

## **Inhibition of Ultraviolet B-Induced Expression of the Proinflammatory Cytokines in the Cornea by Fucoxanthin Treatment**

**Keywords:** fucoxanthin, ultraviolet B, corneal disorder

Brown seaweeds are used in traditional Chinese medicine to regulate the energy imbalance, either in the form of an excess or a deficiency of the body's elemental energies in Asia. Fucoxanthin is a carotenoid that is found in common brown seaweed, such as *Hijikia fusiformis* and *Sargassum fulvellum*. Many pharmaceutical properties of this compound have demonstrated. However, the effects of fucoxanthin have not been extensively examined on light-induced corneal disorder in the ocular tissues. Ultraviolet B (UVB) irradiation is the most common cause of radiation damage to the eyeball and is a risk factor for human corneal damage. The experimental rats were intravenously injected with fucoxanthin at doses of 0.5, 5 mg/kg body weight/day or with a vehicle before UVB irradiation. Lissamine green for corneal surface staining showed that UVB irradiation caused serious damage on the corneal surface, including severe epithelial exfoliation and deteriorated epithelial smoothness. Histopathological lesion examination revealed that levels of proinflammatory cytokines, including tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) and vascular endothelial growth factor (VEGF), significantly increased. However, pretreatment with fucoxanthin inhibited UVB radiation-induced corneal disorders including evident preservation of corneal surface smoothness, downregulation of proinflammatory cytokine expression, and decrease of infiltrated polymorphonuclear leukocytes from UVB-induced damage. Moreover, significant preservation of the epithelial integrity and inhibition of stromal swelling were also observed after UVB irradiation in fucoxanthin-treated groups. Pretreatment with fucoxanthin may protect against UVB radiation-induced corneal disorders by inhibiting expression of proinflammatory factors, TNF- $\alpha$ , and VEGF and by blocking polymorphonuclear leukocyte infiltration.