



CLINICAL APPLICATIONS

- *Broad-Spectrum Support for Healthy Immune Function*
- *Supports Healthy Respiratory Function*
- *Maintains Normal Inflammatory Balance*



IMMUNE HEALTH

OrthoMune® is a targeted blend of nutrients designed to provide broad-spectrum support for the body's immune reserves. The formula includes quercetin, a powerful bioflavonoid that aids in supporting the immune system. Vitamin C and N-acetyl cysteine are potent antioxidants that promote respiratory function and support the function of quercetin. Vitamin D and zinc are important micronutrients needed to create a robust immune reserve. This powerful combination works to promote healthy respiratory and immune function in all patients, including those who are pregnant, breastfeeding or have autoimmunity.

Quercetin

Quercetin is best known for its antioxidant activity in scavenging free radicals. Additionally, quercetin helps balance cytokine levels and improve T-lymphocyte balance. Several mechanism studies highlight quercetin's ability to provide immune system support while also stimulating the ciliary beat frequency of the nasal epithelium, aiding the excretion of respiratory mucus.¹⁻³ Quercetin has been shown to block the mechanisms by which microbes enter host cells and replicate within the body.³ Additionally, a human clinical trial found quercetin supplementation supported healthy respiratory function following a stressor (i.e., intense bout of exercise), compared to placebo.⁴

Vitamin C

Vitamin C is a potent antioxidant that has been studied for many years for its immune-supporting effects. Through its antioxidant functions, vitamin C has been shown to protect important immune cells from oxidative damage.⁵ Data shows vitamin C is heavily concentrated in macrophages, supports lymphocyte activity, modulates cytokine release, improves

endothelial function, restores mitochondrial function, and can directly support a challenged immune system.³ Of particular interest, vitamin C has been shown to recycle oxidized quercetin back to its parent compound, which supports a robust immune response while increasing the efficacy of quercetin.^{3,6}

N-Acetyl Cysteine

N-acetyl cysteine (NAC) is the precursor of the master antioxidant, glutathione. NAC has been shown to support mucus clearance and normal respiratory function through its ability to cleave disulfide bonds in mucus.^{7,8} NAC is found to raise glutathione levels, which is important to protect the biological activity and safe metabolism of quercetin.^{3,9} Along with protecting the activity of quercetin, NAC supports all detoxification pathways and helps maintain immune balance by supporting glutathione levels.^{10,11}

Zinc

Zinc is essential for maintaining immune system integrity and healthy immune development.¹²⁻¹⁴ Supplementation with zinc supports key immune functions, such as natural killer cell activity and phagocytosis by macrophages and neutrophils.¹⁵ Furthermore, studies show that zinc can directly support the body during immune system challenges and can help support healthy respiratory function.^{15,16}

Vitamin D3

It has been shown that low vitamin D levels have immunologic implications with a significant decrease in immune function, affecting respiratory health.^{11,12,17} This is most likely because the vitamin D receptor is expressed by several immune cells, including monocytes, macrophages, dendritic cells, and B and

T cells.¹⁸ Supplementation with vitamin D has been shown to modulate NK cell activity to promote a healthy innate immune response.^{15,19} Along with these immune-supporting benefits, vitamin D has also been shown to support the respiratory system and epithelial tight junction integrity.^{15,19-21}

Directions

2 capsules per day or as recommended by your health care professional.

Does Not Contain

Gluten, yeast, artificial flavors or colors.

Cautions

If you are pregnant or nursing, consult your physician before taking this product.

Supplement Facts ^{v2}		
Serving Size 2 Capsules		
Servings Per Container 60		
	Amount Per Serving	% Daily Value
Vitamin C (as Ascorbic Acid USP)	600 mg	667%
Vitamin D (D3 as Cholecalciferol)	62.5 mcg (2,500 IU)	313%
Zinc (as Zinc Bisglycinate Chelate) (Albion®)	25 mg	227%
N-Acetyl-L-Cysteine USP	600 mg	*
Quercetin Dihydrate	250 mg	*
* Daily Value not established.		

Other Ingredients: Hypromellose (Natural Vegetable Capsules), Microcrystalline Cellulose, Magnesium Stearate and Silicon Dioxide.

ID# 267120 120 Capsules

References

- Wu W, Li R, Li X, et al. Quercetin as an Antiviral Agent Inhibits Influenza A Virus (IAV) Entry. *Viruses* 2015;8(1).
- Mehrbod P, Hudy D, Shyntum D, Markowski J, Łos MJ, Ghavami S. Quercetin as a Natural Therapeutic Candidate for the Treatment of Influenza Virus. *Biomolecules* 2020;11(1).
- Colunga Biancatelli RML, Berrill M, Catravas JD, Marik PE. Quercetin and Vitamin C: An Experimental, Synergistic Therapy for the Prevention and Treatment of SARS-CoV-2 Related Disease (COVID-19). *Frontiers in immunology* 2020;11:1451.
- Nieman DC, Henson DA, Gross SJ, et al. Quercetin reduces illness but not immune perturbations after intensive exercise. *Med Sci Sports Exerc* 2007;39(9):1561-1569.
- Carr AC, Maggini S. Vitamin C and Immune Function. *Nutrients* 2017;9(11).
- Boots AW, Haenen GR, Bast A. Health effects of quercetin: from antioxidant to nutraceutical. *Eur J Pharmacol* 2008;585(2-3):325-337.
- De Rosa SC, Zaretsky MD, Dubs JG, et al. N-acetylcysteine replenishes glutathione in HIV infection. *Eur J Clin Invest* 2000;30(10):915-929.
- Aldini G, Altomare A, Baron G, et al. N-Acetylcysteine as an antioxidant and disulphide breaking agent: the reasons why. *Free Radic Res* 2018;52(7):751-762.
- Rushworth GF, Megson IL. Existing and potential therapeutic uses for N-acetylcysteine: the need for conversion to intracellular glutathione for antioxidant benefits. *Pharmacol Ther* 2014;141(2):150-159.
- Grandjean EM, Berthet P, Ruffmann R, Leuenberger P. Efficacy of oral long-term N-acetylcysteine in chronic bronchopulmonary disease: a meta-analysis of published double-blind, placebo-controlled clinical trials. *Clin Ther* 2000;22(2):209-221.
- Falluel-Morel A, Lin L, Sokolowski K, McCandlish E, Buckley B, DiCicco-Bloom E. N-acetyl cysteine treatment reduces mercury-induced neurotoxicity in the developing rat hippocampus. *J Neurosci Res* 2012;90(4):743-750.
- Linus Pauling Institute. Zinc. 2019; <https://lpi.oregonstate.edu/mic/minerals/zinc#impaired-immune-function>. Accessed January 7, 2021.
- Baum MK, Shor-Posner G, Campa A. Zinc status in human immunodeficiency virus infection. *J Nutr* 2000;130(5S Suppl):1421S-35S.
- Maares M, Haase H. Zinc and immunity: An essential interrelation. *Arch Biochem Biophys* 2016;611:58-65.

15. Rondanelli M, Miccono A, Lamburghini S, et al. Self-Care for Common Colds: The Pivotal Role of Vitamin D, Vitamin C, Zinc, and Echinacea in Three Main Immune Interactive Clusters (Physical Barriers, Innate and Adaptive Immunity) Involved during an Episode of Common Colds—Practical Advice on Dosages and on the Time to Take These Nutrients/Botanicals in order to Prevent or Treat Common Colds. *Evid Based Complement Alternat Med* 2018;2018:5813095.
16. Hemilä H. Zinc lozenges and the common cold: a meta-analysis comparing zinc acetate and zinc gluconate, and the role of zinc dosage. *JRSM open* 2017;8(5).
17. Ginde AA, Sullivan AF, Mansbach JM, Camargo CA Jr. Vitamin D insufficiency in pregnant and nonpregnant women of childbearing age in the United States. *Am J Obstet Gynecol* 2010;202(5):436.e431-438.
18. Sassi F, Tamone C, D'Amelio P. Vitamin D: Nutrient, Hormone, and Immunomodulator. *Nutrients* 2018;10(11).
19. Prietl B, Treiber G, Pieber TR, Amrein K. Vitamin D and immune function. *Nutrients* 2013;5(7):2502-2521.
20. Martineau AR, Jolliffe DA, Hooper RL, et al. Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. *BMJ* 2017;356:i6583.
21. Shi YY, Liu TJ, Fu JH, et al. Vitamin D/VDR signaling attenuates lipopolysaccharide-induced acute lung injury by maintaining the integrity of the pulmonary epithelial barrier. *Mol Med Rep* 2016;13(2):1186-1194.