



Natural astaxanthin and immune function support

Our immune system is essential for our survival, it protects us from pathogens such as bacteria, viruses, parasites. It is an incredibly complex system involving cellular and extracellular proteins, plus multiple cell types, tissues, and organs.

Immunodeficiency is a condition in which the immune system's ability to fight threats — for example, pathogenic bacteria or viruses — is compromised. This occurs when the immune system functions inefficiently or fails to function at all. Immunodeficiency can arise due to unhealthy lifestyle, obesity/malnutrition, smoking, excessive drinking, certain infections, and genetic factors, among other conditions.

The most helpful ways to strengthen the immune system and fight off disease include eating a healthy diet high in fruit and vegetables and rich with antioxidants, maintaining a healthy weight, managing stress levels, quitting smoking, reducing alcohol intake, and exercising regularly. There are certain functional ingredients which studies suggest could help in promoting immune resilience, yet are not common in the daily diet of most people.

Astaxanthin, a dark red carotenoid naturally produced by the microalgae *Haematococcus pluvialis*, is one of the most powerful antioxidants known. Much more potent than other carotenoids. It protects cells from both internal and external oxidative stressors. However, the value of astaxanthin extends far beyond its antioxidant properties, recent studies suggest astaxanthin could help support immune function.

One study, published in 2015 in the journal *Evidence-Based Complementary and Alternative Medicine*, investigated the potential of astaxanthin to promote antibody production as well as oxidative and immune function balance. A group of male soccer players received either 4mg of astaxanthin or a placebo for 90 days. Saliva and blood samples were taken before and after supplementation with astaxanthin. Results showed a rise in salivary levels of Immunoglobulin A (IgA) following the astaxanthin supplementation, accompanied with improved pro-oxidant-antioxidant balance [1].

Immunoglobulins (Ig), also known as antibodies, are proteins produced mainly by immune cells and used by the immune system to neutralize pathogens such as disease-causing bacteria and viruses. IgA is an antibody type that plays a crucial role in the immune function of mucous membranes (such as found in the mouth, nose, eyelids, trachea (windpipe) and lungs, stomach and intestines). IgA type antibodies also provides protection against microbes that multiply in body secretions. Lowered concentrations of salivary IgA are associated with an increased frequency of upper respiratory tract infection episodes [2].



Yet another study examined the effect of astaxanthin compared to β -carotene on the production of antibodies by cells of the immune system (peripheral blood mononuclear cells) [3]. Astaxanthin enhanced antibody production in response to stimuli, whereas β -carotene did not have a significant effect on human Ig production.

Preclinical studies also suggest an immune-modulatory role for astaxanthin [4]. Astaxanthin has been shown to increase antibody production *in vivo* in a T-helper immune cell-dependent manner. An increase in the number of antibody secreting cells was also observed [5].

In addition to promoting antibody secretion, results of animal studies suggest astaxanthin could help upregulate cytokines (immune response signaling molecules that orchestrate the body's response to infection). One mouse study revealed that astaxanthin caused significant stimulatory effects on the proliferation response of spleen cells and thymocytes. (Both the spleen and the thymus gland are immune system organs.) The results indicated that astaxanthin could have immunomodulating activities that enhance the proliferation and functions of murine immunocompetent cells [6].

Another mouse study examined the effects of astaxanthin on immune response of splenic lymphocytes [7]. Mice were administered astaxanthin for 2 weeks, thereafter lymphocyte response to lipopolysaccharides (LPS, a molecule found in the outer membrane of bacteria) was tested. Treatment with astaxanthin significantly increased LPS-induced lymphocyte proliferation, as well as production of interferon- γ (INF γ), a cytokine critical for fighting viral and some bacterial and protozoal infections.

The data presented in the studies described above, in addition to other published studies, indicate that astaxanthin supplementation could help support immune response function and resilience to viral, bacterial, and similar assaults.

References:

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