

## ***Arginine, Essential or Non-Essential?***

Amino acids are the building blocks on proteins. Proteins are the building blocks of cells. Cells are the building blocks of organic life. What is true for nearly all building blocks, is that they get worn down, used up, and damaged over time and need replacement or repair. This is also true for amino acids.

Amino acids are generally separated into two categories: the essential and the non-essential. There is an amino acid, however, that stands somewhere in-between these two classifications. That amino acid is *Arginine*.

Some texts will classify it as non-essential because most healthy adults obtain enough nutrients in their diet to produce sufficient quantities. There is, unfortunately, a large group (actually a number of various groups) of people whose bodies' natural processes do not, or cannot, produce sufficient arginine to meet their needs. The people that typically fall into this category are those who have poor diets, have gastro intestinal problems that compromise absorption, people with genetic disorders related to arginine production and use, and infants and do not begin to fully synthesize enough arginine to meet their needs.

What does arginine do? While the list of answers is growing, the most widely known is the role it plays in the process of removing toxic byproducts of protein metabolism from the body. When one consumes protein, it is broken down by

digestion, it is then distributed, processed, and used throughout the body. Through these various chemical processes, waste is produced and the body has a somewhat efficient system of channeling those wastes either out of the body or to be stored in fatty tissue.

The majority of these toxic byproducts are nitrogen based. The most common of these is ammonia. Ammonia in high concentrations is very toxic and getting it removed from the body is a high priority. The way the body gets rid of ammonia is by excreting it through the urine.

Ammonia is removed from the body via the urea cycle. This cycle is performed mainly by liver and kidney cells. It takes ammonia and turns it into urea, a much safer compound that is the main non-fluid compound in urine. The urea cycle was the first metabolic cycle ever discovered. It was discovered by Hans Krebs and Kurt Henseleit in 1932. Hans Krebs is extremely famous for his discovery of another extremely important cycle that is named after him, the Krebs cycle, which explains the production of energy in mitochondria.

The key players in the urea cycle are three amino acids, *ornithine*, *citrulline*, and arginine. Without sufficient arginine to complete the urea cycle, ammonia and other nitrogenous waste accumulate in the liver and kidneys. This can lead to liver failure and hepatic encephalopathy, which is when the toxins reach the central nervous system and cause all sorts of

problems that, if left unchecked, can eventually lead to coma and death. Life, however, is not always lived in such extremes. There is always a graduating scale, especially with toxicity. Your body's urea cycle could be *slightly* under performing and you could have *slightly* higher levels of ammonia toxicity with only *mild* symptoms. Or you could have no issues at all. Your position on such a scale is determined by knowing your body and maintaining both a healthy diet and supplementing for deficiencies.

It is a definite bonus that our body's have a system for producing such an important amino acid so that a healthy diet can take care of those very basic, yet very vital needs. That being said, there is a growing list of other benefits that supplementing additional arginine can have on your health.

Among the most well known benefits is arginine's effect on the cardiovascular system. Arginine is also used to make nitric oxide, which is very different from *nitrous* oxide (laughing gas). Nitric oxide has a number of uses in the body, foremost of which is its role as a signaling molecule for the smooth muscle that lines blood vessels. Nitric oxide signals this smooth muscle to relax which allows the blood vessels to widen and thereby increase blood flow and lower blood pressure. This is particularly helpful for people with blood circulation problems like atherosclerosis and intermittent claudication (painful cramping caused by obstructed arteries as a result of exercise).

This benefit of arginine in increasing blood flow can also benefit another related condition that affects a growing number of men in the adult population: erectile dysfunction. By increasing vasodilatation of the blood vessels in the penis through the boosted production of nitric oxide the effects of ED are reduced. Interestingly, Viagra works towards a similar end. Instead of boosting nitric oxide, it simply blocks the function of a particular enzyme that destroys nitric oxide. Could arginine be a more natural alternative?

Those suffering from certain types of arthritis can also benefit from the increased blood flow created by arginine supplementation. By increasing the blood flow to in the joints may provide some much needed relief from the pain and stiffness that accompanies this condition.

Another great property of arginine is its effects on wound healing. Numerous studies, including a study done at the University of Florida have shown that arginine supplementation decreases recovery time of injuries, increases wound strength, and restores damaged collagen in incision injuries.

Arginine also promotes the immune system through its effect on the thymus and pituitary glands. Arginine supplementation increases the performance of both of these important glands. The thymus gland is a key part of the immune system that produces T-cells. T-cells play a number of key roles in the immune system, among which are the tumor suppressing powers. The pituitary

gland, when receiving additional arginine, increases its production of Human Growth Hormone, HGH, which has a number of positive effects on the body. According to Wikipedia, HGH's effects, "...include decreased body fat, increased muscle mass, increased bone density, increased energy levels, improved skin tone and texture, increased sexual function and improved immune system function. At this time, [HGH] is still considered a very complex hormone, and many of its functions are still unknown."

Though there are many benefits to increasing arginine intake, there are a couple instances where it may be beneficial to actually reduce your body's arginine level for a temporary period. The typical advice given by most medical professionals for people experiencing herpes simplex outbreaks is to alter one's diet so that foods rich in arginine are avoided and to supplement with another amino acid, *Lysine*. Lysine inhibits arginine metabolism and since arginine is needed by the virus in order to replicate, the virus is brought under control by literally starving it of arginine. The obvious downside is that if this protocol is maintained for too great a period one can begin to develop an arginine deficiency.

Arginine deficiencies can create undue stress on the liver from the toxic burden from nitrogenous wastes, decreases thymus and pituitary gland efficiency, and it can also lead to male infertility since it is a necessary substance in maintaining normal sperm count. Arginine deficiency has also been associated with premature aging and

increased difficulty in fat metabolism, which can make one overweight. People with herpes simplex virus should make sure that they get enough arginine and use lysine effectively when using these two supplements to treat herpes. This requires proper advice, knowledge and counseling from a medical professional.

Arginine is generally safe for people without herpes simplex at most dosages. Higher dosages have reported stomach irritation and nausea. Also, people who have recently suffered a heart attack should avoid supplementing arginine since it has been associated with healing complications. If someone is supplementing arginine and has recently had a heart attack, they should stop and wait to resume supplementing only once they get permission from a qualified medical professional, as you should with any significant changes in your diet and health program.

Arginine is a very important amino acid. Even though our bodies are capable of making it, there are tremendous benefits that can be had from enriching our bodies with additional arginine.



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