Synopsis of Original Research Paper

Activity of Shogaol Derivatives as Antioxidant and Gene Expression Regulator

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Ginger is the rhizome of Zingiber officinale Roscoe, a plant cultivated in tropical and subtropical countries. Ginger extract contains many kinds of constituents, such as gingerol, shogaol, and gingediol, responsible for the pungent taste of ginger and has been know to possess a variety of pharmaceutical effects. The present study was conducted to evaluate antioxidant activities of some of ginger constituents and their synthetic derivatives (thirteen compounds) and to find out novel functions of these compounds in cell. All phenolic compounds inhibited lipid peroxidation of methyl linoleate and low density lipoprotein (LDL). A hydrophilic group at the end of side chain decreased antioxidant activity in LDL. The compounds with longer side chain showed stronger antioxidant activity. A global study of gene expression using DNA microarray in endothelial cell exposed to ginger-related compounds revealed that compounds having α-,β-unsaturated carbonyl, eg. shogaol, strongly induced expression of genes which were regulated by Keap-1/Nrf2/ARE pathway. The side chain effects on gene expression was not as large as observed in antioxidant activity. Nrf2-regulated genes encode cytoprotective proteins against oxidative stress, which may explain a part of pharmaceutical effects of ginger extract.