

Zeaxanthin in Combination with Ascorbic Acid or α -Tocopherol Protects ARPE-19 cells against photosensitized peroxidation of lipids

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The antioxidant action of carotenoids is believed to involve quenching of singlet oxygen and scavenging of reactive oxygen radicals. However, the exact mechanism by which carotenoids protect cells against oxidative damage, particularly in the presence of other antioxidants remains to be elucidated. This study was carried out to examine the ability of exogenous zeaxanthin alone and in combination with vitamin E or C, to protect cultured human retinal pigment epithelium cells against oxidative stress. The survival of ARPE-19 cells, subjected to merocyanine 540-mediated photodynamic action, was determined by the MTT test and the content of lipid hydroperoxydes in photosensitized cells was analyzed by HPLC with electrochemical detection. We found that zeaxanthin-supplemented cells, in the presence of either α -tocopherol or ascorbic acid, were significantly more resistant to photoinduced oxidative stress. Cells with added antioxidants exhibited increased viability and accumulated less lipid hydroperoxides than cells without the antioxidant supplementation. Such a synergistic action of zeaxanthin and vitamin E or C indicates the importance of the antioxidant interaction in efficient protection of cell membranes against oxidative damage induced by photosensitive reactions.

Free Radical Biology & Medicine, Vol. 36, No 9, pp. 1094-1101, 2004