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Fresh red raspberry phytochemicals suppress the growth of hepatocellular carcinoma cells by PTEN/AKT pathway

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ABSTRACT

The red raspberry (*Rubus idaeus L.*) is a common fruit worldwide and its extract has been found to inhibit the growth of many types of tumors, mainly because it is rich in bioactive phytochemicals. However, the mechanism underlying its anticancer activity in hepatocellular carcinoma (HCC) is not well understood. Herein, the aim of this study was to determine the effects of red raspberry phytochemicals on the proliferation of hepatocellular carcinoma cells and to elucidate its biochemical and molecular targets. CCK8 and colony formation ,as well as flow cytometry assays, were employed to determine the effects of red raspberry extract (RRE) on cell proliferation and cell cycle distribution in HCC cells. Our results showed that RRE significantly inhibited cell proliferation and arrested cell cycle progression at the S phase in HCC cells. RRE increased the expression of Phosphatase and tensin homologue (*PTEN*) by reducing the methylation status of the *PTEN* gene promoter and inhibiting *DNMT1* expression and regulated AKT signaling pathway. These findings show that red raspberry phytochemicals inhibit the proliferation of HCC cells by regulating PTEN/AKT signaling pathway, providing evidence that RRE may be used as a potential auxiliary therapy for patients with HCC.