

◆ **Ascorbic Acid (Vitamin C)**, first demonstrated to strengthen immunity in 1942, plays multiple important roles in health.<sup>1</sup> In his book *Reishi, Ancient Herb for Modern Times*, Kenneth Jones reports; "Vitamin C reduces the high molecular weight of polysaccharides. As Vitamin C breaks up these sugars, their viscosity or stickiness drops and their bioavailability increases. Once the polysaccharides are reduced ... they are rendered more accessible to the immune system cell called the 'macrophage.' When this immune cell becomes activated, an array of other defenders is signaled to go into action to protect the body against disease."<sup>2</sup> Examples of other benefits include: 1) maintenance of oral mucosal integrity; 2) erythropoietic (red blood cell) activity; 3) supports health of endothelial cells (lining of blood and lymphatic vessels, heart, eye, and body cavities);<sup>3,4</sup> 4) iron absorption;<sup>5</sup> 5) leukocyte function;<sup>6</sup> 6) support of natural killer cell activity and T and B cell function;<sup>7</sup> 7) statistically significant increase in the serum levels of IgA, IgM and C-3 complement;<sup>8</sup> and 8) significant synergistic enhancement of immune benefits offered by maitake mushroom fraction-D.<sup>9</sup>

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<sup>1</sup> **Ascorbic acid and the immune system.** Ottoboni F, Ottoboni A. *The Journal of Orthomolecular Medicine*. 2005; 20(3): 179-183. Full text access: <http://www.orthomolecular.org/library/jom/2005/toc3.shtml>

<sup>2</sup> Jones K. **Reishi: Ancient Herb for Modern Times.** Healing Arts Press. 1995.

<sup>3</sup> **Vitamin C supplementation could reverse diabetes-induced endothelial cell dysfunction in mesenteric microcirculation in STZ-rats.** Sridulyakul P, Chakraphan D, Patumraj S. *Clin Hemorrhheol Microcirc* 2006;34(1-2):315-21. <http://www.ncbi.nlm.nih.gov/pubmed/16543652>

<sup>4</sup> **Long-term effects of oral vitamin C supplementation on the endothelial dysfunction in the iris microvessels of diabetic rats.**

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<http://www.ncbi.nlm.nih.gov/pubmed/17467747>

<sup>5</sup> **Ascorbic acid--important for iron metabolism.** Atanassova BD, Tzatchev KN. *Folia Med (Plovdiv)*. 2008 Oct-Dec;50(4):11-6.

<http://www.ncbi.nlm.nih.gov/pubmed/19209525>

<sup>6</sup> **Reduced bactericidal activity in neutrophils from scorbutic animals and the effect of ascorbic acid on these target bacteria in vivo and in vitro.** Goldschmidt MC. *Am J Clin Nutr*. 1991 Dec;54(6 Suppl):1214S-1220S.

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<sup>7</sup> **Enhancement of natural killer cell activity and T and B cell function by buffered vitamin C in patients exposed to toxic chemicals: the role of protein kinase-C.** Heuser G, Vojdani A. *Immunopharmacol Immunotoxicol*. 1997 Aug;19(3):291-312. <http://www.ncbi.nlm.nih.gov/pubmed/9248859>

<sup>8</sup> **The effect of ascorbic acid supplementation on some parameters of the human immunological defence system.** Prinz W, Bortz R, Bregin B, Hersch M. *Int J Vitam Nutr Res*. 1977;47(3):248-57.

<http://www.ncbi.nlm.nih.gov/pubmed/914459>

<sup>9</sup> **Maitake D-Fraction: Apoptosis Inducer and Immune Enhancer.** Konno S. *Alternative and Complementary Therapies*. April 2001, Vol. 7, No. 2:102-107.

<http://www.liebertonline.com/doi/abs/10.1089/10762800151125137?prevSearch=allfield%253A%2528Maitake%2528D-Fraction%252C%252BKonno%2529&searchHistoryKey=>