Carotenoids

Carotenoids are compounds that can be found in photosynthetic organisms and are often used as pigments or dyes. Most humans and animals are incapable of synthesizing carotenoids and must obtain them through a diet of fruits and vegetables. Structurally, carotenoid compounds consist of a series of terpene units that allow for effective free radical scavenging. As antioxidants, carotenoids exhibit a variety of biological activities and health benefits, including risk reduction for breast cancer, prostate cancer, and gastric cancer.

β-Carotene (C0269) is a red-orange pigment found in sweet potatoes, carrots, pumpkins, and spinach; it exhibits provitamin A activity and can be cleaved into two molecules of vitamin A. β-Carotene intake is associated with reduced risk for amyotrophic lateral sclerosis (ALS), likely due to its ability to reduce oxidative stress, a component involved in the pathogenesis of ALS[1]. High dietary levels of β-carotene are also associated with reduced risk of breast cancer and gastric cancer[2-3]. Administration of β-carotene suppresses the invasive activity of hepatoma cells[4]. In animal models of mammary carcinogenesis, β-carotene intake in a lipid-enriched diet decreases tumor incidence and tumor growth[5].

Lycopene (L9609) is another red pigment with biological activity. Lycopene is found in many red fruits and vegetables such as tomatoes, melon, and grapefruit. Like other carotenoids, this compound is also an antioxidant. Intake of lycopene is associated with protection against UV-induced skin damage; subjects administered lycopene present increases in procollagen I and decreases in MMP-1, two biomarkers of UV-induced erythma[6]. In animal models of liver carcinogenesis, this compound minimizes diethylnitrosoamine-induced decreases in hepatic antioxidative enzyme activity, increases in inflammatory signaling, and activation of mTOR and NF-κB; as a result, the incidence, number, size, and volume of hepatic nodules is decreased[7].

Other carotenoids such as **Capsanthin (C0260)** exhibit additional research applications. This compound decreases expression of IL-6, TNF-α, and MCP-1, suppressing obesity-induced inflammation in adipocytes[8]. This compound also inhibits cell cycle progression and induces apoptosis in leukemia cells, potentially through the upregulation of PPARγ[9].

References:
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