

Propolin G, a prenylflavanone, isolated from Taiwanese propolis, induces caspase-dependent apoptosis in brain cancer cells.

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Abstract

We have previously shown that six propolins, A-F, could be isolated from Taiwanese propolis (TP) and that they exerted a broad spectrum of biological activities. Recently, we isolated a seventh compound, propolin G. Its chemical structure has been identified by NMR and fast atom bombardment-mass spectrometry spectra and was found to be identical to a known compound, nymphaeol C. We used high-performance liquid chromatography to determine the relative contents of propolins C, D, F, and G in TP collected in various seasons and regions and found them to be relatively higher in TPs collected from May to July than from September to October. In our present study, we were interested in the various biological activities of TP extract as well as in propolin G as a pure compound. We found that propolin G could efficiently induce apoptosis in brain cancer cell lines (glioma and glioblastoma). The apoptosis might have been through a mitochondrial- and caspase-dependent pathway. This result demonstrated that the TP collection season was more an important factor than the geographical region. Propolis has been suggested to possess a potent antioxidant activity. We further evaluated the antioxidant property of propolin G using DPPH (1,2-diphenyl-2-picrylhydrazyl). Our results indicate that propolin G does possess free radical scavenging activity. We also evaluated the neuroprotective action of propolin G, TP, and BP (Brazilian propolis) extracts against oxidative stress in rat primary cortical neurons. Our data demonstrate that propolin G and TP extracts have a marked neuroprotective effect that is greater than BP extract. In conclusion, the isolation and characterization of propolin G from TP have demonstrated for the first time that this compound is a potent inducer of apoptosis in brain cancer cells and that this compound and TP extract exhibit a protective effect against oxidative stress in rat cortical neurons.