Journal of Research in Biology

An International Scientific Research Journal

ISSN No: Print: 2231 –6280; Online: 2231- 6299

Ferulic acid modulates ultraviolet-B radiation mediated inflammatory signaling in human dermal fibroblasts

Authors:
Kanagalakshmi A[1], Agilan B[1], Mohana S[1], Ananthakrishnan D[2], Velmurugan D[2], Karthikeyan R[1], Ganesan M[1], Srithar G[1] and Rajendra Prasad N[1*]

Institution:
1. Department of Biochemistry and Biotechnology, Annamalai University, Annamalainagar – 608 002, India.

2. Bioinformatics Infrastructure Facility (BIF),University of Madras, Chennai-25

Corresponding author:
Rajendra Prasad N

ABSTRACT:

Ultraviolet B (UVB 290-320 nm) participate in the development of the cutaneous inflammatory response which includes a cascade of events that involves increased expression of cyclooxygenase-2 (COX-2), release of tumor necrosis factor-alpha (TNF-α) and other inflammatory cytokines. Peroxisome proliferator-activated receptors (PPARα/γ) are considered to be potential targets for photo protection because they inhibit UVB mediated inflammatory responses. In this study, we investigated the effect of ferulic acid on UVB-radiation induced expression of TNF-α and COX-2 in human dermal fibroblasts (HDFa). Further, the action of ferulic acid on PPARα/γ activation and its binding interaction with these proteins were analyzed by induced fit docking. We found that onetime UVB exposure (19.8 mJ/cm^2) showed significantly increased the expressions of COX-2 and TNF-α in HDFa after 4 h post-irradiation when compared to the control cells. Ferulic acid pretreatment for 30 min before UVB exposure prevented UVB-induced overexpression of these inflammatory markers. It has also been found that ferulic acid activates PPARα/γ expressions in HDFa. Further, induced fit docking analysis showed that there was a greater binding interaction of ferulic acid with PPARγ than PPARα. Thus, ferulic acid exhibits beneficial effects against UVB-induced inflammatory responses probably through down-regulating COX-2 and TNF-α expressions and activating PPARα/γ agonists.

Keywords:

Ultraviolet B radiation, Ferulic acid, Human dermal fibroblasts, Inflammatory markers, Photoprotection.

Journal of Research in Biology