J Biochem Mol Toxicol. 2014 Aug 6. doi: 10.1002/jbt.21594. [Epub ahead of print]

Natural Antioxidants Exhibit Chemopreventive Characteristics through the Regulation of CNC b-Zip Transcription Factors in Estrogen-Induced Breast Carcinogenesis.

Chatterjee A[1], Ronghe A, Singh B, Bhat NK, Chen J, Bhat HK.

Author information

Abstract

The objective of the present study was to characterize the role of resveratrol (Res) and vitamin C (VC) in prevention of estrogen-induced breast cancer through regulation of cap "n"collar (CNC) b-zip transcription factors. Human breast epithelial cell line MCF-10A was treated with 17β-estradiol (E2) and VC or Res with or without E2. mRNA and protein expression levels of CNC b-zip transcription factors nuclear factor erythroid 2-related factor 1 (Nrf1), nuclear factor erythroid 2 related factor 2 (Nrf2), nuclear factor erythroid 2 related factor 3 (Nrf3), and Nrf2-regulated antioxidant enzymes superoxide dismutase 3 (SOD3) and NAD(P)H:quinone oxidoreductase 1 (NQO1) were quantified. The treatment with E2 suppressed, whereas VC and Res prevented E2-mediated decrease in the expression levels of SOD3, NQO1, Nrf2 mRNA, and protein in MCF-10A cells. The treatment with E2, Res, or VC significantly increased mRNA and protein expression levels of Nrf1. 17β-Estradiol treatment significantly increased but VC or Res decreased Nrf3 mRNA and protein expression levels. Our studies demonstrate that estrogen-induced breast cancer might be prevented through upregulation of antioxidant enzymes via Nrf-dependent pathways.