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Study on the biological activity of canolol in rapeseed oil

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PLENARY TALKS

Rapeseed is one of the most important oilseed crops in China. The low add-value and single form of rapeseed products seriously restricts the development of rapeseed industry. Canolol (4-vinylsyringol) is a main and natural antioxidant phenolic compound extracted from crude canola oil. Compared with other rapeseed polyphenols, canolol not only has strong antioxidant properties, but also 56-83% can be transferred to rapeseed oil, which can significantly increase the oxidation stability of rapeseed oil and prolong shelf life. It is of great significance to explore the biological activities of canolol, thus providing important theoretical support for the development of high-value products and improving the economic benefits of rapeseed. In recent years, we investigated the cellular antioxidant ability and cytotoxicity in HepG2 cells. The results suggested that canolol had desired antioxidant in organism with low cellular cytotoxicity compared to sinapic acid, resveratrol and sesamol. By constructing oxidative stress-induced cell damage model, we found that canolol could effectively inhibited hydrogen peroxide-triggered oxidative stress, and p38 MAPK pathway played the pivotal role during the process. In addition, we explored the anticancer activity on human cervical carcinoma HeLa cells in vitro and in vivo. The results showed that canolol induced apoptosis of HeLa cells and inhibited tumor growth with low systemic adverse effect, accompanying with excess generation of intracellular ROS and lysosome rupture. The results in vitro and in vivo confirmed that MAPK signaling pathways mediated mitochondrial signaling pathway activation were involved in canolol-induced apoptosis. As we known, acrylamide (ACR) occurs in in many cooked carbohydrate-rich foods and has caused widespread attention due to its acute toxicity, neurotoxicity and reproductive toxicity, genotoxicity and carcinogenicity. We further investigated the protection of canolol against ACR-induced cytotoxicity in PC12 cells. The results demonstrated that canolol was effective in reducing ACR-induced cytotoxicity, and the protection was realized via inhibition of ROS generation, mitochondrial membrane depolarization and apoptosis by inhibiting activation of MAPK signaling and mediating autophagy. These works suggested that canolol possesses significant nutrition and potential, which is favorable for enhancing the nutrition value of rapeseed oil.

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