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# View Abstract

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**AUTHORS**

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**Commercial Relationships Disclosure:** Luminita Paraoan: Commercial Relationship: Code N (No Commercial Relationship) | Gunticha Suwanmanee: Commercial Relationship: Code N (No Commercial Relationship) | Daniel Grimes: Commercial Relationship: Code N (No Commercial Relationship) | Ioan Matei: Commercial Relationship: Code N (No Commercial Relationship) | Sirikul Manochantr: Commercial Relationship: Code N (No Commercial Relationship)

**Study Group:** (none)

**ABSTRACT**

**TITLE:** The effects of fucoxanthin on ultraviolet A (UVA)-induced oxidative stress in human retinal epithelial cells

**ABSTRACT BODY:**

**Purpose:** UVA irradiation causes the production of reactive oxygen species (ROS), mitochondrial dysfunction and DNA damage in RPE cells. Fucoxanthin, a marine carotenoid extracted from brown seaweed, is a bioactive compound with anti-inflammatory and antioxidant properties. Fucoxanthin was previously shown to significantly inhibit ROS generation and protect RPE cells from $H_2O_2$-induced oxidative stress cell damage. This study aims to investigate the protective effects of fucoxanthin against UVA-irradiated differentiated ARPE-19 cells.

**Methods:** ARPE-19 cells were differentiated to a physiologically relevant RPE-like phenotype using α-MEM low serum-containing medium, supplemented with 1% N1, 0.25 mg/ml taurine, 20 ng/ml hydrocortisone, 0.013 ng/ml triiodo-thyronine and 10 nM nicotinamide for 4 weeks. Gene expression of RPE markers *RPE65*, *RLBP1*, and *RDH5* was investigated using real-time RT-PCR. To assess the impact of fucoxanthin-induced mitigation of UV cytotoxicity, the cells were pretreated with 1.25μM, 2.5μM and 5μM fucoxanthin for 3 days prior to UV treatment. Subsequently, fucoxanthin-treated cells were exposed to UVA at 40 J/cm$^2$ for 40 min, followed by the MTT assay. Intracellular ROS production and SOD activity were assessed by measuring the oxidative conversion of DCFH-DA to fluorescent DCF using a fluorospectrophotometer and colorimetric SOD activity assay, respectively.

**Results:** Differentiated ARPE-19 exhibited cobblestone morphology and heavy pigmentation, compared with the fibroblast-like morphology and lack of pigmentation in the undifferentiated ARPE-19. RPE-specific markers *RPE65*, *RLBP1*, and *RDH5* in differentiated ARPE-19 were upregulated compared to undifferentiated ARPE-19. After UVA exposure, the cell metabolic activity of ARPE-19 cells was decreased to 35%, while cells pretreated with fucoxanthin at concentrations of 1.25 μM, 2.5 μM and 5μM for 72h showed significantly increased metabolic activity to 50.7%, 58.7% and 81.1% ($p<0.05$) respectively, compared with the untreated group. Pretreatment with fucoxanthin similarly decreased intracellular ROS production compared with the untreated group.

**Conclusions:** The results demonstrate that fucoxanthin has a cytoprotective effect and mitigates UVA-induced damage in differentiated ARPE-19 cells. The findings may lead to an additional strategy for AMD prevention and development of new therapeutic agents.

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**DETAILS**

**PRESENTATION TYPE - PLEASE NOTE, IF YOU CHANGE YOUR PRESENTATION TYPE AFTER APPLYING FOR AN AWARD (BELOW), YOU MUST GO BACK AND RESELECT THE APPLY BUTTON.:**
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**CURRENT REVIEWING CODE:** 3350 Retina/RPE: Biochemistry and molecular biology - BI

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**TRAVEL GRANTS and AWARDS APPLICATIONS**

**AWARDS:**