Technical Literature

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Lutein Studies and Skin Health

Several studies in the past few years have reported anti-oxidant effects of several carotenoids and tocopherols. Here are brief synopses of the studies indicating the presence of lutein in skin and the protection it provides from UVR-induced oxidative stress.

Key Conclusions

- Dietary lutein reduces UV-B-induced tissue swelling
- Lutein may protect skin against UV-A or UV-B oxidative stress
- Lutein and zeaxanthin have been detected in facial, cervical/ovarian and bucal mucosal tissues.

2001 Study: A study presented at the 2001 Society of Investigative Dermatology 62nd Annual Meeting by Dr. Granstein from Cornell University examined the effect of lutein in the diet on UV-induced inflammation. Mice were fed diets containing 0, 0.04%, or 0.4% lutein, respectively, for two weeks. The ears of the mice were then exposed to UV-B radiation. The thickness of each ear was measured before and 24 hours after radiation exposure (1).
Results: Ear swelling in response to UV-B radiation was significantly inhibited in the mice fed a 0.4% lutein diet relative to controls.

2000 Study: Stahl *et.al* at the Heinrich-Heine-Universtat in Dusseldorf, Germany, studied the effect of consumption of carotenoids on the prevention of UV-induced erythema in the skin of human volunteers (2).
Results: Erythema (redness) resulting from UV radiation was significantly reduced after eight weeks of supplementation with a carotenoid mixture that included lutein.

1999 Study: Dr. Greenway from the Scripps Clinic in La Jolla, Calif. and collaborators examined the carotenoid composition of normal skin samples removed from six patients with sun-damaged skin during reconstructive surgery (3).
Results: High concentrations of carotenoids, including lutein, were evident in the skin samples. Interestingly, one of the patients had significantly higher concentrations of lutein in skin from the nose. Carotenoids such as lutein may contribute to protection against exposure to UV light.

1998 Study: T. Wingerath and coworkers examined human skin for the presence of carotenol fatty acid esters (4).
Results: These researchers demonstrated that carotenol esters are present in human skin and that they may be formed by esterification of xanthophylls after absorption.

1998 Study: O'Connor and O'Brien, at University College, Cork, Ireland, exposed rat-kidney fibroblasts to UV-A light (5).
Results: Their results showed that lutein, β-carotene and astaxanthin were effective in protecting cells against UV-A oxidative stress in vitro.

1998 Study: At the Centre of Pharmacognosy, University of London, Taylor and Evans investigated the anti-inflammatory activity of lutein in chemically- and physically-induced erythema in rat skins (6).
Results: The addition of 5g of lutein to the skin, after the application of the chemical irritant, inhibited 50 percent of erythema formation. Furthermore, a 52 percent reduction of epidermal cell layers was observed after applying lutein (100 μg/day) to UV-B-treated skin. UV-B light induces hyperproliferation of epidermal cell, which is characteristic of UV-B dermatitis.

1995 Study: At the University of Arizona, Dr. Peng and collaborators correlated carotenoid concentrations in plasma and human skin (7).
Results: These studies showed a significant correlation of carotenoid, retinoids and tocopherol concentrations in the plasma and bucal mucosal cells (BMC) and in plasma and skin. Furthermore, these researchers also found significantly lower carotenoid (lutein, zeaxanthin, crytoxanthin and cis-β-carotene) concentrations in plasma, BMC and skin in smokers than in the non-smokers.

1993 Study: Dr. Peng and coworkers from the University of Arizona developed a method to measure carotenoids, retinoids and tocopherols in human tissue (8).
Results: Traditional saponification methods often destroy some of the micronutrients present in the skin. Using a non-saponification procedure, these researchers were able to quantify lutein, lycopene, α-carotene, β-carotene, retinol, retinyl palmitate, α-tocopherol, and γ-tocopherol in facial skin and cervical/ovarian tissues.

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