IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 3, December 2025
Impact Factor: 7.67

Vitamin C and Human Heath : An Intergative Review of its Biological and Clinical Significance

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Abstract: *Vitamin C (L-ascorbic acid) is a vital dietary antioxidant that participates in many cellular processes essential for human health. Because humans lack the enzyme required for its synthesis, the body depends entirely on external intake to maintain sufficient levels. Vitamin C contributes to tissue integrity through its role in collagen formation and supports immune, neurological, and metabolic functions by acting as a cofactor for several enzymes. Recent scientific work from 2020 to 2025 has broadened its clinical relevance, showing benefits in reducing oxidative stress, supporting immune defense during infections, improving endothelial function, and assisting in gastrointestinal and metabolic health. Evidence also indicates a potential role for vitamin C in neuroprotection and skin repair, while high-dose intravenous formulations are being explored for severe conditions such as sepsis, acute respiratory distress, and cancer as an adjunctive therapy. Although mechanistic studies strongly support its biological importance, clinical outcomes vary due to differences in dosage, delivery route, and patient status. This review brings together current findings on the chemistry, biological actions, therapeutic applications, and emerging research directions of vitamin C, offering an updated overview of its multifaceted significance in promoting and maintaining human health.*

Keywords*:* Vitamin C, Ascorbic acid, Antioxidant, Immune function, Nutrition, Clinical significance, Chronic disease

DOI: 10.48175/568