



## VITAMIN C: THE CRITICAL NUTRIENT IN THE COVID-19 PANDEMIC

Vitamin C is a vital nutrient for human health and survival. It is well known that the human body does not produce vitamin C, and it must be obtained from food sources and dietary supplements. Yet, a clinically significant deficiency of vitamin C is the fourth leading nutrient deficiency in the US.

Recently, vitamin C has gained a renewed importance in the COVID-19 pandemic because of its immune modulating properties. Although not approved as a treatment of COVID-19, intravenous vitamin C was one of the first options successfully used in several hospitals in New York, China, Italy and other places at the peak of COVID-19. A review of 18 clinical trials covering more than 2000 patients analyzed the effect of vitamin C and ICU stay. The authors stated that in at least six of those clinical trials even oral vitamin C doses of 1-3 g/day were enough to reduce the ICU stay by 8.6%.\*

The antioxidant properties of vitamin C are critical during the period of oxidative stress created while fighting any infection and it has been especially important in COVID-19 patients during stages of sepsis and multi-organ failure. As an effective antioxidant and an immune booster, vitamin C increases mobility and efficacy of white blood cells (neutrophils or the “police cells of the body”) and promotes destruction of the viruses and bacteria. It also stimulates the activity of the lymphocytes (another type of white blood cell), and increases production of antibodies. Additionally, vitamin C supports collagen connective tissue formation and builds extracellular matrix (the “glue” that binds cells), and prevents tissue destruction in widespread infections. It is also important for faster wound healing and prevention of many other chronic conditions.

Moreover, vitamin C is a cofactor for several enzymatic reactions. It participates in the biological recycling of vitamin E, glutathione and many other cell protective molecules. When taken with calcium, vitamin C increases calcium absorption. Vitamin C neutralizes toxins in the body, and protects cells from harmful substances and the side effects of many drugs.

Vitamin C supplements come in various forms - ascorbic acid,



calcium ascorbate, and magnesium ascorbate. However, the majority of vitamin C supplements on the market contain only a single form, usually ascorbic acid. Ascorbic acid is a water-soluble compound and is excreted through the urine. Unless frequently replenished, it is difficult to obtain the benefits of vitamin C by taking only ascorbic acid. Mineral salts of ascorbic acid, such as calcium ascorbate and magnesium ascorbate, are easily absorbed and metabolized well by the body’s cells. Such a combination with calcium and magnesium also neutralizes the acidic effect of ascorbic acid and contributes to a “buffering” effect which is gentler on the stomach lining.

There is a misconception that calcium ascorbate can increase the likelihood of kidney stones. However, the majority of the kidney stones are of calcium oxalate, which is present in foods such as soda, coffee, chocolates, spinach, and beets. Inadequate water intake is one of the major contributors for kidney stone formation. Several clinical studies have not been able to establish any strong correlation between supplemental vitamin C and increased kidney stones.

Another unique form of vitamin C is ascorbyl palmitate, which is a fat-soluble form of vitamin C. It is better absorbed by the cells than ascorbic acid alone. Cell membranes enriched with ascorbyl palmitate are more resistant to oxidative damage, which means they are better protected against diseases and aging. Ascorbyl palmitate is also an effective antioxidant. One of the advantages of taking a nutritional supplement that contains ascorbyl palmitate is that this form of vitamin C can reach areas of the body that water-soluble forms cannot and its effects last longer. A well balanced vitamin C or multi-nutrient supplement should contain at least 25% of its vitamin C in the fat-soluble ascorbyl palmitate form. However, most of the vitamin C supplements on the market contain little or no ascorbyl palmitate. Optimum supplementation with a synergistically formulated vitamin C supplement can make all the difference in protecting your health!

Ref: \*Hemilä H, et al. *Nutrients*; 2019

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The ground-breaking nature of this research poses a threat to the multi-billion dollar pharmaceutical “business with disease”. It is no surprise that over the years the drug lobby has attacked Dr. Rath and his research team in an attempt to silence this message. To no avail. During this battle, Dr. Rath has become an internationally renowned advocate for natural health. Says he: “Never in the history of medicine have researchers been so ferociously attacked for their discoveries. It reminds us that health is not given to us voluntarily, but we need to fight for it.”

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