







What is IMMULINA™?

IMMULINA™ is a spirulina extract and the predominant active compounds are Braun-type lipoproteins which are useful for improving human immune function. These lipoproteins are present at much greater levels than those found within commonly used immune enhancing botanicals such as Echinacea and ginseng.

What are lipoproteins?

Lipoproteins are soluble proteins that can transport fat and other lipids in the blood. Lipoproteins are what make up cholesterol, with high density lipoprotein being known as the "good" cholesterol and low density lipoprotein being known as the "bad" cholesterol.¹ Lipoproteins are recognized by the Toll-like receptor 2 (TLR2) which are part of the innate immune system.²

What makes IMMULINA™ unique?

Different than dried biomass of spirulina, which will affect the results observed.³ Dried biomass contains phycocyanin, IMULINA™ does not contain this.³



Where can IMMULINA™ deliver results?

Scientific evidence suggests that IMMULINA™ helps to support a healthy immune system:

Clinical trials

- 11 healthy males were given 400mg IMMULINA™ daily for 56 days³
- 10 healthy individuals (7 male, 3 female) from North America given 400mg IMMULINA™ for 7 days⁴
- 12 healthy individuals (5 male, 7 female) from Denmark given 200mg or 400mg
 IMMULINA™ for 7 days⁴

Preclinical trials

- Mouse model showed enhanced innate immune system
 - Mice were given 10-12mg/day IMMULINA™ as an oral dose

Immunity

- TLR2 dependent process for Braun-type lipoprotein for enhanced innate immunity^{4,5}
- Age dependent temporary enhancement of adaptive immune response observed in individuals over 50.3
- May have a priming effect on adaptive immune responses related to effects on the innate immune system.⁴

Potential IMMULINA[™] Applications

IMMULINA™ can be used in capsules, tablets, melts, or in powder form.

References

- 1. Matasic, D.S., C. Brenner, and B. London, Emerging Potential Benefits of Modulating NAD(+) Metabolism in Cardiovascular Disease. Am J Physiol Heart Circ Physiol, 2017.
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- 3. Lobner, M., et al., Enhancement of human adaptive immune responses by administration of a high-molecular-weight polysaccharide extract from the cyanobacterium Arthrospira platensis. J Med Food, 2008. 11(2): p. 313-22.
- 4. Nielsen, C.H., et al., Enhancement of natural killer cell activity in healthy subjects by Immulina(R), a Spirulina extract enriched for Braun-type lipoproteins. Planta Med, 2010. 76(16): p. 1802-8.
- 5. Pugh, N.D., et al., Oral administration of a Spirulina extract enriched for Braun-type lipoproteins protects mice against influenza A (H1N1) virus infection. Phytomedicine, 2015. 22(2): p. 271-6.



