




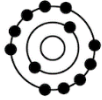
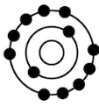
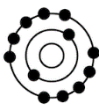
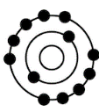
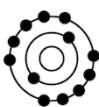
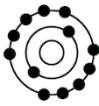
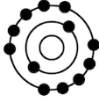
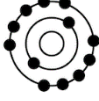
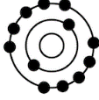


Immune Protective Health Formulation – AstaReal® Positioning

Claim	Reference	Study Design	Participants	Dose	Results	Page #
Supports healthy immune response 	Park J.S. et al. <i>Nutr Metab (Lond)</i> . 2010;7:18.	DBPC	42 healthy subjects	0, 2, 8 mg/day	8 mg/day: higher mitogen induced lymphocyte proliferation response compared to placebo with phytohemagglutinin, Concanavalin A, and pokeweed mitogens ($p<0.05$). 8 mg/day: 17% increase in NK cytotoxic activity vs. placebo after 8 weeks ($p<0.05$) 2 mg/day: ~6% increase in skin reaction area at 72hr in delayed-type hypersensitivity tuberculin test vs. placebo ($p<0.05$)	Pg 4, Fig 2 Pg 5, Table 2 Pg 5, Fig 3
Supports healthy immune response 	Baralic et al. <i>Evidence-Based Complementary and Alt. Med.</i> 2015 (4): 1-9 (2015).	DBPC	40 healthy subjects	0, 4 mg/day	4 mg/day: increased sIgA concentration after 90 days of supplementation vs. baseline ($p<0.05$) 4 mg/day: increased sIgA secretion rate after 90 days of supplementation vs. baseline ($p<0.05$)	Pg 5, Fig 1
Supports healthy immune response 	Hongo et al. 2016. <i>J Clin Ther Med.</i> 32(7)577-91.	DBPC	39 healthy subjects	0, 12 mg/day	12 mg/day: Salivary SIgA concentration stable over the course of 8 weeks in spite of mental/physical stress loads. In contrast, placebo group had decrease in salivary sIgA concentration after 8 weeks vs. baseline ($p<0.05$).	Pg 19, Fig 5
Supports healthy	Park J.S. et al. <i>Nutr Metab</i>	DBPC	42 healthy subjects	0, 2, 8 mg/day	8 mg/day: IFN- γ levels greater in 8mg group (9.55	Pg 6, Table 3

<p>inflammation response</p> 	<p>(Lond). 2010;7:18.</p>				<p>pg/mL) vs. placebo (4.68 pg/mL) after 8 weeks ($p < 0.05$) 8 mg/day: IL-6 levels greater in 8mg group (25.2 pg/mL) vs. placebo (13.6 pg/mL) after 8 weeks ($p < 0.05$) 2 mg/day: CRP levels lower after 8 weeks compared to placebo ($p < 0.05$)</p>	<p>Pg 6, Fig 4</p>
<p>Supports healthy inflammation response</p> 	<p>Baralic et al. Evidence-Based Complementary and Alt. Med. 2015 (4): 1-9 (2015).</p>	<p>DBPC</p>	<p>40 healthy subjects</p>	<p>0, 4 mg/day</p>	<p>4 mg/day: CRP levels did not increase after 90 days of training following 2 hour bout of exercise compared to baseline. In contrast, 57% increase in CRP was observed in placebo group after 90 day training following 2 hr exercise session ($p = 0.05$).</p>	
<p>Antioxidant</p> 	<p>Park J.S. et al. <i>Nutr Metab (Lond)</i>. 2010;7:18.</p>	<p>DBPC</p>	<p>42 healthy subjects</p>	<p>0, 2, 8 mg/day</p>	<p>2 mg/day: Concentrations of plasma 8-hydroxy-2'-deoxyguanosine reduced after 4 weeks and 8 weeks compared to placebo ($p < 0.05$) 8 mg/day: Concentrations of plasma 8-hydroxy-2'-deoxyguanosine reduced after 4 weeks and 8 weeks compared to placebo ($p < 0.05$)</p>	<p>Pg 7, Fig 5 Pg 7, Fig 5</p>

<p>Antioxidant</p> 	<p>Baralic et al. Evidence-Based Complementary and Alt. Med. 2015 (4): 1-9 (2015).</p>	<p>DBPC</p>	<p>40 healthy subjects</p>	<p>0, 4 mg/day</p>	<p>4 mg/day: Prooxidant Antioxidant Balance (PAB) decreased after 90 days vs baseline ($p < 0.05$) attributed to combined training and supplementation effect</p>	<p>Pg 5, Table 3</p>
<p>Antioxidant</p> 	<p>Hashimoto H. et al. Rinsho Ganka (Jpn J Clin Ophthalmol) 65(4): 465-470, 2011.</p>	<p>uncontrolled</p>	<p>35 cataract patients</p>	<p>0, 6 mg/day</p>	<p>6 mg/day: AstaReal® Astaxanthin reduces total hydroperoxides (hydrogen peroxides, lipid peroxides, and peroxides of protein in aqueous humor; $p < 0.05$)</p>	
<p>Antioxidant</p> 	<p>Iwabayashi M. et al. Anti-Aging Medicine 6(4): 15-21, 2009.</p>	<p>Uncontrolled</p>	<p>35 healthy subjects</p>	<p>12 mg/day</p>	<p>12 mg/day: AstaReal® Astaxanthin increases blood biological antioxidant potential (BAP; +4.6%, $p < 0.05$)</p>	
<p>Antioxidant</p> 	<p>Karppi, J. et al. Int. J. Vitam. Nutr. Res. 77(1): 3-11, 2007.</p>	<p>DBPC</p>	<p>39 healthy subjects</p>	<p>0, 8 mg/day</p>	<p>8 mg/day: AstaReal® Astaxanthin decreases oxidation of fatty acids in healthy men ($p < 0.05$)</p>	
<p>Antioxidant</p> 	<p>Hashimoto H. et al. Atarashii Ganka (Journal of the Eye) 26 (2):229-234, 2009. and Hashimoto, H. et al. J. Clin. Biochem. Nutr. 53(1): 1-7, 2013.</p>	<p>Uncontrolled</p>	<p>35 cataract patients</p>	<p>6 mg/day</p>	<p>6 mg/day: AstaReal® Astaxanthin increases superoxide scavenging activity ($p < 0.05$)</p>	
<p>Antioxidant</p>	<p>Yamada T. et al. J. Clin. Biochem.</p>	<p>Uncontrolled</p>	<p>6 healthy subjects</p>	<p>12 mg/day</p>	<p>12 mg/day: reduces total</p>	

	Nutr., 47: 130–137, 2010.		and 6 Sjogren's syndrome subjects		salivary HEL oxidation marker in SS patients (p<0.05)	
Antioxidant 	Baralic I. et al. Phytother. Res. 27: 1536–1542, 2013.	DBPC	40 healthy subjects	0, 4 mg/day	4 mg/day: protection of thiol groups against oxidative modification (increase in -SH groups, p<0.05; improved PON1 activity towards paraoxon and diazoxon, p<0.05 and p<0.01, respectively)	
Antioxidant 	Fujino, H. et al. Medicine and science in sports and exercise. 48. 129. Board #290 June 1, 2016.	DBPC	29 healthy subjects	0, 24 mg/day	24 mg/day: reduced derivatives of reactive oxygen metabolites (d-ROM; p<0.01)	

Immune Function notes:

- B Cell - a lymphocyte not processed by the thymus gland, and responsible for producing antibodies.
- T Cell - a lymphocyte of a type produced or processed by the thymus gland and actively participating in the immune response.
- T cell-dependent (phytohemagglutinin, concanavalin A) and B cell-dependent (pokeweed mitogen) mitogens
- SIgA is an antibody produced by B cells that inhibits the proliferation of pathogens on the mucosa of the oral cavity, airway, intestines, and other organs.

Healthy Inflammation Response

Antioxidant Support