Immune stimulating action of dietary astaxanthin in humans

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We studied the role of dietary astaxanthin on immunity and oxidative status. Female subjects (21.5 yr) with no history of major diseases received 0, 2, or 8 mg astaxanthin (n = 14) daily for 8 wk in a double-blind, placebo controlled study. Blood was drawn on wk 0, 4 and 8. The tuberculin test was assessed on wk 8. Plasma astaxanthin was undetectable prior to feeding but increased ($P < 0.01$) dose-dependently on wk 4 and 8. Dietary astaxanthin stimulated concanavalin A-, phytohemagglutinin- and pokeweed mitogen-induced lymphoproliferation and increased NK cell cytotoxic activity. In addition, astaxanthin also increased the proportion of total T cells and B cells, but did not influence the populations of Th, Tc or NK cells or the ratio of Th:Tc cells. The frequency of cells expressing LFA-1 marker was higher in subjects given 2 mg (42.1%) but not those given 8 mg (30.6%) astaxanthin compare to control (31.8%) on wk 8. No similar dietary effect was observed with ICAM-1 or LFA-3 expression. Subjects fed 2 mg but not those fed 8 mg astaxanthin had higher DTH response than unsupplemented controls. Dietary astaxanthin dramatically decreased blood DNA damage (8-oxodeoxyguanosine) after 4 wk of feeding but did not influence lipid peroxidation in plasma. Therefore, dietary astaxanthin enhanced immune response and decrease DNA damage in human subjects.