[6]-Gingerol induces reactive oxygen species regulated mitochondrial cell death pathway in human epidermoid carcinoma A431 cells.

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Abstract

Since skin cancer incidence and prevalence is constantly rising up the charts despite all efforts, search for newer, better agents for protection and treatment is required. Ginger (Zingiber officinale Roscoe), a monocotyledonous herb, is widely used as a herbal medicine, given the presence of homologous phenolic ketones, of which [6]-gingerol is the major one. The quantity of [6]-gingerol in the fresh ginger rhizome was found to be 104-965 microg/g in common varieties of ginger available in Indian market. Herein, [6]-gingerol was assessed for its anti-apoptotic effects in human epidermoid carcinoma A431 cells. [6]-Gingerol treatment exhibited considerable cytotoxicity as indicated by growth inhibition of A431 cells mediated via generation of reactive oxygen species (ROS). Increase in ROS led to decrease in mitochondrial membrane potential (MMP) and subsequent induction of apoptosis. Results revealed that perturbations in mitochondrial membrane are associated with deregulation of Bax/Bcl-2 ratio at gene transcriptional level as well as protein level, where treatment with [6]-gingerol leads to up-regulation of Cytochrome-c and Apaf-1 subsequently culminating in triggering of Caspase cascade. These firmly suggest that [6]-gingerol can be effectively used for the treatment of skin cancer.

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