

Short communication

Modulation of UVA light-induced oxidative stress by
 β -carotene, lutein and astaxanthin in cultured fibroblasts

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Received 14 April 1997; received in revised form 16 June 1997; accepted 8 July 1997

Abstract

The ability of β -carotene, lutein or astaxanthin to protect against UVA-induced oxidative stress in rat kidney fibroblasts (NRK) was assessed. Activities of the antioxidant enzymes catalase (CAT) and superoxide dismutase (SOD), and changes in thiobarbituric acid reactive substances (TBARS) were measured as indices of oxidative stress. Exposure to UVA light at a dose intensity of 5.6 mW/cm² for 4 h resulted in a significant decrease in CAT and SOD activities and a significant increase in TBARS. No cytotoxicity, as indicated by lactate dehydrogenase (LDH) release, was observed. β -Carotene (1 μ M), lutein (1 μ M) and astaxanthin (10 nM) protect against UVA light-induced oxidative stress *in vitro* with astaxanthin exhibiting superior protective properties. © 1998 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: UVA light; β -Carotene; Lutein; Astaxanthin; Rat kidney fibroblasts

1. Introduction

There is evidence that certain antioxidants can protect against photodamage induced by UVA light. Increased dietary antioxidant consumption may be beneficial in prevention of UV light-induced damage *in vivo*. Most of the studies have

focused on α -tocopherol [1] and on the carotenoid β -carotene [2,3] as photoprotective agents with little regard for the possible role of other carotenoids. In fact, β -carotene only represents 10–15% of total carotenoids in the plasma [4]. Little is known about the antioxidant activity, and hence possible photoprotective properties, of naturally occurring carotenoids other than β -carotene. However, the structure of all carotenoids is broadly similar and many are be-

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