


Cyanidin 3-Glucoside and Peonidin 3-Glucoside Inhibit Tumor Cell Growth and Induce Apoptosis In Vitro and Suppress Tumor Growth In Vivo

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Abstract

Dietary polyphenols, including anthocyanins, are suggested to be involved in the protective effects of fruits and vegetables against cancer. However, anticancer effects of peonidin 3-glucoside have not been clearly demonstrated, with only limited studies being available concerning the inhibitory effect of cyanidin 3-glucoside for tumor cell growth. Therefore, in this study, we have isolated and identified the two bioactive compounds, peonidin 3-glucoside and cyanidin 3-glucoside, from *Oryza sativa* L. indica, to treat various cancer cells. The results showed that, among analyzed cell lines, HS578T was the most sensitive to peonidin 3-glucoside and cyanidin 3-glucoside. Treatment with peonidin 3-glucoside or cyanidin 3-glucoside resulted in a strong inhibitory effect on cell growth via G2/M arrest. Regarding cell cycle-related proteins, peonidin 3-glucoside treatment resulted in down-regulation of protein levels of cyclin-dependent kinase (CDK)-1, CDK-2, cyclin B1, and cyclin E, whereas cyanidin 3-glucoside could decrease the protein levels of CDK-1, CDK-2, cyclin B1, and cyclin D1. In addition, cyanidin 3-glucoside or peonidin 3-glucoside also induced caspase-3 activation, chromatin condensation, and cell death. Furthermore, anthocyanins from *O. sativa* L. indica were evidenced by their inhibition on the growth of Lewis lung carcinoma cells in vivo.