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Immune-enhancing role of vitamin C and zinc and effect on clinical conditions.

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Abstract

Vitamin C concentrations in the plasma and leukocytes rapidly decline during infections and stress. Supplementation of vitamin C was found to improve components of the human immune system such as antimicrobial and natural killer cell activities, lymphocyte proliferation, chemotaxis, and delayed-type hypersensitivity. Vitamin C contributes to maintaining the redox integrity of cells and thereby protects them against reactive oxygen species generated during the respiratory burst and in the inflammatory response. Likewise, zinc undernutrition or deficiency was shown to impair cellular mediators of innate immunity such as phagocytosis, natural killer cell activity, and the generation of oxidative burst. Therefore, both nutrients play important roles in immune function and the modulation of host resistance to infectious agents, reducing the risk, severity, and duration of infectious diseases. This is of special importance in populations in which insufficient intake of these nutrients is prevalent. In the developing world, this is the case in low- and middle-income countries, but also in subpopulations in industrialized countries, e.g. in the elderly. A large number of randomized controlled intervention trials with intakes of up to 1 g of vitamin C and up to 30 mg of zinc are available. These trials document that adequate intakes of vitamin C and zinc ameliorate symptoms and shorten the duration of respiratory tract infections including the common cold. Furthermore, vitamin C and zinc reduce the incidence and improve the outcome of pneumonia, malaria, and diarrhea infections, especially in children in developing countries.

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