



Vitamin C: High-dose IVC Treatment

<p><u>Immune support</u></p> 	<p>Vitamin C has long been a means for enhancing the immune system and supporting the body during periods of infection or disease.</p> <p>It has been used in many conditions, including viral infections (e.g. colds, herpes, shingles, hepatitis, HIV, meningitis), bacterial infections (e.g. Helicobacter pylori, E. coli), allergies, asthma, arthritis, pneumonia, chronic fatigue, glandular fever and tuberculosis.</p> <p>Vitamin C deficiency is a common factor in many chronic and acute illnesses.</p> <p>It is important for promoting the function of immune cells and protecting them from oxidation.</p> <p>Clinical trials support the positive role of vitamin C on the immune system: for example, vitamin C supplementation may reduce the severity and duration of common cold symptoms.</p> <p>Vitamin C has an anti-bacterial and anti-viral effect due to interaction with metal transition ions (particularly copper) creating a selectively pro-oxidant environment that kills or inactivates pathogens through the production of hydrogen peroxide, without causing significant toxicity to healthy cells.</p>
<p><u>Cancer</u></p>	<p>Vitamin C is implicated in preventing cancer due to its ability in scavenging free radicals and carcinogens, maintaining the integrity of connective tissue and improving immunocompetence and resistance to cancer.</p>

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Most adults have cancer cells in their body but the immune and circulatory systems normally eliminate them and prevent them from becoming established. Adequate vitamin C intake is important to prevent nutrient deficiencies and maintain antioxidant levels so the anti-tumour defence system keeps working effectively.

If cancer does become established, evidence suggests that vitamin C may selectively kill cancer cells via production of hydrogen peroxide, encapsulate tumours with a collagen wall to prevent metastasis, promote macrophage function and removal of cancer cells, prevent or reduce side effects from conventional treatments, relieve pain and improve quality of life.

In vitro studies by Riordan and colleagues have shown that extracellular vitamin C concentrations of more than 20 000µmol/L (350mg/dL) are toxic to most cancer cells, but not to normal cells. This concentration has been measured in vivo in human blood plasma following intravenous administration.

Intravenous vitamin C may have a palliative care role, particularly for terminal cancer patients. A study of cancer patients assessed with a quality of life survey before and after intravenous vitamin C showed:
improvement in physical, emotional and cognitive function as well as a reduction in fatigue, nausea, vomiting, pain and loss of appetite.

Cardiovascular diseases

Vitamin C is important for maintaining a healthy heart and blood vessels by reducing oxidative stress and promoting vasodilation increasing nitric oxide bioavailability. This helps reduce endothelial dysfunction, one of the key features of cardiovascular disease.

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Research suggests vitamin C may be supportive in the following conditions:
hypertension,
coronary artery disease, angina,
reperfusion injury, atherosclerosis,
heart failure, acute myocardial infarction, obstructive sleep apnoea,
Behçet's syndrome, and Kawasaki disease.

Clinical trials investigating these conditions consistently found that vitamin C improved flow mediated vasodilation (FMD).
Several of the studies also found that vitamin C infusions given during major surgery, such as a cardiopulmonary bypass, resulted in fewer post-operative complications.

Diabetes



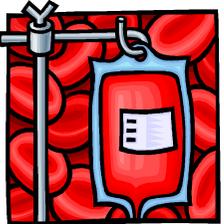
Dehydroascorbic acid (the oxidized form of vitamin C) competes with glucose for uptake into cells using a glucose transporter.
As a result, many diabetics with hyperglycaemia have low tissue concentrations of vitamin C. Vitamin C can support diabetics by preventing vitamin C deficiency, helping regulate glucose and sorbitol levels, acting as an antioxidant to protect organs from free radicals and protecting the function of the cardiovascular system.

Oxidative stress and the accumulation of sorbitol in cells are major contributing factors to diabetic complications such as endothelial dysfunction, retinopathy and nephropathy. Vitamin C is an aldose reductase inhibitor and has been shown to normalise sorbitol levels in red blood cells.
As an antioxidant, vitamin C may help prevent the oxidative damage to organs such as the eyes

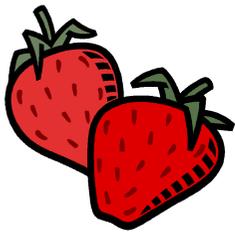
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	<p>and kidneys that frequently occur in type 2 diabetes.</p> <p>It may also reduce the risk of cardiovascular complications by several mechanisms including lowering blood pressure and preventing haemodynamic changes induced by hyperglycaemia.</p>
<p><u>Wound healing</u></p> 	<p>Vitamin C promotes the healing of wounds and injuries through increasing production of collagen, antioxidant activity and enhancing immune cell function.</p> <p>It has been shown to assist recovery from fractures, ulcers and pressure sores, burns, trauma and surgery.</p> <p>Clinical studies found that vitamin C reduced the incidence of complex regional pain syndrome following wrist fractures.</p> <p>Collagen and vitamin C are essential for new bone formation and repair.</p> <p>High serum vitamin C levels have been associated with higher bone mineral density and lower incidence of bone fractures.</p> <p>It may also accelerate the healing of ulcers and pressure sores.</p> <p>In a clinical trial with surgical patients, after one month the group given extra vitamin C had an 84% reduction in size of pressure sores while the placebo group had a 42% reduction.</p> <p>High dose intravenous vitamin C given within 24 hours of receiving severe burns or trauma can reduce lipid peroxidation, resuscitation volume, oedema formation and respiratory dysfunction.</p> <p>Following surgery or major trauma, vitamin C levels are very low. Vitamin C administration can correct the deficiency and reduce the incidence of organ failure, duration of mechanical ventilation, intracranial hypertension and time spent in the ICU (intensive care unit).</p>

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<p><u>Haemodialysis</u></p> 	<p>The typical treatment for anaemic haemodialysis patients is erythropoietin; however, some patients do not respond well to this treatment.</p> <p>Vitamin C has been shown to increase responsiveness, relieve anaemia, improve functional iron stores and correct vitamin C deficiency.</p>
<p><u>Neurological disorders</u></p> 	<p>Vitamin C is an important cofactor and antioxidant in the brain and central nervous system. Many neurological diseases involve oxidative stress and reduced concentrations of vitamin C in the cerebrospinal fluid.</p> <p>Some evidence suggests vitamin C may have therapeutic value in Alzheimer's disease, Charcot-Marie-Tooth disease, Parkinson's disease, and stroke.</p>
<p><u>Smoking</u></p> 	<p>Smokers have low serum levels of vitamin C.</p> <p>The recommended daily allowance of vitamin C for smokers is higher than for non-smokers because they are exposed to increased oxidative stress.</p> <p>Vitamin C may be beneficial for smokers because it reduces endothelial dysfunction and Inflammation caused by cigarette smoke, reduces blood lead levels (when daily intake is at least 1000mg/day), and may prevent white blood cells adhering to blood vessels, thus potentially preventing the development of atherosclerosis or emphysema.</p>

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<p><u>Conclusion</u></p>  <hr/>	<p>Vitamin C has a critical role to play in the prevention and intervention of many medical conditions.</p> <p>There is scientific evidence supporting the use of vitamin C during acute and chronic illnesses, for injuries, and for reducing the risk of disease.</p> <p>The safety of vitamin C over a wide range of doses has been demonstrated in a number of clinical trials; reports of serious adverse events are very rare.</p> <p>As a safe, natural, low-cost nutrient, the potential immune-supporting and antioxidant benefits of vitamin C should be considered when developing treatment plans.</p>
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Adapted from NZFP: Original Scientific Papers

[Vitamin C: Evidence, application and commentary](#)

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