

SKIN ANTI-AGING AND ANTI-CARCINOGENIC EFFECTS OF LUTEIN, AND POLYPODIUM LEUCOTOMOS.

N. Philips

Biology and Chemistry/Biochemistry, Georgian Court College, 900 Lakewood Avenue, Lakewood, NJ 08701

Lutein, a carotenoid, and Polypodium leucotomos, a fern extract, are potent antioxidants and anticarcinogenic agents. The extracellular matrix (ECM) maintains the structural integrity of the skin. Skin aging is associated with the degradation of the ECM by the matrix metalloproteinases (MMPs), and reduced cellular response to signals. MMPs are also involved in the metastasis of cancer cells. Identification of agents that inhibit MMPs can be beneficial in the inhibition of skin aging and cancer.

The purpose of this research is to investigate the dose dependent effects of lutein and Polypodium leucotomos on the proliferation and expression of MMP-1 (degrades structural collagen) and MMP-2 (degrades the basement membrane) in normal dermal fibroblasts (early and late passage) and melanoma cells. In-vitro cell passage is thought to mimic in-vivo aging. Fibroblasts and melanoma cells were exposed to 0, 0.1uM, 0.3uM, 1uM, 3uM, and 10uM lutein for 24 hours, and examined for cell proliferation, MMP-1 and MMP-2 protein levels, and MMP-1 promoter activity. Lutein did not significantly alter the proliferation of normal skin fibroblasts or melanoma cells. It inhibited MMP-1, and MMP-2 protein levels, dose responsively, from 0.3uM to 10uM in fibroblast and at 0.1uM to 1uM in melanoma cells. Lutein (0.1uM to 10uM) inhibited MMP-1 promoter activity in normal fibroblasts.

Early and late passage fibroblasts, and melanoma cells were treated with 0, 0.01%, 0.03%, 0.1%, 0.3% and 1% Polypodium leucotomos for 24 hours, and analyzed for cell proliferation and protein levels of MMP-1 and MMP-2. In early passage fibroblasts, Polypodium leucotomos from the lowest to the highest concentrations (0.01% to 1%) inhibited the proliferation and expression of MMP-1 and MMP-2, dose responsively. In late passage fibroblasts, higher concentrations of Polypodium leucotomos (0.1 to 1%) were required to mediate the inhibition of proliferation and MMPs, in

comparison with the early passage cells. Polypodium leucotomos was also effective in inhibiting the proliferation and MMP expression in melanoma cells.

Lutein, and Polypodium leucotomos are effective skin anti-aging agents. Lutein inhibits the MMPs. Polypodium leucotomos inhibits the proliferation and expression of MMPs in early and late passage fibroblasts. However, the late passage fibroblasts are less responsive and require higher concentrations (0.1%-1%) of Polypodium leucotomos for effects, in comparison with the early passage fibroblasts (0.01%-1%).

Lutein, and Polypodium leucotomos are effective anticarcinogenic agents, for the prevention/treatment of melanoma. Lutein at lower doses (0.1uM-1uM) inhibits MMPs, and thereby metastatic potential. Polypodium leucotomos inhibits proliferation and the expression of MMPs in melanoma cells.

Acknowledgements: Dr. Salvador Gonzalez, Massachusetts General Hospital, Boston, MA; and Georgian Court College Students (S. Covert, D. David, A. Ekhelar, D. Gocek, C. Hendrix, C. Inzano, L. Ord, B. Surgent, and P. Wines)

Key words: matrixmetalloproteinases, tissue culture, cell passage, proliferation

Problems or questions regarding this site should be directed to <mailto:ameraging@aol.com>