

Lutein protects HT-29 cells against deoxynivalenol-induced oxidative stress and apoptosis: Prevention of NF- κ B nuclear localization and down regulation of NF- κ B and cyclooxygenase-2 expressions

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Increasing evidence suggests that oxidative stress is closely linked to toxic responses in cells. The tricothecene mycotoxin, Deoxynivalenol (DON), primarily affects cells of the immune system and the GI tract. DON's cytotoxicity is closely linked to intracellular ROS, and it exerts its toxic effect by a mechanism known as ribotoxic stress response, which drives both cytokine expressions at low dosages and apoptosis at high dosages. Studies to alleviate DON's toxicity are sparsely reported in literature. In the present study, the cytoprotective effect of lutein, was tested in HT-29 cells against DON-induced oxidative stress, inflammatory responses and apoptosis. MTT assay revealed IC 20 values of DON at 250 ng/ml. Pre-treatment of cells with 10 μ M lutein resulted in 95% cell viability. Lutein combated DON-induced oxidative stress and downregulated expression of inflammatory genes, NF- κ B and COX-2. Lutein also prevented DON-induced migration of NF- κ B into the nucleus, as measured by immunofluorescence. Electron microscopic studies, cell cycle analysis and upregulation of Caspase-9 and Caspase-3 expressions revealed that DON-induced intrinsic pathway of apoptosis in HT-29 cells. The results of the present study demonstrate for the first time that lutein exerts a cytoprotective role against DON-induced oxidative stress and apoptosis by its antioxidant and anti-inflammatory mechanisms.

Biography

Vijaya Padma received her Ph.D. from University of Madras, India for the work on "Biochemical studies on the effect of fish oil in isoproterenol induced myocardial infarction". She worked as a Lecturer in Kongu Nadu Arts and Science College, Coimbatore for three years. She joined the Department of Biotechnology, School of Biotechnology and Genetic Engineering, Bharathiar University, as a Lecturer in April 2005. She established Animal Tissue Culture and Molecular Genetics Laboratory apart from teaching the Post Graduate students. Now her research group is involved in testing various phytochemicals as cytoprotective agents against toxins - mycotoxins, pesticides, dioxin and also to evaluate their anticarcinogenic, antimutagenic and anti-inflammatory properties. They are also involved in understanding the role of mitochondrial mutations in various disease conditions. She has published several research articles in both national and international peer reviewed journals.

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