Creatine Monohydrate

Creatine monohydrate has become the most popular bodybuilding supplements in history. It is used to increase strength and lean body mass and has shown consistent results in experimental studies.

Over 95% of creatine is in skeletal muscle. One third is in free-form creatine, two-thirds is in creatine phosphate. Creatine phosphate produces energy in the form of ATP in muscle cells for about 10 seconds. After it is depleted the muscle shifts into anaerobic glycolysis for fuel.

Creatine is formed from the amino acids arginine and glycine with a methyl group from S-adenylmethionine (SAM). Magnesium is a required cofactor to form SAM from methionine, B12, folic acid and betaine are required cofactors to recycle homocysteine to methionine for reuse as SAM.

One gram or less of creatine monohydrate produces only a modest rise in plasma levels, whereas a 5 gram oral dose every two hours has been shown to sustain adequate plasma levels.

Insulin may be a potent upregulator of a muscle's ability to take in creatine. Many users take creatine monohydrate with a carbohydrate drink such as glucose, dextrose or maltose.

Reported side effects of creatine include gastric disturbance, headaches, clenched teeth and the sound of blood rushing into the ears.

# Whey Protein

Whey protein is the protein of choice for many body builders and strength athletes. Whey protein is the major protein in breast milk, as opposed to cow's milk which is composed primarily of casein.

Whey is composed of alpha and beta lactoglobulin, albumin, and immunoglobulins (IgG1, IgG2, secretory IgA and IgM). Other components include enzymes, iron binding proteins, calcium, potassium, sodium, phosphorous and vitamins A, C, B1, B2, B3, B5, B12, folic acid and biotin. Whey is a balanced source of essential amino acids and peptides with a high protein efficiency ratio.

The primary concerns about supplementing with whey protein are the possibility of food allergies, it's lactose content and proposed links to insulin-dependant diabetes mellitus.

Food allergies are a concern with any of the protein supplements. A significant concern might be the method of processing the whey. High temperatures during heating or drying can generate browning reaction products which have lowered digestibility. All whey products contain lactose, although many have very low amounts.

The amino acid sequence of the bovine serum albumin component of whey is similar to beta cell protein found on the insulin-secreting beta cells of the pancreas. To date the relation of whey protein to diabetes is unclear.

# **Phosphatidylserine**

Phosphatidylserine is used by resistance trainers primarily due to its presumed ability to prevent muscle tissue degradation.

Physical exercise induces a clear increase in plasma epinephrine, norepinephrine, adrenocorticotropic hormone, cortisol, growth hormone and prolactin.

It is theorized that if the increase in cortisol subsequent to intense exercise is reduced, excess muscle tissue breakdown might be prevented.

# **Arginine**

Arginine is occasionally used by body builders to stimulate growth hormone secretion. Arginine is also required for creatine synthesis.

# **Branched-Chain Amino Acids**

Leucine, isoleucine and valine are considered branched-chain amino acids because of their similar structures and interlocking methyl groups. These amino acids, especially leucine, are particularly important since they contribute as energy substrates and nitrogen donors in the formation of alanine, glutamine and aspartate.

# **Glutamine**

Glutamine is the most abundant amino acid in the blood and skeletal muscle. Glutamine stimulates the synthesis and inhibits the degradation of proteins. It is an important vehicle for the transportation of nitrogen and carbon within tissues, stimulates the synthesis of glycogen in the liver, and is an energy source for cell division. Glutamine is a precursor of nucleotides, glutathione and many other important molecules.

Glutamine is considered to have an anabolic effect on skeletal muscle. During periods of metabolic stress such as infection, surgery, trauma and burns, glutamine reserves can become depleted resulting in a loss of muscle mass. As such, glutamine is considered a conditionally essential amino acid.

# **Ornithine Alpha Keto Glutarate**

Ornithine alpha ketoglutarate (OKG) promotes wound healing and has been successfully used in hospital burn units to slow protein loss by decreasing muscle protein catabolism and increasing synthesis.

# **Boron**

Boron appears to increase testosterone levels in rats in a dose and time dependant manner.

## **Chromium**

Chromium is often recommended as a fat-burning supplement and as an aid in increasing lean muscle mass. Available research, however, does not support these claims.

Chromium is involved in the production of glucose tolerance factor, and fat and cholesterol metabolism use fairly high levels of chromium. For these reasons chromium picolinate is often recommended for patients with diabetes or insulin resistance.

## **Selenium**

Selenium is a cofactor for the enzyme glutathione peroxidase that is commonly found in antioxidant formulas. Evidence shows that organic selenium partially compensates for the increased oxidative stress in athletes.

## **Pyruvate**

Pyruvate is the naturally occurring end-product of carbohydrate metabolism. Pyruvate is believed to increase cellular respiration with a corresponding increase in fat utilization. Pyruvate may improve exercise performance by enhancing glucose transport into muscle cells ensuring a steady source of immediate energy. It has been shown to increase the time to reach exhaustion.

## **Desiccated Liver**

Historically boxers and weight lifters used beef liver concentrates to promote strength and enhance lean muscle growth.

## **Coenzyme Q10**

CoQ10 is a fat soluble quinone that occurs in the mitochondria of every cell in the body where it functions as a cofactor in the electron transport chain.

## **Vitamin C**

Vitamin C is a potent antioxidant that is required for collagen synthesis. Ascorbic acid may help protect muscles from excessive damage due to training or trauma.

## **Medium Chain Triglycerides**

Medium chain triglycerides are rapidly broken down and absorbed in the intestinal tract and transported to the liver where they are metabolized into ketones and used for energy. MCT's are more likely to be used as fuel and less likely to be stored as fat than long chain triglycerides. Long-term use of MCT's has been shown to lessen storage of fat in body tissues and to promote decreases in body weight.



## **Carnitine**

Carnitine is located in the mitochondrial membrane and is a cofactor for the transportation of long chain fatty acids into the mitochondrial matrix where they undergo beta-oxidation. The primary source of carnitine is animal protein.

## **N-Acetyl Cysteine**

N-acetyl cysteine (NAC) is a precursor of glutathione. NAC supplementation may increase the free radical scavenging ability of the body.

## **Glucosamine Sulfate**

Athletes are subject to muscular microtrauma and often develop joint problems. Glucosamine sulfate has been shown to stimulate the manufacture of joint cartilage and is a primary structure needed for the formation of connective tissue.

## **Zinc**

Zinc plays a critical role in the synthesis of RNA and DNA which is needed for cell division, growth and development. As such, zinc is an important mineral for repair after trauma. Zinc deficiency often results in white spots on the nails.

# Ashwagandha

Ashwagandha (*Withania somnifera*) is an Ayurvedic herb that is considered to be an adaptogen. It was historically used to increase energy and vigor in cases characterized by exhaustion and debility.

# Ginseng

Korean ginseng has a long history as an adaptogen, Ginseng promotes regeneration of the body after stress and fatigue.

Siberian ginseng has been shown to improve physical strength and mental alertness. It was used routinely by Soviet Olympic athletes and military officers.

# Ma Huang

Ephedrine, the major alkaloid of the plant *Ephedra seneca* or Ma huang, has a action similar that of epinephrine which stimulates the sympathetic nervous system. Ephedrine is much less active, has a longer duration, and has a more pronounced effect on the brain and central nervous system.

Ephedrine is used in many herbal diet formulas to increase thermogenesis, the conversion of food into heat. The thermogenic effects of ephedrine are enhanced by methylxanthines found in coffee (*Coffea arabica*), tea (*Camellia sinensis*), cola nut (*Cola nitida*) and guarana (*Paullinea cupana*).

## **Curcumin**

In Ayurvedic medicine, turmeric (*Curcumin longa*) is the primary herb used for soft tissue and muscular injuries. It is applied topically in pastes and taken internally to reduce inflammation and to prevent scars and adhesions.

## **Bromelain**

Bromelain has a significant antiinflammatory effect and is believed to enhance the absorption of flavenoids and glucosamine. Bromelain is generally taken away from meals as it acts as a digestive enzyme. Bromelain is very effective in repair from injury and is considered to be even more effective when used prior to the traumatic event.

## **NADH**

NADH (nicotinamide adenine dinucleotide) naturally occurs in human cells where it facilitates energy production. Heart muscle cells, for example, contain 90 mg of NADH per gram; brain cells have 50 mg/g. NADH is also one of the most potent antioxidants and helps protect cells against free radical damage.

# Saw Palmetto

Saw palmetto is native to Florida and has a long history of medicinal use by Native American Indians, Eclectic Physicians, and Naturopathic Medical Doctors.

The active constituents of saw palmetto include fatty acids such as oleic acid, lauric acid, and myristic acid. High quality saw palmetto supplements are typically standardized to contain 90% fatty acids and sterols.

The main pharmacological activity of saw palmetto berries is the inhibition of the enzyme 5-alpha-reductase which catalyzes the conversion of testosterone into dihydro-testosterone (DHT). An accumulation of DHT in the prostate is believed to contribute to both prostatic enlargement and male pattern baldness.

## Diet

*The Zone* by Barry Sears, PhD is written with athletes in mind. The diet consists of balancing the ratio of carbohydrates, protein and fats to achieve a state where the body and mind work together at their ultimate best: The Zone.

*Eat Right for Your Type* by Peter D'Adamo presents a diet based on one's blood type.

*Lean Bodies* by Cliff Sheats presents another perspective on dieting that challenges the old fashioned idea of starvation diets.

# Overtraining Syndrome

All athletes should be aware of the symptoms of overtraining. These include fatigue and cumulative exhaustion, insomnia, depression, fits of anger, constant low-grade fevers and frequent infections. Frequently body builders find themselves driven instead of choosing to do what is appropriate. One of the key signs of overtraining is an elevated or depressed resting heart rate.

Hormonal imbalance can also result from overtraining. For women this causes a deep voice. For men it can cause impotence.

Perhaps the most important aspect of professional body building is cycling and cross training. Time off is needed from vigorous exercise routines for the body and mind to rest and recover. Nutritional and other supplements should also be cycled, particularly if they are taken in large quantities.

## Resources

**Bill Phillips**

[www.bodyforlife.com](http://www.bodyforlife.com)

**All Natural Body Building**

[www.allnaturalbodybuilding.com](http://www.allnaturalbodybuilding.com)

## More Booklets

Dr. Steriti has written several booklets on natural health, including:

Tips for New Mothers

Healthy Skin, Hair and Nails Naturally

Sports Nutrition for Athletes

A Guide to Diets

What Foods to Buy at an Organic Market or Health Food Store

How to Choose a Good Multiple

Great Health Quotes

An Introduction to Naturopathy and Naturopathic Medicine

Alternative and Nutritional Lab Tests

These booklets can be ordered by sending \$5 per booklet with a self-addressed, double-stamped envelope to:

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# **How to Find a Naturopath**

## **What is Naturopathy?**

Naturopathy is a term made popular in the early 1900's to describe a system of medicine that emphasizes natural therapies including herbs, homeopathy, hydrotherapy, nutrition, diet, and manipulation.

## **What is Naturopathic Medicine?**

Naturopathic medical schools have four-year full-time programs that teach both naturopathy and conventional Western diagnosis and treatment. Graduates are trained to become primary care physicians in licensed states.

There are currently four naturopathic medical schools in the United States and one in Canada: Bastyr, National, and Southwest Colleges of Naturopathic Medicine, The University of Bridgeport, and the Canadian College of Naturopathic Medicine.

Currently Alaska, Arizona, British Columbia, Connecticut, Hawaii, Maine, Manitoba, Montana, New Hampshire, Ontario, Oregon, Utah, Vermont and Washington have naturopathic medical licensing laws.

## **Where do I find a naturopath?**

Check the American Association of Naturopathic Physician's web site:

[www.naturopathic.org](http://www.naturopathic.org)

# **Top Ten Reasons to See a Naturopath**

1. It's part of your healthy life-style.
2. You are taking a lot of supplements, but aren't sure if they are right for you.
3. You want advice from a specialist that is well trained in natural therapies.
4. You want to make an informed decision about your health.
5. You want a natural health program designed for you.
6. You are confused by contradictory health claims.
7. You have vague complaints but aren't sick enough to see a medical doctor or use drugs.
8. You are concerned about the long-term side effects of drugs.
9. You have an uncommon health problem which has many specialists baffled.
10. The drugs you are taking cause side effects which are worse than the original problem.