

CURCUMIN, A DIETARY PHYTOCHEMICAL, ACTIVATES CELLULAR ANTIOXIDANT RESPONSE IN HUMAN MYELOID CELLS AT CHEMOPREVENTIVE DOSES

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Background: The evidence linking high levels of environmental pollutants to chronic degenerative diseases is alarming, with heavy metals (HM) identified as a critical factor. Research suggests that certain dietary phytochemicals can reduce HM levels and mitigate their adverse health effects: curcumin (Curc), a natural polyphenol, could act against Cadmium (Cd) toxicity.

Methods and Results: The present study demonstrates that preincubation with low doses of Curc (1 μ M) in differentiated HL-60 and K-562 human myeloid cells can significantly protect against cytotoxicity induced by Cd or H₂O₂. Curc reduced the increased levels of reactive oxygen species (ROS) generated by Cd or H₂O₂ by inducing a protective form of autophagy, a relevant process for cellular homeostasis. Curc activated mild oxidative stress that triggers the expression of Nrf2-dependent transcripts, such as NADPH Quinone Oxidoreductase 1 (NQO1) and Heme Oxygenase (HO1). Free and unmetabolized Curc is detectable inside the cells after 5 minutes of treatment, and its presence parallels with increased levels of intracellular glutathione (GSH).

Conclusions and Significance: These findings indicate that the supplementation of Curc, a natural compound found in turmeric, in the form of nutraceuticals, shows promise in offering protection to frail individuals residing in heavily polluted areas. This approach may help mitigate the adverse health effects caused by heavy metal contaminants in the environment.

Keywords: Curcumin; dietary chemoprevention; ROS; Nrf2/ARE; autophagy

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